UNIVERSITY OF SURREY

SCHOOL OF MANAGEMENT

FRAMEWORKS AND MODELS TO IDENTIFY AND INCREASE THE SUCCESS POTENTIAL OF E-SERVICES

by

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PhD Abstract

E-services are one alternative to streamline processes and ICT infrastructures or (partially) automate service-oriented processes without overcompensating for higher integration and relationship costs. The purpose of this thesis is to increase the knowledge of management and life cycle issues for successful e-services in procurement. It is grounded on an extensive case study of a Swiss e-market from 2000-2001 that offers procurement services. The provider and its customers were analysed in terms of their motivations, actions and outcomes. Further triangulation cases were added to validate the applicability of findings. The data was evaluated using a combination of qualitative research methods.

The focus area turned out to be a complex challenge. Different disciplines were touched to be able to capture business, process, ICT and social implications. This was achieved by elaborating and applying a framework that includes ICT, service, innovation and business, process and outsourcing, and social lenses. The results provide fine grained insights into the nature of e-services, their processes from a life-cycle perspective, and identified emergent challenges of e-service management and paths to increase the success from a customer and provider perspective.

The findings building on technical and conceptual possibilities offered by e-services are: (1) different types of e-services require different combinations of resources, organisation, innovation, strategy, and business models, (2) elaboration of a set of shared concepts for e-service development should aid the successful future development, (3) identified sources of failure such as limited learning from customers’ needs and adoption barriers limit the success potential, (4) utilisation of e-services by users is a critical measurement to learn and adapt to customer needs, (5) identification of operational capabilities that foster the success of providers, and (6) the e-service success model combined with the e-service innovation and e-service process life cycle model may aid future e-service developments to achieve success by selectively applying the findings to new contexts.

The thesis strives to increase the body of knowledge on the management and social side of e-services knowing that not all technical hurdles are yet solved. For academia the testing of the findings in similar contexts may increase the reliability, further elaborate or challenge the findings.
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Declaration

I hereby declare that this thesis has been composed by myself and has not been presented or accepted in any previous application for a degree. The work, of which this is a record, has been carried out by myself unless otherwise stated and where the work is mine, it reflects personal views and values. All quotations have been distinguished by quotation marks and all sources of information have been acknowledged by means of references including those of the Internet. Some of the material contained herein has been presented in the form of the following publications:

Editorship:

Refereed Journal Papers Published/In Progress:

Professional Conference Papers Published:

Business Journals:

Book Chapters (academic):

Book Chapters (business):
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<tr>
<th>Abbreviation</th>
<th>Full Name</th>
<th>Source</th>
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<tbody>
<tr>
<td>a:a</td>
<td>Application-to-application</td>
<td></td>
</tr>
<tr>
<td>AR</td>
<td>Action Research</td>
<td></td>
</tr>
<tr>
<td>BCI</td>
<td><em>Business Collaboration Infrastructure</em> (e-service)</td>
<td>Own</td>
</tr>
<tr>
<td>BD</td>
<td>Business Development</td>
<td></td>
</tr>
<tr>
<td>BPML4WS</td>
<td>Business Process Modelling Language for Web services</td>
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<tr>
<td>BPO</td>
<td><em>Business Process Outsourcing</em> (e-service)</td>
<td>Own</td>
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<tr>
<td>B2B</td>
<td>Business-to-Business</td>
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<tr>
<td>B2C</td>
<td>Business-to-Consumer</td>
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<tr>
<td>CRLC</td>
<td>Customer Resource Life Cycle</td>
<td>(Ives and Learmonth, 1984)</td>
</tr>
<tr>
<td>CSLC</td>
<td>Customer Service Life Cycle</td>
<td>(Ives and Mason, 1990); (Piccoli et al., 2001)</td>
</tr>
<tr>
<td>cXML</td>
<td>Commerce XML</td>
<td>Ariba</td>
</tr>
<tr>
<td>CXT</td>
<td>Conextrade AG</td>
<td></td>
</tr>
<tr>
<td>D&amp;M'92</td>
<td><em>DeLone and McLean IS Success Model</em> version 1992</td>
<td>(DeLone and McLean, 1992)</td>
</tr>
<tr>
<td>D&amp;M'02</td>
<td>DeLone and McLean IS Success Model revisited</td>
<td>(DeLone and McLean, 2002)</td>
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<tr>
<td>Ebxml</td>
<td>Electronic business XML</td>
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<tr>
<td>ELPM</td>
<td><em>E-service life cycle process model</em></td>
<td>Own</td>
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<tr>
<td>EPLC</td>
<td><em>E-service provider life cycle</em></td>
<td>Own</td>
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<tr>
<td>ERP</td>
<td>Enterprise Resource Planning</td>
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<tr>
<td>ESM</td>
<td><em>E-service success model</em></td>
<td>Own</td>
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<tr>
<td>http</td>
<td>Hypertext transfer protocol</td>
<td></td>
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<td>I&amp;K</td>
<td>Information and knowledge (e-service)</td>
<td>Own</td>
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<tr>
<td>ICS</td>
<td>Information and communication system</td>
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<td>ICT</td>
<td>Information and communication technology</td>
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<td>IS</td>
<td>Information system</td>
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<td>Information technology</td>
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<tr>
<td>KPI</td>
<td>Key performance indicator</td>
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<td>MRP</td>
<td>Materials requirements planning</td>
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<tr>
<td>p:p</td>
<td>Person-to-person</td>
<td></td>
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<tr>
<td>p:a</td>
<td>Person-to-application</td>
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<tr>
<td>RPC</td>
<td>Remote procedure call</td>
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<tr>
<td>SLA</td>
<td>Service level agreement</td>
<td></td>
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<tr>
<td>SOA</td>
<td>Service oriented architecture</td>
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</tr>
<tr>
<td>SOAP</td>
<td>Simple object access protocol</td>
<td></td>
</tr>
<tr>
<td>UDDI</td>
<td>Universal description, discovery and integration</td>
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</tr>
<tr>
<td>WSDL</td>
<td>Web service description language</td>
<td></td>
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<tr>
<td>WSLA</td>
<td>Web service level agreement</td>
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<tr>
<td>XCBL</td>
<td>Extended common business library</td>
<td>CommerceOne</td>
</tr>
<tr>
<td>XML</td>
<td>Extensible markup language</td>
<td></td>
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1. Introduction to the Intricacies of E-services

Part A: Elaborating the Fundamentals

Part A of the thesis defines the area of focus, which is challenging for a subject that touches many disciplines and is not yet settled. It presents the fundamentals to discuss and analyse e-services. The thesis starts with an introduction to the subject (ch. 1) and discusses the theory basis for the ensuing data presentation and analysis of the data (ch. 2). Chapter 3 elaborates the research methodology and the research methods that were chosen to match the research questions and research goals. Part A closes with the introduction of the key terms and initial frameworks for the further line of argument (ch. 4).

1 Introduction to the Intricacies of E-services

1.1 Initial Situation and Motivation for the Research Area

With the proliferation of Internet technologies as a basis for business practice, a global phenomenon of electronic inter-enterprise networking with a high level of entrepreneurship and innovation started in the late 90s. Since then companies have explored new possibilities to serve their customers and improve their position in their business networks by (re)inventing, (re)designing and automating their processes and the exchange of information. The Internet induced boom phase started with business-to-consumer companies like amazon.com and moved to business-to-business initiatives such as e-procurement solutions of Ariba or CommerceOne. The fast pace of change and excitement about a new inexpensive Internet platform and fast standardisation was followed by a phase of disillusion. The cause of disappointment was that hurdles of the last decades cannot be removed within a few years. Furthermore, information and communication technology alone does not suffice (cf. Carr, 2003). However, fundamental drivers of the phase of excitement continue to exist as the evolution of e-commerce and electronic collaboration is fuelled by the following four trends:

1) The improvement potentials within companies are complemented by a strong focus on realising the inter-organisational potential between businesses building business networks (cf. Österle et al. 2000; Klein, 1996; Brandenburger and Nalebuff, 1996), the emergence of new intermediaries to facilitate electronic commerce (cf. Brenner and Schubert, 1998; Raisch, 2001), and Internet technology driven new possibilities to build interorganisational systems (Bensaou and Venkatraman, 1993).

2) A movement towards services (cf. Quinn, 1992) and outsourcing (cf. Quinn, 1999a; Karmarkar 2004) can be observed. Within service industries, the use of IS is underdeveloped compared to manufacturing industries. Digitalisation of services or their digital coordination is a field, which is not yet fully understood and explored (cf. Rayport and Sviokla, 1995).
information elements of services are in the process of transforming the service industries (cf. Karmarkar, 2004) and a servification of products is reported (cf. Tomiyama, 2001).

3) The once called 'Internet Economy' claims to rely on different rules (cf. Kelly, 1998; Zerdick et al., 2001), which allow for different business strategies. This claim requires validation. Electronic commerce and e-business become mainstream business thinking and should be integrated with general strategy thinking (cf. Porter, 2001). The impact of the Internet is not only to serve as a new inexpensive media for communication. It is a metaphor for advanced technologies, concepts and standards that foster the evolution of new applications. These applications can enable new services, new forms of delivery, new organisational forms, which can have the power to change industry structures and ultimately define the success or failure of companies.

4) Integration between organisations is not sufficiently covered by ERP systems and EAI solutions alone. These systems still require enormous effort to integrate between organisations. Integration facilitators like e-markets position themselves as integrators. Another approach is to apply standardised Web-services as integrating solution and revolutionise the IT-strategy (see Hagel and Brown, 2001).

The above mentioned developments and trends within each area are not yet fully understood when analysed separately. The strategic implications of focusing on core competencies and outsourcing lead to more external partnerships which can be increasingly hybrid or fully electronic in their management and output. Rust and Kannan (2002) foresee the area of e-service as an amalgamation of these trends. This combination of influences defined the special area of concern for which this work attempts to increase the understanding of the interplay of these forces.

1.2 Focus Area of E-services

Perceived relative novelty and a premature state in the academic literature about e-services were present in 1998. A high degree of uncertainty and little common understanding about the concept existed (see ch. 4.2). This thesis strives to bring deeper insights into the nature of e-services by addressing the conceptualisation, development, use and acceptance of e-services for business-to-business procurement. A recent survey by German and Austrian procurement associations in cooperation with Accenture (cf. BME, BMÖ and Accenture 2003) supports the need for a better understanding. According to this survey with 219 respondents from European and US companies, external procurement services will more than double within the next three years. The focus of procurement outsourcing is on indirect goods, such as office suppliers or maintenance, but 22% of the interviewed companies want to outsource the procurement of direct production materials and capital goods as well. Multi-national enterprises are currently using procurement services (31%) and will increase procurement services outsourcing
in the future (67%). The mode of procurement outsourcing is electronic and human based. Of SMEs with less than 1000 employees or a turnover of less than € 500,000 currently only 15% are already using external procurement services and 34% will use them in the near future. The survey suggests that the scope of procurement outsourcing and the usage rises which opens a rich potential to offer procurement services electronically or electronically supported in the form of e-services.

The choice to outsource can be explained since procurement processes were undergoing massive redesign and innovation in the late 1990s due to new Internet-based software and service offerings. It became clear that externalisation of the support of the ordering process via e-markets (e.g. ariba.net or mercateo.com) or reverse auction services (e.g. freemarkets.com) could trigger further processes like logistics or payment processes to be reorganised as well. One possibility to close the electronic workflow gap is to integrate further e-services. The literature on e-services is still diversely discussing the topic from different perspectives and a myriad of definitions and interpretations exists (Appendix E). Service, marketing and information and communications technology (ICT) are among the most frequently taken perspectives (cf. Stafford, 2003). In contrast here a process outsourcing view is applied based on the experience of one action research study. The advantages of the process outsourcing perspective are that change, power and strategic issues gain more weight. Taking a holistic perspective into account provides a richer picture and a better representation of business reality.

E-services might be syndicated via B2B e-markets or offered directly. E-services can be defined here in their most simple form as

*Internet-based, modular software application-enabled services to solve a specific business need. They seamlessly integrate with the business customer's processes and systems via direct electronic interaction.*

E-services can build on the (partial) immateriality of their nature to achieve many positive effects for provider and customer. From an economic viewpoint network and critical mass effects in correlation with standardisation suggest that a follower strategy for an e-service provider cannot be successful. One exception can be a specific niche. In line of this argument actors that can become de-facto standard e-service providers will be able to reap almost monopolistic returns (Arthur, 1994, 3), as they offer the best content or the highest service levels, although they rely on standard protocols and interfaces. The underlying thought is to extend the positive feedback and increasing returns mechanisms researched for technologies, towards e-services (cf. Arthur, 1994; Arrow, 1998; Shapiro and Varian, 1999). It may be possible for e-services that are designed to comply with these principles (see ch. 2.3.5 and 4.2).

The research explores the nature of e-services and how they can be designed and applied to business practice with economic benefits. The research question is how can a higher acceptance and success with e-services be achieved? This research question identifies challenges.
1. Introduction to the Intricacies of E-services

e-service providers were facing and elaborates initial success elements to achieve a higher acceptance. The acceptance on the customer side is analysed and reasoning of challenges, misconceptions, failures and hurdles of early e-services in procurement and potential ways to avoid them is given. The researcher was closely collaborating with one provider of e-services to gain these insights with an internal view of business development. The view of customers was complemented several months later by interviews with existing customers. The external environment of the analysed provider was extended by an interview with a competitor, further e-service providers, and potential customers. Based on this data the thesis comprises the roles of a service provider that of an intermediary re-selling third party e-services and the users of e-services. The researcher was able to explore the situation from a provider, consultant and user perspective complemented by academic discussions and research theories.

The choice of a relevant topic, appropriate research design and methods were required. For achieving rigor and relevance in parallel (cf. Benbasat and Zmud, 1999) an interpretive approach was used. The structured exploration of this field fosters a better understanding of the contingencies and aids researchers in elaborating theories. Decision makers can derive support for selecting and implementing of e-service projects accordingly. Furthermore, it may enable e-service providers and e-service consumers to structure their business development and strategies.

1.3 Case of Conextrade

When looking at the impact the Internet Economy had and continues to have on the business world, one main change was the advent of e-markets (cf. Zerdick et al., 2001). Although discussed more than 15 years ago by Malone and Rockart (1987) as source of efficiency through a 'move to the market' only selected electronic forms were implemented (e.g. electronic broker systems for financial stock exchanges). Widespread awareness and implementations started in 1998.

The national Swiss telecommunications provider Swisscom started with first evaluations and projects in 1997. The B2B e-market project for MRO e-procurement was launched at the beginning of 2000 and officially branded as Conextrade (CXT). CXT has seen itself as a trade enabler offering an e-market transaction platform and as provider of additional e-services. CXT is in the role of delivering its own e-services as well as those of third parties through its position as an intermediary between its customers. It faces the challenge of being a new entrant in existing markets, with new processes and only promised potential efficiencies.

With the high amount of novelty, uncertainty and dynamic changes within the Internet Economy from 1999 to 2001, CXT has proven as an ideal setting for this action research study. Its suitability is high due to the frequent need to reinvent and redesign itself. The situation allowed problems to be identified and solutions to be both sought and implemented in practice.
1.4 Goals and Addressees of the Thesis

The (re)definition of business models, merger and acquisition activities and the integration of e-services were central themes at CXT that helped to shape this work.

CXT needed additional offerings to increase its customer retention and to attract new customers. Central questions to CXT are: Which e-services should CXT offer? Can CXT provide these services by itself? How does one develop e-services? How are these services integrated within the existing processes on a business and technical level? How does one sell these services? Which e-services will customers pay for and how much? Providing answers to these and similar questions is the business relevant purpose of the thesis.

By working part-time for CXT, the author had insight to shape ideas and to test findings. Topics that permanently keep management attention were the redefinition of the business model, screening of new partners, new software solutions and standards, and refining the service development processes. Further case studies provide examples of the challenges and results of evaluating e-services in the areas of logistics. Apart from the conceptual and technical challenges, the biggest hurdle has been change management required at CXT, as well as its partners and customers, as they require time to learn and accustom to a new environment and business logic (cf. Drucker, 1994).

1.4 Goals and Addressees of the Thesis

The purpose of this thesis is to identify challenges of inventing, managing, and selling e-services in inter-organisational business networks. It aims to increase the understanding what e-services are and what sound and practically proven concepts and models can be proposed to identify, manage, run and use e-services successfully. An analysis of customers using early e-services and lessons for e-service providers processes were accumulated to achieve these goals within the focus area of procurement. It follows the research goal of Ulrich (1984a) who postulated that research is to lead to action in both, academia and business practices.

The customers of e-service in this context are businesses who are directly involved in the procurement process, such as buyers, sellers, and intermediaries, enabling trade, information, logistics or financial service provisioning. The insights from one central case are compared with the perception of customers, competitors and with literature. The analysis covers the social and technical perspective and strives for a sound assessment of the status quo, learnings, and future challenges in this area.

The exploration of this complex and new application of service-oriented information systems is intended to discover ways to improve the procurement processes. The intended audience for this thesis includes academics and practitioners that are interested in understanding the contingencies between process-oriented e-service invention, service engineering, implementation and monitoring their performance. It elaborates concepts, frameworks, and models that can be
transferred to applicable similar contexts to achieve this. The thesis provides insights into the practical hurdles and gaps based on empirical experience in one specific context, as well as ways in which these may be overcome.

For business, it is primarily of interest to project managers and decision makers in the role of developing an e-service for inter-organisational purpose or for potential customers.

1.5 Overview of Results

The thesis aims to bridge the gap between research, software provider’s, e-service provider’s visions and business realities during the study undertaken in Switzerland. The information acquired is utilised to define frameworks and models to describe the cases and increase the understanding of success with e-services. The thesis identifies critical elements and proposes context specific design recommendations during the e-service life cycle. Further, concepts are elaborated to clarify language misunderstandings, political challenges and handle strategic, process and resource changes. The proposed concepts can be used to manage the life cycle of e-services and to identify success elements, models and measures that will lay the basis for achieving better performance in future projects. This mutual knowledge transfer was achieved by working closely together with business practice.

The initial success model was used to analyse the CXT’s e-service performance from a customer viewpoint. E-services turned out to be complex with only a vague shared understanding. The classification into full and hybrid e-services helped to be more specific. Full e-services require a high e-service readiness of the customers, whereas hybrid e-services require active monitoring and management of the usage of the e-service.

Emergent results are that (1) customer needs should be addressed fully by establishing learning mechanisms to cope with complex and fast changing environments, (2) successful e-service providers should possess selected capabilities, and (3) a management tool to roll-out, monitor and adapt e-services can be recommended. Appendix K adds excerpts of a reality tested ‘handbook’ on how to invent and use e-services based on theory and practice.

1.6 Structure of the Thesis

After this brief introduction to the thesis chapter 2 presents the theoretical foundation for the enfold ing discussion. It covers academic and selected business practice approaches to the phenomenon of e-services. The chapter integrates theories and concepts from five different lenses to describe elements of the life cycle of e-services. The constituting lenses of ICT and service theories are discussed first. Consecutively, the innovation and business, process and outsourcing, and the socio-political lenses are elaborated. This input together with the data shapes the area of concern; the framework of ideas as well as the chosen methods (see ch. 3). Chapter 3 covers the research goals, research questions and methods. The approach presented starts with existing literature and uses principles of grounded theory to refine the concepts.
The first results were exposed to practice following action research intervention. This iterative design was used in the CXT study to enable learning and elaborate the concepts. Qualitative interviews were used to collect data about CXT’s customers and additional triangulation cases. The second part of the chapter describes the data collection and analysis processes.

Chapter 4 lays the conceptual foundation of the thesis. It introduces the main actors and their generic goals within the context of e-services. The chapter presents a working definition and the e-service framework to categorise e-services. The categorisation is used to present and analyse data in the following chapters. Success measurement models are introduced and discussed in the context of e-services.

Chapters 5 and 6 describe the data and build on the terms defined in chapter 2 and 3. In addition to the study of the central case of CXT, customers of CXT were interviewed. In chapter 6 additional cases of e-service providers are used as rival cases to provide some external validity and to explore further areas. Moreover, they are required to apply previous research findings or test if explanations are still meaningful when conditions and contexts vary (see Strauss and Corbin, 1998, 147).

Chapter 7 develops the emergent concepts in the life cycle of e-services. The purpose is to identify critical elements when inventing and developing e-services. The concepts of e-service invention, business concepts and e-service engineering are proposed. The chapter closes with an overview on the need for procedures to avoid some of the identified problems of the cases. In Appendix K the techniques are described, which combine the concepts towards actionable steps by proposing procedures. They provide practical recommendations to solve the business problems identified in the context of the CXT case and others.

Chapter 8 starts with a discussion of the findings ordered along the e-service success model. It is a respecification of the DeLone and McLean IS success model (1992) that is adapted to the application area of e-services. The chapter discusses the literature used and reflects upon the case data. The data is used to apply and refine the model and deduce implications for the e-service provider.

Chapter 9 discusses emergent themes from the case data from the provider’s perspective. The key themes identified as success enablers are: (1) adequate communication and learning from customers, (2) management of and monitoring of utilisation, (3) capabilities of e-service providers are. First ideas on the strategy for e-services can be found in Appendix J.

Chapter 10 summarises the findings of the analysis chapters 7, 8 and 9. It combines the elaborated insights to answer the research questions in a concise form. It provides reasoning why e-services were not offered and adopted by users to a larger extend based on the analysed data. The chapter closes with an indication that might guide future research and help future initiatives to build successful e-services.
2 Theoretical Foundations of E-services

This chapter introduces and discusses the theoretical basis which, in addition to research data and practical experience, has influenced the area of concern and the author's framework of ideas. The theories were initially derived from the research question and literature to enrich the researcher's understanding. Since it will be argued that there is no single theory applicable to e-services as emergent phenomena (see ch. 3), an analysis framework is developed and used to integrate different aspects into five relatively disjunctive lenses. The purpose is to provide a more complete overview in order to avoid reductionism and fragmentation which is a common human reaction to cope with complexity (cf. Dorner, 1997).

The basic design was driven by a systems theory and cybernetics approach, which is used as a 'new "language" which allows synergetic interaction between different disciplines thus increasing the possibility of innovative, transdisciplinary solutions to complex issues' (see Schwaninger, 2000b, 208). The system elements of e-services are defined from a nomological perspective through the constituting elements of ICT ('ICT lens') and service theories ('Service Lens'). The constituting elements present a selection of relevant theories to improve the understanding of the nature and peculiarities of the constituting research disciplines for e-services.

The system element view is complemented by a system behaviour view on e-service enriched systems. The decisions of the management on the system's purpose are covered in the 'Innovation and Business Lens'. It contains the deliberate design of the system competencies, its goals, and deliberately planned strategy (cf. Quinn, 1991). The management decisions are followed by the decisions on the system structure and intended behaviour ('Process and Outsourcing Lens') that define the 'how the system works'. This lens integrates the organisational structure and process view similar to Schwaninger's view (2000b). Finally, 'soft factors' emerged during the work with business practice in in-depth studies and during the data analysis. It required an expansion of the theory basis towards the social side which is not sufficiently covered in control and design oriented systems theory and cybernetics (cf. Malik, 1992; Schwaninger, 2000b). The 'Socio-political Lens' aggregates political, cultural, and change issues together with learning and trust issues since these were more prevalent and dominant than originally expected. The theories grouped in this lens are characterised by only limited purposeful design influence on individual and group behaviour through management action, interorganisational conflicts, and elusive social dynamics. The theories allocated to the lenses were used to understand and analyse the data or plan interventions. The proposed lenses aid the structuring of the data collection and analysis (see Figure 2-1).
The extended intuitive systems theory and cybernetics based framework can be corroborated by identifying similar perspectives taken by other integrative management or change approaches from a business and IT strategy background (see Bleicher, 1996a; Schwaninger, 2000b; Scott-Morton, 1991; Silver and Markus, 1995; Hsiao and Ormerod, 1998; Prastacos et al., 2002). Figure 2-2 shows other authors' similar approaches and that the lenses seem to be complete.

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<td>(1) IT Infrastructure</td>
<td>(1) IT Technology</td>
<td>(1) Enabling IT</td>
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<td>(2) Service</td>
<td>Not explicitly covered by any of the analysed integrative approaches.</td>
<td>(2) Strategy</td>
<td>(2) Strategy</td>
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<td>(3) Innovation &amp; Business</td>
<td>(1) Activities (Mission, Program)</td>
<td>(1) Activities (Corp. Policy, Strategy)</td>
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<td>(5) Socio-political</td>
<td>(3) Behaviour (Culture, Cooperation...)</td>
<td>(3) Behaviour (Culture, Capabilities)</td>
<td>(5) Individuals and Roles (7) External socio-economic environment.</td>
<td>(4) Structure, and Culture (5) External environment</td>
<td>(5) Individuals and Roles</td>
<td>(5) Human Capital</td>
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*Figure 2-1: Five lenses research framework and theoretical elements applied*

*Figure 2-2: Comparison of the five lenses with other integrative approaches*
If e-services are introduced in business an encompassing change perspective to guide the theory review and to complement the empirical data is appropriate. The constituting two lenses focus on the foundation of e-services as 'change initiator'. The remaining three complementary lenses focus on the context to change. The argument of Hsia and Olmerod (1998, 27) that an unbalanced approach focusing solely on one aspect (e.g. technology) or only static and linear aspects would not be suitable to encompass the dynamic and contingent nature of complex change. Their argument can be cautiously transferred from the IT-enabled change to the e-service enabled change domain.

The five lenses include the external environment which adds elements in the models of Scott-Morton (1991) and Silver et al. (1995) by adopting an open systems view. In contrast to the other cited approaches the service lens is added. It is assumed to be of relevance in the context of e-services to be able to understand the specifics of services to avoid over generalisations and forms a basis for the e-service management. Services are not positioned separately by other integrative frameworks because they originate from general business and IT research domains. The socio-political lens is required to be able to depict complex change (cf. Hsiao and Ormerod, 1998). The logic for integrating the often separately treated dimensions of process and structure (see Figure 2-2) is that in the context of outsourcing to external e-services both decisions are made simultaneously. Therefore a separation into two lenses does not seem to produce additional insights, if both are developing in parallel. The comparison with other approaches indicates that relevant dimensions were taken to describe IT-enabled change. The five lenses order the discussion of deduced as well as emergent theories that are suitable to elaborate frameworks and models and their relationships applied to serve the purpose of the thesis. They enrich the inductive and data driven approach (see ch. 3).

The chapter begins with an analysis of the elements constituting e-services. It examines issues through the ICT lens and elements of related theories, which represent the basis of the 'e' in e-services. The service lens explores traditional services and analytical approaches to providing electronic services. Both lenses form the basis for describing e-services in the complementary lenses of innovation and business, process and outsourcing as well as from a socio-political lens. It corresponds to Bleicher’s approach (1999, 72), who defines integrated management from the viewpoints of activity, structure, and behaviour. It starts with a review of aspects relating to innovation and business, which include strategies and policies (activity). The process and outsourcing lens details the focus area of procurement processes, life-cycle aspects of e-services and outsourcing (structure). The final lens represents the socio-political dimension of e-service implementations (socio-political behaviour), which contains behavioural issues within the organisation and its interactions with its environment. This section focuses on eclectically presenting key theories and implications as basis for the argumentation presented in subsequent chapters.
2.1 Information and Communication Technology Lens

The application of information and communication technology can cause several positive effects. It is argued that ICT has an impact on productivity and profit (cf. Hitt and Brynjolfsson, 1996), the size of firms (cf. Brynjolfsson et al., 1994), the form of inter-organisational coordination (cf. Malone et al., 1987; Zwass, 1996), that it can allow for new business models (cf. Timmers, 1998) or increase the degree of automation and the availability of information (cf. Zuboff, 1988) to name a few of these effects. This lens explores some of the effects, architectures, and technologies which are relevant to support e-services.

Starting with fundamental information and communication theories, generic cybernetic models and the nature of information systems in organisations, this section elaborates the architectures and components of e-services. This forms the groundwork for the further exploration of e-services and the sections on the data collection and analysis.

2.1.1 Information and Communication

One of the drivers of the e-business euphoria was the availability of the Internet and its potential to explore 'new' business opportunities (see Porter, 2001). The innovation of the browser made the benefits of a World Wide Web transparent and was the first easy-to-use application to access the Internet. The following activities served to fuel a hype phase, which ultimately encouraged a loss of realism. The basic terms and elements are discussed upfront before the potential impacts of this development for e-services are investigated.

According to Szyperski, information and communication have the character of 'Siamese twins', which justifies their simultaneous treatment. Coenenberg defines communication as the transfer of information from a sender to a receiver via a channel (see Zerbe et al., 1995, 6). The syntactical communication model by Shannon/Weaver (1949) describes the communication process based on signals and interferences through noise (see Picot et al., 2001, 91). Different models, standards and procedures have evolved to describe and conduct communication in natural language between persons, Graphical User Interfaces (GUI) between ICT and persons, and between computers (e.g. ISO-OSI model). The communicating actors are persons (p) and computers, applications or intelligent devices (a). Their combinatorial relationships can be formalised as p:p, p:a, and a:a.

Luhmann (1994, 102) defines information as an 'event that selects the system status. Information requires structures, is however not a structure in itself, but rather the event that updates the use of structures'. Beer (1997) defines information similarly as being dynamic and aimed at triggering some form of activity at the receiving end.

The standardisation of ICS can harmonise their behaviour to information, whereas it is only possible to influence persons via education. This particular characteristic of information is a criterion which sets it apart from data, which is a structured representation of received sym-
bols without attributed meaning or simple unqualified facts (Berners-Lee, 1999, 71). Due to the event character, information triggers a number of activities which lead to new information (changed system status) and/or new activities. Information has model character and is immaterial although it requires physical transportation technology or storage media for transmission or storage purposes (duality of information) (see Wigand et al., 1997).

The counter positioning of the nature of information and material resources provides insights into the different mechanisms and rules of the so called ‘Information Economy’ (cf. Martiny and Klotz, 1989; Krcmar, 1997; Choi et al., 1997) (see Appendix C). The separation of information from the physical world, as well as the differences in the nature of information with its dynamic and subjective characteristics, indicate that the set of rules applicable to the handling of information differs from those relevant for material resources. It can be concluded that a transformation from a physical product or a physical storage to an information product can change the production, distribution and coordination considerably which is can be a rich area for innovation.

2.1.2 Semiotic Perspective on Communication

By assuming the interdisciplinary semiotic communication perspective, one can analyse the close interrelatedness, which discerns data and information by the impact it has on the receiver (cf. Stegu, 1998, 114). Semiotics is the science, which studies the role of signs as part of social life as defined by the Swiss linguist Saussure (1916). He defined the layers of syntax (formal or structural relations between signs or words), semantics (relationship of signs or words to what they stand for or their meaning), and pragmatics (the relation of signs to interpreters or intention). Fleisch’s (2000, 145) classification is embedded in the framework of Swagerman et al. (2000) to assess the impact of integration options and requirements to achieve a seamless coordination between business units (see Figure 2-3). Physics describe the infrastructure for ICT or phonetics for an exclusively human language processing. Empirics describe the coding pattern or phonology for human coding. The social and pragmatics layer are combined into the pragmatics layer as, the delineation is too vague. It serves as unifying framework for comparing ICT with human based communication and information processing.

<table>
<thead>
<tr>
<th>Level of Communication</th>
<th>Object of standardisation aimed at facilitating coordination</th>
<th>Example in e-business</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pragmatics</td>
<td>Shared understanding, commitment, internal behaviour</td>
<td>Global virtual communi-</td>
</tr>
<tr>
<td></td>
<td>Expressing intentions and actions in accepted processes</td>
<td>ties, ebXML, BPSS</td>
</tr>
<tr>
<td>Semantics</td>
<td>Agreed objects and content of business documents</td>
<td>xCBL, cXML, ..</td>
</tr>
<tr>
<td>Syntactics</td>
<td>Computer languages, message structures, protocols</td>
<td>TCP/IP, https, Java</td>
</tr>
<tr>
<td>Empirics</td>
<td>Codes, patterns, objects for technical transport</td>
<td>Digitalisation of data</td>
</tr>
<tr>
<td>Physics</td>
<td>Material infrastructure and signals</td>
<td>Router, computer chips</td>
</tr>
</tbody>
</table>

Figure 2-3: Semiotic levels for communication
The complexity rises from the physical layer to the pragmatic layer. This explains why standardisation is developed bottom up. The main differentiation to the traditional communication lies in the capability of leveraging the unique properties of electronic media in the lower three layers. These are reproducibility at no cost and changes do not require a total recreation (cf. Choi et al., 1997). Further advantages usable are the digitalisation and indestructibility of digital information that results from the low error rate of digital encoding (Choi et al., 1997). On the syntactical level the integration through standardised languages and protocols facilitates to the access, exchange, manipulate and store complex structures through lower prices of software implementing the standards. With the advent of standards at the semantics and pragmatics layer (see Figure 2-3 for examples) further efficiency gains in time, space, and money are possible (cf. Swagerman et al., 2000).

One key success factor is to leverage these efficiency gains and establish shared meaning (semantics), shared understanding on action, context and shared norms (pragmatics). The application of the framework has its limits since the layers are not easily separable in practice (see Riehm, 1997, 51). A further hurdle is that an agreement between all actors and on all layers is required to achieve ideal flexible electronic transactions in business networks.

The semiotic framework can be used to visualise the need, demand for, and supply of information that defines the information processing task from a human perspective. Human information processing defines the information demand. This has to match objectives and tasks (information need). The information supply is a complex process that can be computer supported (see Figure 2-4).

![Figure 2-4: Information process cycle (see Horvath, 1994)](image)

### 2.1.3 Systems Theory and Cybernetics

The information exchanging objects are single instances of persons or computers or their combination as systems. Ulrich (1970, 105) defines a system as an 'orderly set of elements,
between which some kind of relationship exists or can be created'. Elements can consist of sub-elements or can be part of super-systems (recursive character). The system boundaries are defined by the subjective purpose of the investigator (cf. Beer, 1981). Relationships between elements describe the interdependencies between elements. The structural view describes system elements and relationships, whereas the system behaviour describes the dynamic view of interacting elements via their relationships.

From an outside view a system is an input-output system, which supports the definition of boundaries towards its environment. The inside view consists of the structure and behaviour of the elements and sub-systems, which defines an automaton with state-transition diagrams (see Ferstl and Sinz, 1993, 17). Applied to socio-technical organisations, systems theory can justify the delegation of tasks and the building of organisational units (see Malik, 1992, 82) to manage the complexity. Complexity is the property of a system, which is able to adapt to a large number of states or behaviours. Variety is a measure of complexity, which is definable by 'the diversity of and configurations of the states of systems that are generated by the interaction of the latter and their elements' (see Malik, 1992, 186).

To manage this complexity, Wiener (1948) defined cybernetics, an interdisciplinary approach, as 'science of communication and control in the animal and machine' (see Beer, 1985). Cybernetics places high importance on information, control systems, modelling, general rules, and principles that apply to all kinds of systems on any level of aggregation. The basic principles of cybernetics are feed forward control, feed back control and combinations in complex systems (cf. Ferstl and Sinz, 1993; Schwaninger, 2000b; Huch et al., 2004, 229ff). Simple feedback-control mechanisms have the following major problems: (1) latency of the feedback can cause the correction to aggravate the problem; (2) variety of the controller is smaller than the variety of disturbances; and (3) a controller can only be controlled by a higher controller, which requires interconnected horizontal and vertical control systems. The cybernetic perspective helps to use a consistent and understandable language when relatively new fields and many areas of science will be touched. This simplicity and its universal applicability (cf. Beer, 1981) helps to analyse and structure business networks as well as assists building ICS architectures. ICS provides a potential to better manage the complexity of internal and increasingly external business relations. Systems theory provides a sound basis for analysing the structural and behavioural aspects of ICT as well as the social elements of real organisations.

Combined with the definition of a model as 'a system that represents another system in a goal-oriented way' (see Ferstl and Sinz, 1993, 18), these foundations can describe companies, information systems, and social systems. According to Grochla (1975) a company can represent an open system consisting of an information system and a basis system that generates the output. When one adds the cybernetic governance and feedback-control mechanisms, a basic
throughput system, and the information system as a model of the throughput system a simplified cybernetic view of the enterprise emerges (see Figure 2-5).

![Figure 2-5: Model of an enterprise and cybernetic elements (according to Ferstl and Sinz, 1993)](image)

In this sense information system provides a model to operationalise the separation of the information and physical worlds and lays the basis for the representation and computability of the information. Information systems can coordinate or control the physical world via a model of it and sensors and actors to interact with it. Additionally, IS can produce outputs in the form of information products (see ch. 3.2) or present information to human actors. The degree of automation varies between little to full automation. The effects of ICSs are according to Applegate (1994) based on the work of Zuboff (1988) that they can automate tasks, inform human actors and integrate with other systems. Applegate’s integrating function is most relevant to support interorganisational Business Networks (cf. Österle et al. 2000).

A more elaborated view is the Viable Systems Model (VSM) of Beer, which has been applied to the business world (cf. Schwaninger, 1994a; Malik, 1992; Espejo and Schwaninger, 1996). It consists of several hierarchical and horizontal feed-forward and feed-back regulatory systems derived from the human nervous system (cf. Malik, 1992). The VSM can be used to identify governance deficiencies in existing organisations and propose improvements. Schwaninger applied cybernetic principles to different management layers and connected them with generic goals, design parameters and control variables in the model of systemic control (2000b). Based on the St. Gall Management Model an operative, a strategic and a normative level depict the system 3, system 4 and system 5 of Beer’s VSM. The three layers are connected via feed-back and feed-forward control mechanisms and propose structure, goals and design parameters to manage complexity and be able to self-control and self-develop.

2.1.4 Role of ICT and its Impact on Business Organisations

Enthusiasts see information technology as major organisational problem solver, which increases the organisations’ capacity to cope with external and internal complexity and improve
their performance (see Galbraith, 1977). More recent research suggests that this causal relationship is not existent (cf. Kling, 1980; Carr, 2003). Instead some authors argue the impact of ICT is context bound and dependent on social acceptance (cf. Lyytinen, 1987).

Information and communication technologies (ICT) are the basic infrastructure that drives inter-organisational and organisational use of information systems and management. Further, the term information and communication system (ICS) is used to address the computer-based information-processing infrastructure of enterprises. In contrast, the term information system (IS) is more encompassing and includes both human and machine based systems.

The task of information management for a single enterprise focuses on managing the information supply. It comprises (1) management support in the design of the human and ICT based IS, (2) operational management of integrated application systems in cooperation with business functions, and (3) management of the ICT infrastructure (see Ferstl et al., 1996).

The role of ICT has changed within the last 15 years. The impact on businesses increased due to a wider application in scope and content (see Figure 2-6). The possible positive and negative effects of ICT in organisations can be achieved if ICT is used diligently to support or substitute the human task fulfilment of business processes.

<table>
<thead>
<tr>
<th>Old Role (until 1990s)</th>
<th>New Role (from 1990s-today)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metaphor</td>
<td>Partner-Partner Relationship (Willson, 1994, 344), (Ferstl et al., 1996, 15) for task fulfilment</td>
</tr>
<tr>
<td>Monetary view</td>
<td>Strategic investment (Venkatraman, 1991, 122)</td>
</tr>
<tr>
<td>Scope</td>
<td>Integration (process based, function and organisation spanning)</td>
</tr>
<tr>
<td>Objective</td>
<td>Additionally ‘informating’ (Zuboff, 1988), ‘integrating’ (Applegate, 1994, 37), transformation enabler (as supplement or for new products and services) (Venkatraman, 1991, 154), new possibilities to design information and communication relationships for increased flexibility (Wigand et al., 1997)</td>
</tr>
<tr>
<td>Advantages</td>
<td>Additionally enabling new organisational forms (Wigand et al., 1997); (Rockart and Short, 1991, Venkatraman and Henderson, 1996, 7), new strategies (Wigand et al., 1997), new business rules (Shapiro and Varian, 1999, Hamel, 2000)</td>
</tr>
</tbody>
</table>

Figure 2-6: Overview on the role change of ICT

Depending on the nature of the output and industry different IS applications can be used to gain competitive advantage. For digital products the separation of information from the physical world as described by Rayport and Sviokla (1995) becomes increasingly possible (see Figure 2-7). The virtual world defines its own value chain and needs to use the characteristics of information (see Appendix C). They present a model that shows the potential to decompose
2.1. Information and Communication Technology Lens

digital products into an infrastructure dimension, a context dimension, and a content dimension.

![Diagram](Image)

**Figure 2-7: Effects of ICT on as seen by Rayport and Sviokla**

The authors use these dimensions to highlight the differences between (physical) conventional and digital markets. In the (digital) market space all three layers can be object of individual services (see Rayport and Sviokla, 1994), which explains, why many new electronic services might evolve. The higher the value of content and use of information, the bigger is the leverage of its unique characteristics.

Newer research suggests that a key factor is the integration of the physical components (cf. Raisch, 2001, 235) to better manage the physical value chain. Instead of using ICT models of the physical world auto identification technology enables the collocation of physical output and information technology. The rising challenge is managing and coordinating the physical and virtual world via intelligent cooperative IS. Remote frequency identification (RFID) technology is a development towards collocation of data storage and processing. RFID helps to provide real-time information about the location and status of things. It enables new innovative processes and e-services (cf. Fleisch and Dierkes, 2003).

2.1.4.1 Impacts of ICT on the Flexibility of Organisations

The impact of ICT on organisations is an important and well-researched area (cf. Hitt and Brynjolfsson, 1996; Zerdick et al., 2001). Among those, two research findings point towards conditions and impacts of increasing the flexibility of organisations through the use of ICS.

An approach that focuses on the impact of ICT on the organisation and human actors is that of applying structuration theory on technology (cf. Orlikowski, 1992), which bases upon the work of Giddens (1984). Giddens discerns the institutional realm from the human action mediated by the modalities of structuration. The modalities of Giddens are interpretive schemas, resources and norms. It is argued that information technology is subject to interpretive flexibility. It depends on the individual how he understands and uses ICT. Orlikowski builds on insights of Barley (1986) with computer tomographs in hospitals. Further, she elaborates that
mutual influences exist between ICT, humans and the organisational context. ICT can change but is also subject to change by the organisational context (see Figure 2-8). Orlikowski coins this term the duality of technology which emphasises the power to influence but also to be influenced by the context it is used in. The relationships between ICT, humans and business networks are defined by mutual influences, which require a full understanding of the mechanisms before achieving desirable changes. Recent research focuses on the design of architectures to meet the flexibility requirements of e-business (cf. Legorreta et al., 2001).

Lucas and Olson present a framework to highlight the impact that ICT has on the flexibility of a company (1994, 158). They focus on the input-output relationship in time. They identified that ICT can have direct positive and negative first-order effects. After its implementation, second-order effects can arise. Their list of potential effects highlights that the achievement of required flexibility gains depends on the environment and the deployment of ICT technologies. The negative effects can function as checkpoints, before choosing an ICT solution in order to understand its total impact on the company and its business network in its deployment life cycle (see Figure 2-9).

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**Figure 2-8: Structuration theory applied to ICT and organisations**

**Figure 2-9: Impact of ICT on the flexibility of organisations**
2.1.4.2 Impacts of ICT on Success and Performance

One of the early definitions of success for ICT-based systems started in the late 70's with a paper of Mason (1978) on measuring the output of IS. Mason uses the Shannon and Weaver communications theory (cf. 1949) and semiotics (see ch. 2.1.2) to define a technical, semantic, functional, and pragmatic level of output as well as corresponding output measures. The academic discussion then continued with a paper of DeLone and McLean (1992) that summarised the status quo of different research approaches and proposed an integrated success model with six dimensions called the DeLone and McLean IS Success (D&M’92) model. The paper stimulated an academic discussion about the success models and the empirical validation of their model (see ch. 4.4 for a more details). The original authors published two further papers reviewing the responses and extending the model (DeLone and McLean, 2002; 2003). In a recent paper they applied it to e-commerce settings (see DeLone and McLean, 2004).

A contribution that extends the influences on individual impact of the D&M’92 model can be Goodhue’s and Thomsons’s (1995) Technology-to-Performance Chain (TPC). The introduction of the task-technology-fit and its influencing factors of task and technology characteristics can be relevant enhancements of the D&M’92 model in the light of this thesis. The model focuses on the individual performance and addresses voluntary, partly voluntary and mandatory use of IS. In cases of voluntary use utilisation research fits (cf. Cheney et al.; 1986, Davis; 1989; Davis et al., 1989; Doll and Torkzadeh, 1991) and in cases of mandatory use the task-technology-fit might be a useful enhancement (cf. Benbasat et al., 1986, Dickson et al., 1986). Cooper and Zmund (1990) identify a causal linkage from task technology-fit to utilisation in their analysis on the diffusion of MRPII systems, which was not confirmed in the work of Goodhue and Thomson (1995).

Bensaou and Venkatraman present another approach that analyses the performance of interorganisational coordination aspects from an information processing perspective (see 1993, 8). Extending Galbraith’s argument to inter-organisational settings their model proposes that the fit between information processing needs and information processing capabilities determines the performance or the task effectiveness (cf. Galbraith, 1977). The information processing needs are defined by the environmental uncertainty, partnership uncertainty, and task uncertainty. The information processing capabilities are defined by structure, process, and IT. The research framework relies on organisational, transaction cost economic, and political economy but lacks observable and measurable indicators (see Bensaou and Venkatraman, 1993, 14). The authors contend that the use of a multivariate logic to embed IT performance within a larger set of forces is advantageous compared to a simple bivariant analysis.

Finally, Smithson and Hirscheim (1998) propose a literature based framework to analyse IS. Their key dimensions are efficiency, effectiveness and understanding. The framework has been applied to outsourcing relationships which share the external provider perspective with
2. Theoretical Foundations of E-services

external e-services (see also ch. 4.2). The benefits of their approach for the research on e-services are (1) the addressing of the socio-political side within the understanding dimension, (2) the addressing multiple stakeholders, and (3) the provisioning of a qualitative framework to derive context-specific metrics to evaluate success.

2.1.5 Business-to-Business ICT Elements

If the application of Internet-based ICT systems is critical for any business (Linthicum, 2001, xvii), the inclusion into the ICT architectures becomes an inevitable task. The communication can happen between automated actors (a), between persons (p), and between humans and automated actors like machines. One central application of B2B ICT is electronic commerce. It 'denotes the seamless application of ICT from its point of origin to its endpoint along the entire value chain of business processes conducted electronically and designed to enable the accomplishment of business goals' (see Wigand, 1997). ICT systems contain a wide range of elements and logical layers. ICT systems consist in the simplest form of a database, an application, and some communication system (ADC model) (Ferstl and Sinz, 1993). A user machine may use one or many virtual machines in a multi-layer abstract machine model to increase the level of abstraction. These layers and abstractions are used to reduce the complexity, to standardise and increase portability of ICT. A more fine grained definition of architectures designs and functional application areas emerged since 1997 with Internet or Web-centric application architectures. They can be characterised by 4-layer architectures, which contain a Web client, a Web server, an application server, and application components. Application components can be software components, encapsulated legacy systems, or data base systems (cf. Sinz et al., 2000). Within application systems Themistocleus (2002) discerns custom, packaged, and e-business as different application types with separate integration challenges and combinations thereof. The e-business applications themselves can be classified from a functionality viewpoint as Electronic Commerce (EC), Supply Chain Management (SCM), Customer Relationship Management (CRM), Enterprise Application Integration (EAI) and B2B Integration (B2BI) (cf. Alt and Fleisch, 2000, Fleisch, 2000). Computer-aided Design (CAD), Product Data Management (PDM) and Product Lifecycle Management (PLM) applications for engineering oriented data exchange are related categories with e-business elements (cf. Abramovici and Sieg, 2002). Depending on the chosen author SCM (cf. von Steinæecker and Kuehner, 2000) or EC (cf. Wigand, 1997; Kalakota and Robinson, 1999) cover nearly all inter-organisational processes. In practice oriented overviews Alt et al. propose a process-oriented delineation of overlapping functionality of between the terms (2000b) and Kalakota and Robinson propose a simple functionality-oriented delineation (1999).

EAI is defined as 'unrestricted sharing of information between two or more enterprise applications. A set of technologies that allows the movement and exchange of information between different applications and business processes within and between organisations' (see Linthi-
cum, 1999, 354). The term middleware often addresses messaging oriented mechanisms and pursues similar goals why it is summarised under EAI. B2B integration which is also termed B2B EAI denotes the interorganisational focus of integration software. Appendix L presents a short history synopsis of integration and a comparison of integration mechanisms.

2.1.5.1 The Role of Technical Standards

Much of the discussion about the efficiency and flexibility of e-business and e-markets centres on standards. They promise to offer a more efficient connection to partners (cf. Shapiro and Varian 1999) which reduces transaction costs. A standard can be defined on communication, application and database level. They can be defined as open standard (e.g. ISO or W3C), industry standard (e.g. Java) or de-facto standard (e.g. SOAP, Windows) (cf. Lubell, 2004). Depending on the integration mechanism used only selected levels are relevant. Figure 2-10 shows a selection of XML-based standards.

![Figure 2-10: XML standards (see Harmon, 2003, 276)](image)

Business-to-business solutions require precautions to be taken in order to address security issues (see Eckert et al., 2002, 21). The minimum security involves a type of secure communication protocol, firewalls and security software, in order to prevent the business and its business partners from malfunctions and computer crime.

Trust and security services can safeguard against repudiation or security risks. If the business network achieves automation and integration throughout its scope, it not only realises the advantages of digitalisation (time, quality, costs). Moreover, it can omit complete tasks (e.g. stop sending invoices) or enable new processes (e.g. facilitate international trade via e-services).

2.1.5.2 Delivery Modes of ICT Integration Services

The tasks of ICT systems can be performed internally or by external service providers. Mantel and Schissler (2002, 172) discern four different possibilities from a task and application sys-
tem relationship perspective. Figure 2-11 shows different delivery modes ranging from internal integration with EAI to inter-organisational integration between companies by an external service provider (B2B ASP).

![Application system delivery modes](see Mantel and Schisler (2002))

This differentiation has considerable impact on the application architecture since it highlights that application integration like other tasks can be outsourced to third parties and that new business from externals can be insourced. This offers new possibilities to solve application integration challenges with e-service principles and technologies.

### 2.1.5.3 Elements of a B2B E-service Integration Middleware

One project at CXT was to define a middleware that enabled both the offering of e-Procurement infrastructure e-services and integration components for third party e-services. The result was an architecture of components for an ideal B2B EAI software. The proposal builds upon project work carried out with three B2B EAI vendors as well as on literature research (cf. Hagel and Brown, 2001, Riehm, 1997, Linthicum, 2001, Brodie and Stonebraker, 1995). B2B EAI is as a software product supporting standards-based and customised integration of applications and e-services ranging from the syntactic to the pragmatic layer, based on document standards for the data and control flow.

The application functionality and tools provided by an ideal EAI software enable the user to offer or integrate services on all layers of semiotics (see Figure 2-12). The pragmatic layer signifies fully automated integration between organisations. As such, it provides so called 'connectors' to other B2B or ERP or legacy systems. It offers a messaging infrastructure supporting synchronous and asynchronous messages in various protocols, and document standards higher than the ISO-OSI reference model level 4 standards. It includes a Web application development and a development environment for additional application logic. It supports the latest standards for Web services and workflows, including a workflow management and execution component, which can execute rules based on the value of document instances. Further, it contains B2B integration software components like registries (e.g. for trading partners).
and repositories (e.g. documents, contracts), single-sign-on functionality, and, it supports a number of security levels. The software supports data management, automatic conversion between standards and mapping tools to model partner specific integration. The administration software components should offer guaranteed delivery, exception handling and a reliable monitoring. The business intelligence component should allow the provision of report generators on e-service and transaction activities to trading partners and the B2B EAI owner. The fit between e-services specific and general B2B EAI depends on the requirements a specific e-service has. The assumption is that an e-service that covers the whole spectrum of functionality needs to offer each of the elements depicted in Figure 2-12. This functional or component view will be used to classify technical e-service solutions (see ch. 5 and Appendix G).

<table>
<thead>
<tr>
<th>Pragmatic Layer</th>
<th>Semantic Layer</th>
<th>Syntactic Layer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workflow Component</td>
<td>Business Intelligence Component</td>
<td>Messaging Infrastructure</td>
</tr>
<tr>
<td>Web Application Builder</td>
<td>Mapping Tools</td>
<td>Trading Partner Registry</td>
</tr>
<tr>
<td>Conversion Tools</td>
<td>Document Routing</td>
<td>Security</td>
</tr>
<tr>
<td>Repositories</td>
<td>Administration &amp; Tools</td>
<td>Queuing</td>
</tr>
<tr>
<td>Tools</td>
<td>Connectors To ERP &amp; B2B Systems</td>
<td>Routing</td>
</tr>
<tr>
<td>Development Environment</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 2-12: Example of the functional view of B2B integration middleware architecture

### 2.1.5.4 Integration of ICT in E-business Environments

The technical integration of different ICT systems is a central challenge in e-business (cf. Linthicum, 2001; Vollmer, 2001; Peyret, 2001). To meet the goals of efficiency, transparency and flexibility and to reap the potentials of integrated execution of all information-based elements of economic processes, semantic business process integration is required (see Thome, 2001, 287). Many semantic failures and confusions inhibit the communication between businesses (e.g. product classifications, buyer and supplier master data changes or additionally required trading partner specific information). All trading partners require coordinated, unequivocal, computer-readable interpretation and action rules to guarantee a complete and correct end-to-end automation. Today most of the integrated information exchanges require partner specific regulations and arrangements (see Thome, 2001, 287), which increase the transaction costs and limits the partners' benefits.

The integration of inter-organisational processes on a semantic layer can be achieved with multiple architectural variants: (1) via direct connection of ERP systems, which is complex (cf. Themistocleous et al., 2001) and might require additional components like EAI systems,
2. Theoretical Foundations of E-services

(2) via the aforementioned e-business application types using their integration mechanism, or
(3) via integration services offered by third parties like EDI-VANs, e-markets or e-service
providers.

Integration is not the goal but a means to achieve other goals like responsiveness, flexibility,
transparency and cost efficiency. The degree and the type of integration define the degree of
coordination required. A brief synopsis of the developments of the last 15 years helps to un-
derstand the integration challenges ICS architectures have solved and where new challenges
are (see Appendix L.2).

2.1.6 Implications of the ICT Lens on E-services

The theories on the nature of ICT and its potential impact on existing processes to enable a
higher flexibility or new processes and the success measurement of such an intervention was
presented. Systems theory, cybernetics and semiotics theories complemented this lens. In the
area of B2B ICT systems integration is crucial for the interaction with e-services. Some
modes of integration (see Appendix L.3) are only suited for efficient internal integration. For
example screen wrappers are suited for efficient integration of custom systems but are inap-
propriate for packaged or e-business integration (cf. Zahavi, 1999).

E-services can be used to pursue a decentralised approach. In EAI systems semantic differ-
ences are resolved or mapped within a centralised approach in one company or business net-
work. With e-services this task could be performed by a publicly available server or a trusted
third party. One example is a schema library within a BizTalk scenario (e.g. Holten, 2003,
46). The challenge is to achieve further standardisation on all semiotic levels and the need to
establish ontologies that can be used by different partners within the supply chain. Early ap-
proaches like RosettaNet or the SCOR of the Supply Chain Council point into that direction.
Provider specific or supply chain specific solutions are possible steps until widely accepted
standards on the semantic and pragmatic level exist.

A promising development is the move towards Web service standards and service-oriented
architectures (SOA), which build on the properties of e-services and allow for more flexibility
in ICT deployment (see Cabrera et al., 2002; Klueber and Ludwig, 2003).

2.2 Service Theory Lens

Services comprise the largest and most heterogeneous sector within developed countries.
They account for 50%-80% of the value creation and cover a diverse spectrum such as distri-
bution, consulting, personnel and social services (see o.V., 2001; Quinn et al., 1997, 24). The
heterogeneity stems from a difficulty to delineate the service industry from other sectors and
various uses of the term in 'everyday' language. For example, the OECD uses the UN ISIC
(International Standard Industrial Classification) for all goods, of which 10 out of 16 top cate-
2.2. Service Theory Lens

gories are allocated to service industries. Karmarkar (2004, 104) claims that 'services are in a transformation process towards an industrialisation which is driven by [information and communication] technology that affects the basic economics of service information, the balance of power, and the distribution of profits in an industry'. The resulting change can be radical.

This section elaborates the characteristics of services and presents implications on the use of ICT. The organisational, process and management aspects are covered in the respective lenses. The purpose of the section is to build a fundament to understand, define and manage e-services in their life cycle.

2.2.1 Characteristics and Definitions of Services

A service can describe a function, an institution, and the result of a service process. Further the boarders to production become increasingly fuzzy with more products having an increasing service element (cf. Engelhardt et al., 1994). It is therefore not surprising, that neither authors from Anglo-American (cf. Gutek, 1995; Quinn, 1992; Heskett et al., 1997; Fitzsimmons and Fitzsimmons, 2001) nor from German speaking countries (cf. Bruhn, 1993; Bruckner, 2000; Corsten, 1997) have been able to establish a single definition and understanding of the term and there is no generally accepted universal definition and list of characteristics of services (see Bodendorf, 1999, 1).

Approaches to define services range from pure enumeration of characteristics, negative positioning against physical goods and information (see Corsten, 1994b; Bodendorf, 1999), three-sector model (Corsten, 1994b) to potential oriented models (cf. Engelhardt et al., 1994; Corsten, 1994b; Gutek, 1995). The negative positioning illustrates that traditional services have many similar characteristics when positioned against information and material resources from a value, output, and theory perspective (see Appendix C).

The multitude of approaches leads to confusion and is aggravated by a lack of accepted theory. Levitt was inclined to proclaim that services are economically inefficient and undermanaged when he concluded, 'in short service thinks humanistically, and that explains its failures (...) thinking in humanistic rather than technocratic terms ensures that the service sector of the modern economy will be forever inefficient and that our satisfactions will be forever marginal' (Levitt, 1972, 43). In the last 30 years attempts towards industrialising services have been made to respond to the statement of Levitt (cf. Karmarkar, 2004).

In-detail discussions of terminology and classification approaches of services is omitted (cf. Corsten, 1994a, Bruhn and Meffert, 1998) in favour of the characteristics that are relevant for the further discussion on e-services using a process and interaction oriented perspective (see Engelhardt and Schnittka, 1998, 922).
Examples of services can be categorised in the following framework. Each service is positioned according to the degree of its product or process and material or immaterial characteristics (see Lehmann, 1995). The grey elements are within the focus of this thesis (see Figure 2-13). Most of these services have an immaterial character, which is why they are likely to be at least partially offered via e-services.

The main characteristics that define services from a functional perspective are (see Bodendorf, 1999, 2; Bruhn, 1993):

- **External factor** (or interactivity or externalisation): In contrast to physical objects, services have a different production logic. They require an external factor (Lehmann, 1995, 30). Involving or integrating this external factor in the service fulfilment or delivery is a key challenge for services. Services require either active simultaneous or sequential interaction with an external factor. External factors can be persons, objects or combinations, which have to collaborate or be accessible in order to achieve the desired outcome. The customer is increasingly conceived as a ‘prosumer’ (Piller et al., 2001) or ‘co-producer’ (Fitzsimmons and Fitzsimmons, 2001, 5) which emphasises the customer’s early involvement and active role. This development requires high flexibility of the service provider, and may result in high sunk costs, if the service requires an expensive infrastructure or expensive resources are required. A high variance of external factors may require a high variety of offerings by the service provider to be able to respond adequately. The external factor influences the production process and does not allow a simple input-output relationship (cf. Engelhardt and Schnittka, 1998). A recent tendency is the shift to towards technology based customer self-services reduces capacity and availability risks for the provider to increase the profitability (see Ostrom et al., 2002). Figure 2-14 depicts different

![Figure 2-13: Classified examples of services](image-url)
2.2. Service Theory Lens

types of external factors that are required in order to deliver a service to a service consumer.

![Classification of external factors](source: Adapted from Coersten (1994, p. 175)

**Figure 2-14: Classification of external factors**

The alternative term customer participation (Fitzsimmons and Fitzsimmons, 2001, 25) is not considered appropriate since it suggests only direct human involvement.

- **Simultaneous consumption** (or Uno-actu principle) of services means that the production and sales processes are inseparable. This often necessitates a synchronous interaction in both time and location between service provider and consumer (see Berekoven, 1974, 29). This is subject to change when considering the impact of ICS (see ch. 7.2.2).

- **Immateriality** of services differentiates them from physical goods as seen from a result perspective. This characteristic makes services in principle suitable to a representation by electronic means. The result of a service is to add value by sustaining or changing immaterial or material goods (see Meyer, 1990, 198; similar Hill, 1999, 441)). Some authors like Fitzsimmons and Fitzsimmons (2001) or Meffert (2000) use the term intangibility which can be confused with intangible goods (cf. Hill, 1999). Hill stresses that the distinction between intangible (equals service) and tangible (equals physical goods) is superficial and misleading. Tangibles and intangibles need to be differentiated in order to group products with similar production logic. With the increasing importance of intangible goods like information, (intellectual) property rights, and media their similarity with the production and distribution of physical goods should not be confused by assigning them to the service sector (see Hill, 1999, 427). Intangible goods and services share the characteristic of immateriality and can have common characteristics in their distribution but rely on different production logics. Hill proposed to discern tangible goods, intangible goods, and services.

- ‘**Non storability**’ (or perishability) means that, due to their process character, services cannot be technically or economically pre-produced and stored (cf. Meyer, 1990). This characteristic can be weakened, if services are productised and delivered via electronic means. While the actual service cannot be retained after its production, the effect of the service can be retained (see Sasser et al., 1978, 8).

The characteristics of services require a different approach to production caused by simultaneous consumption, external factor, immateriality and non-storability. They are not entities,
which can be traded like goods and transferred between countries as the concept of ownership is not applicable to services independently of the entity or external factor (see Hill, 1999, 442). To transfer services the provider has to be present or has to define means to achieve a presence. Without digitalising the service delivery the following options exist (cf. Linder et al., 2001). The UN Statistical Commission (UNSC) and Organisation for Economic Co-operation and Development (OECD) jointly developed the Manual of International Trade in Services, which discerns four supply modes for exporting services (see Figure 2-15).

![Figure 2-15: Four supply modes of international trade in services according to OECD](image)

A limitation of the framework is that it misses Internet related services (Linder et al., 2001, 6). Services need external factors, which they do not own in contrast to manufacturers. On the benefit side they may not assume the same amount of costs and risks. On the negative side the output is not legally owned by the producer and is more difficult to assess by third parties.

A few examples of the variety of definitions for services are: ‘A service is a time-perishable, intangible [or better immaterial] experience performed for a customer acting in the role of a co-producer’ (see Fitzsimmons and Fitzsimmons, 2001, 5). With more focus on the service delivery perspective they can be defined as ‘recurring work performed, whereby the work to be provided by the service provider is contractually specified in the Service Level Agreement (SLA). Services must be scalable to a large number of customers by a maximum proportional cost (personnel, administrative and infrastructure)’ (see Koller et al., 2001, 87). A definition from an economic perspective reads as ‘some change in the condition [and to the benefit] of one economic unit produced by the activity of another unit’ (see Hill, 1999, 441).

The working definition for services here is ‘a performance to the benefit of the external factor that goes beyond pre-determined materialistic results, changes the conditions of the external
2.2. Service Theory Lens

factor and requires the simultaneous access to external factors.' This shift from deterministic and physical, rule based thinking opens a new perspective towards a more customer-focused approach. In contrast to changing of ownership for physical objects, service transactions change the conditions of objects.

Gutek (cf. 1995; et al., 2002) emphasises the relationship between service provider, service customer and service organisation in the service delivery process depending on the intensity of the interactions. She discerns service encounters, enhanced encounters and service relationships specifically to deduce implementation recommendations. Service encounter signifies loose relations between customer and provider whereas service relationships in Gutek's terms signify tight long-term relationships to the service provider and the service organisation. Service encounter is the free fleeting of customers based on single interactions. It is not possible to deal with the customers on an individual basis. Therefore customer types are needed since little knowledge about the customers' individual needs are available. The degree of individual customisation is likely to be low. Service relationships are defined by repeated contact with a particular provider. The provider needs individual knowledge of each customer. If it is not personal contact then the role occupants or systems have to function identical or seamlessly coordinated. The advantages of service relationships are a better information exchange and knowledge about each other due to a history of shared interaction. The service provider can expect future interaction and may be able to anticipate customer needs. Enhanced encounters are between the two extremes and describe a stronger link between customer and service organisation than pure service encounter (see Gutek et al., 2002). The distinction can be valuable to design appropriate service operations, since the focus on one type of interaction may increase efficiency, effectiveness, motivation, customer satisfaction, commitment, career development and a better decision basis for the design of the interaction with the customers (see Gutek, 1995, 7).

2.2.2 Service Quality and Relation to Economic Success

Service quality is a complex phenomenon as it is determined not only by the provider but also by the customer and its external objects. This partial subjective character leads to a customer specific conceptionalisation (cf. Meyer and Mattmueller, 1987). Because of its subjectivity service quality is defined as a comparison between two values (cf. Groenroos, 1982). Parasuraman et al. (1985) define service quality based on a comparison between what the customer feels should be offered and what is provided. In the context of human contact-intensive e-services the human element can be measured in the dimensions of reliability, responsiveness, assurance, empathy and tangibles (see Parasuraman et al., 1985, 48).

According to their model, perceived service quality consists of perceived service and the expected service. The latter is dependent on word of mouth, personal needs, and past experi-
Theoretical Foundations of E-services

2. Theoretical Foundations of E-services

ence. Figure 2-16 shows the interplay of service provider and service customer. Negative causes on the service quality are depicted as gaps (see Zeithaml et al., 1988, 36).

![Figure 2-16: Service quality gap model according to Zeithaml et al. (1988)](image)

The assumption here is that the gaps define challenges for e-service providers to successfully offer e-services. Challenges arise from the lack of direct customer contact and the need to implement electronic or direct customer interaction feedback loops to learn from customers' behaviour. Quantitative measuring tools like SERVQUAL have been developed to operationalise the service quality gap 5 (cf. Parasuraman et al., 1988). The definition of its elements is presented in Figure 2-17.

<table>
<thead>
<tr>
<th>Tangibles</th>
<th>Physical facilities, equipment, and appearances of personnel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliability</td>
<td>Ability to perform the promised service dependably and accurately</td>
</tr>
<tr>
<td>Responsiveness</td>
<td>Willingness to help customers and provide prompt service</td>
</tr>
<tr>
<td>Assurance</td>
<td>Knowledge &amp; courtesy of employees and their ability to inspire trust &amp; confidence</td>
</tr>
<tr>
<td>Empathy</td>
<td>Caring, individualised attention the service provider gives its customers</td>
</tr>
</tbody>
</table>

![Figure 2-17: SERVQUAL measurement dimensions](image)

The SERVQUAL measurement is frequently used in marketing research (cf. Parasuraman et al., 1993; Dabholkar et al., 1996) and was also applied to measure IS Service as IT SERVQUAL (cf. Watson et al. 2001; Pitt et al. 1995; Kettinger and Lee 1995).

The Service Profit Chain (see Heskett et al., 1997) describes how output quality and productivity improvements increase the service value of the service concept and lead to a higher customer satisfaction and loyalty, which materialise in revenue and profitability growth (see Figure 2-18).
2.2. Service Theory Lens

This implies that the quality of a relation is as important as the quantity of customers. Fitzsimmons and Fitzsimmons (2001, 218) maintain that a 5% increase in customer loyalty can produce a profit increase of 25 to 85%. If this margin can be transferred to e-services then keeping customers becomes a central objective.

2.2.3 Implications of the Service Lens on E-services

Only in the last decade the impact of ICT and specifically that of the Internet was deployed to leverage the immateriality of production and service processes. ICT can transform services to be delivered space independent, which can have a major impact on the service delivery process and the cost implications. This enables a wider distribution of the value creation and internationalisation of service production (cf. Meffert, 2000, 514). Using ICT enables service providers increasingly to become time and location independent. Further by digitalising or productising services economies of scale become possible.

The trends towards more global customers, liberalisation and deregulation, as well as the competition against time (see Stalk and Hout, 1990) foster electronically mediated services and a rethinking of current practices. If services are offered in electronic form, then the regional elements of the offering are of high importance if the service production, delivery and settlement are not fully digital. Electronic self-service approaches are providing interactivity and helping to productise services (cf. Rust and Kannan, 2002; Ostrom et al., 2002).

The strategic role of information in services is displayed in Figure 2-19 (according to Fitzsimmons and Fitzsimmons, 2001). The use of ICT in services is widespread it ranges from increasing the barriers to entry to improving internal productivity.
2. Theoretical Foundations of E-services

COMPETITIVE USE of INFORMATION

<table>
<thead>
<tr>
<th>Online (real time)</th>
<th>Offline (analysis)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Creation of Barriers to Entry</strong></td>
<td><strong>Database Asset</strong></td>
</tr>
<tr>
<td>- Intuitive Purchasing System</td>
<td>- Micromarketing</td>
</tr>
<tr>
<td>- Frequent User Club</td>
<td>- Development of further services</td>
</tr>
<tr>
<td>- Increase of Switching Costs</td>
<td>- Selling information</td>
</tr>
<tr>
<td>*...</td>
<td>*...</td>
</tr>
<tr>
<td><strong>Revenue Generation</strong></td>
<td><strong>Productivity Enhancement</strong></td>
</tr>
<tr>
<td>- Yield Management</td>
<td>- Inventory Status</td>
</tr>
<tr>
<td>- Point of Sales</td>
<td>- Data Monitoring &amp; Analysis</td>
</tr>
<tr>
<td>- Expert Systems</td>
<td>*...</td>
</tr>
<tr>
<td>- Knowledge Systems</td>
<td>*...</td>
</tr>
<tr>
<td>*...</td>
<td>*...</td>
</tr>
</tbody>
</table>

**Figure 2-19: Impact of information systems on service strategy**

Fitzsimmons and Fitzsimmons (2001, 214) elaborate success factors for both human and machine actors on the customer and the provider side. The substitution of human by machine actors might provide benefits but also disadvantages which need to be taken into account when focusing on e-services (see Figure 2-20).

**Figure 2-20: Success factors for different service encounter types**

The application of ICT to services can be used to change the form of service production and delivery processes of services (see ch. 7).

2.3 Innovation and Business Strategy Lens

Innovation and strategy formulation form the purposeful design activities that can be initiators for a change through e-services. They are the starting point for the discussion of theory elements applicable to better understand and guide e-service invention and development. Structurally this section starts with an overview on the nature and elements of innovation. The subsequent discussion of strategy in e-business and e-services is followed by business networks, e-markets, and economic theory to form the basis for elaborating business models or business concepts. The section concentrates on innovation and business issues in the context of elec-
2.3. Innovation and Business Strategy Lens

Electronic markets. They can be in a dual role of being simultaneously a provider and a syndication partner for e-services. The main case data assumed this role and the theory elements were selected from issues arising from that case. The theories are chosen to better understand, analyse and propose improvements to the context experienced in the main case and to develop theoretical insights based on existing theory.

2.3.1 Theories on Innovation

Innovation can be a key element when transforming processes, organisations, or whole business networks to stay competitive. Drucker (1999, 119) claimed that 'every organisation will need only one core competence for the future: 'INNOVATION' plus the capability to measure and appraise its performance'. Many levers indicate a high potential for transformation and innovation through e-services as indicated in the introduction (see ch. 1). This section analyses innovation in general as well as ICT and service enabled perspectives to structure the areas where innovation potential can be expected.

2.3.1.1 Term and Motivation for Innovation in E-procurement and E-services

Schumpeter described innovations as a composite of the technical and the business world (Janszen, 2000, 3). Innovation management has developed since Schumpeter’s early works (cf. 1942) along the dimensions of increased process thinking and increased complexity defined by the number of actors and wider focus of innovation areas (see Janszen, 2000, 3). The involvement of organisational functions evolved from Research and Development (R&D) staff only to include even external partners (see Figure 2-21). Recent publications bring attention towards internal processes and make-cooperate-buy decisions (cf. Hammer, 2004).

![Figure 2-21: Evolution of paradigms in innovation management](image)

In innovation literature the areas of innovation are frequently categorised (cf. Schumpeter, 1942; Janszen, 2000; Swanson, 1994; Mustonen-Ollila and Lyytinen, 2003). Janszen (2000, 8) used Schumpeter’s categories to define invention areas. Applied to the context of procure-
ment processes and e-services the sources of invention are extended to outsourcing parts of the coordination and to change the definition of 'what' and 'how' a company performs tasks internally and externally. External innovation area is partnering with third parties (p). This extends Janssen's innovation areas to five dimensions (TAMOp).

<table>
<thead>
<tr>
<th>Janszen's Enhancement of Schumpeter's Categories</th>
<th>Examples of Application to Procurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>New inputs: New technology, new materials and components (T: technology)</td>
<td>PCs, mobile phones, UMTS equipment, RFID tags, e-service delivery of services etc.</td>
</tr>
<tr>
<td>New application in the form of a new product, service or process (A: application)</td>
<td>Inter-organisational e-procurement, electronic auctions, collaborative planning, 3rd party sourcing service providers. Outsourcing of tasks or processes to e-services or process innovations fostering e-services (cf. Mustonen-Ollila and Lyytinen, 2003)</td>
</tr>
<tr>
<td>New market or market segment (M: market)</td>
<td>Worldwide sourcing opportunities, opening of Eastern markets</td>
</tr>
<tr>
<td>Introduction of new organisational form or a new management approach (O: organisation)</td>
<td>Use of e-markets, outsourcing of processes to e-service providers and integration of e-services.</td>
</tr>
<tr>
<td>Partnering with third parties (p: partner)</td>
<td>Offer a complex e-service together with a partners or outsourcing relationships.</td>
</tr>
</tbody>
</table>

Figure 2-22: Invention and innovation areas for the procurement process

Janszen (2000, 8) defines innovation as 'commercialisation of something new', which can be categorised as implemented invention in one or a combination of two or more innovation areas (see Figure 2-22). Examples of applied invention areas for the procurement process and especially for e-services are provided. The five dimensions define the innovation areas, which one can use to depict the innovation trajectory of a company. The areas of innovation are highly interdependent and they co-evolve (see Janszen, 2000, 12). This is in line with research by Bolwijn and Kumpe (1990) on innovation that stresses that innovation is not only driven by price, but simultaneously by quality, choice, time and uniqueness.

An unsolved dispute among academics is if continuous improvement can be classified as innovation or not (see Christensen, 1997, xi vs. Sunbo, 1997, 438). It can be resolved with a working definition that innovation changes structures or processes or behaviours on a larger scale than continuous improvement does.

2.3.1.2 IT-induced Innovation

Innovation can be ICT-enabled (cf. Swanson, 1994) but the main challenge is often that the functionality available is not used to its full effect (see Lockett, 1996, 121). A further hurdle to IT-induced innovation often is not the IT-limitations but people issues. Study by Nolan, Norton & Co looked at major projects, which failed to achieve their objectives. Only in 9% of the projects technology was the major blockage, whereas in 78% it was people issues (see Lockett, 1996, 121; Sunbo, 1997). Appendix G.1.1.2 provides an overview on innovation areas with IT.
2.3. Innovation and Business Strategy Lens

2.3.2 Strategy Fundaments for E-Services

2.3.2.1 E-business-Aware Literature on Strategy

According to Quinn (1991, 5) a strategy is the pattern or plan that integrates an organisation's major goals, policies, and action sequences into a cohesive whole. Minzberg and Waters (1985) posit strategy as a pattern in a stream of decisions. Strategies are used to coordinate an organisation's elements and maintain its focus and identity (cf. Espejo and Schwaninger, 1996). In an instrumental view strategies define the 'where to compete', the 'how to compete' and the 'what is the long term core competence' for an organisation so that an organisation stays viable (see Steinmann and Schreyögg, 1997, 152; Porter, 1980). Mintzberg and Waters (1985) discern eight categories of strategies of which four relevant ones will be introduced briefly. The 'planned strategy' evolves from a vision and is based on formal planning; 'the entrepreneurial strategy' is based on the personal control of a single individual; 'the umbrella strategy' sets general strategy guidelines without detailed plans; and 'the imposed strategy' is determined by pressures outside the control of the management. They further stress the distinction between a realised strategy and an unrealised strategy, where intentions were not successfully realised.

E-business is a term introduced by the CEO of IBM in 1997. It is often positioned as more encompassing than e-commerce including not only trade transactions but all electronic mediated transactions within and between businesses (cf. Alt, 2004; Kalakota and Robinson 1999). For the domain of e-business several authors maintain that strategy and e-business are not separable and should be viewed as a whole (cf. Wirtz, 2000; Porter, 2001). Porter (2001) argues that general strategies also apply to e-commerce settings and his five forces from a market-based view of strategy are still relevant. Wirtz identifies virtualisation and complexity as additional forces for the strategy formulation in e-business environments (see Figure 2-23).

![Figure 2-23: Four forces of e-business (see Wirtz, 2000, 117)](image-url)
The strategy concept applied here consists of a combination of market and resource-based views that are appropriate in e-business environments (cf. Haertsch, 2000). The market-based view analyses the market structure and industrial environment and fosters the decision for the market approach (see Porter, 1980; Porter, 1985). The resource-based view (cf. Wernerfeld 1984; Hamel and Prahalad 1994; Rühli 1995; Teece et al., 1997) stresses that companies have a choice on what they want to offer to the market and that the source of profits or permanent economic rents is more sustainable when management focuses on internal core capabilities and core competencies. The proponents support the notion that companies have a restricted freedom of choice, which is dominantly internal and dynamic. The competitive advantage stems from rareness, imperfect imitability, non-substitutability, non tradability (cf. Rühli 1995; Barney 1991; Dierickx et al. 1989; Hinterhuber and Friederich 1997) which applies to resources and output. Core competencies or capabilities have these characteristics and form sources of competitive advantage. A further characteristic of core competencies is the customer perceived value and their extendability (see Hamel and Prahalad, 1994, 204). The competitive advantage can be sustained if they build on history, causal ambiguity, and social complexity (Barney, 1991). The arguments that core competencies are heterogeneous and complex sources of competitive advantage are compatible with Gälweiler’s (1987) argument that companies need to define value potentials, which enable profits that secure liquidity in order to survive. Value potentials are defined as a set of all applicable business-specific prerequisites (e.g. in the form of resources, competencies or capabilities), which must be fulfilled to provide value (Schwaninger, 2000a). The management of new value potentials includes taking into account the dynamics of customer problems, problem solutions and technological substitution along the value chain. Core competencies, customer problem orientation pre-steer the achievable direct value measured in sales, company value, economic profit or cash flow. The partnering element adds a further dimension to access additional resources. Brandenburger and Nalebuff (1996, 18) highlight the role of complementors as specific partners to increases the own value proposition in a combined offering. Dyer and Singh (1998) define a relational view that spans over the whole business network (see Appendix J.1). All four views (see Pohl, 2000, 50) are leveragable via appropriate ICS solutions (see Figure 2-24).

![Figure 2-24: E-business-aware strategy](image-url)
2.3. Innovation and Business Strategy Lens

Only applying the *market-based view* to new businesses is risky if the structural institutional borders are fuzzy or changing. If the market structure and rules of the business are not yet defined the market based view cannot be fully applied. This might be the case for an innovative offering if competition, substitution, suppliers, customers and rules of the business are dynamically changing. A further discussion on implications of strategy literature on ASP and e-services is provided in Appendix J.1.

2.3.2.2 Service Specific Strategy Challenges

The strategy for services can be largely formulated with the standard strategy formulation process and tools (cf. Porter, 1985; Fitzsimmons and Fitzsimmons, 2001, 85ff). The competitive environment is perceived more difficult for service companies than for dominantly productive industries, due to the specific nature of services. The main challenges to improve services and develop e-service strategies are:

- Trust in the service provider if not physically experienced (cf. Colby, 2002).
- International sales due to the lack of standardised logistics providers, location bounded nature of most of the services and time dependency due to the simultaneous consumption
- Relative low barriers of entry but high customer loyalty (see Fitzsimmons and Fitzsimmons, 2001, 29)
- Impossibility to patent a service (see Fitzsimmons and Fitzsimmons, 2001, 29)
- Difficulty to leverage economies of scale due to the simultaneous consumption and co-location of the service provider.
- Management challenges of capacity, demand planning, yield management and pricing (see Döring 1999, 88) due to erratic sales fluctuations (see Fitzsimmons/Fitzsimmons, 2001, 29).

Fitzsimmons and Fitzsimmons (2001, 84) propose that the service vision should be turned into a strategic service concept containing the following dimensions: Delivery system, facility design, location and capacity planning (structural dimensions). Service encounter, quality, managing capacity and demand and information (management dimensions). The service concept requires support by the marketing concept (Johnston and Clark, 2001, 28) (see Figure 2-25).

![Figure 2-25: Interplay of the service concept (according to Johnson and Clark, 2001)](image-url)
A classification of service types helps to manage services and their development by addressing their unique characteristics. The y-axis positions the degree of individuality against the degree of interactivity (Meffert, 1994, 524) (see Figure 2-26). This classification can be used to identify e-service design implications.

![Service types classified according to external factor interaction characteristics](image1)

**Figure 2-26: Service types classified according to external factor interaction characteristics**

Both dimensions are aggregated in Schmenner's Service Process Matrix. A high labour intensity is often correlated with front office dominance (e.g. lawyers). The underlying logic builds on the product-process-matrix for production processes of (cf. Hayes and Wheelwright, 1979b; Hayes and Wheelwright, 1979a) and applies it to the service industry (Figure 2-27).

![Service types using the service process matrix](image2)

**Figure 2-27: Service types using the service process matrix**

The following conclusions can be derived:

- **Mass services** are characterised by low interaction and customisation as well as high labour intensity. The norm strategy is to lower the labour.
- **Professional services** have a high degree of interaction/customisation and labour intensity. Professional services may not need much supporting facilities and goods.
- **Service factory** has low labour intensity and little interaction/customisation. It can be characterised by flow operations.
2.3. Innovation and Business Strategy Lens

- Service shop can be described by a high degree of equipment but offer more customisation than service factories.

The norm strategies are targeted to move to the diagonal and then move to the bottom left. This lowers labour intensity and costs and has the effect to increase control (see Schmenner, 1986, 31). These changes influence the service process engineering and delivery process and require the awareness of the service provider to changes. The impact of ICT on these recommendations is discussed in Appendix J.2.

A challenge of devising strategies for services is that differentiation from products becomes difficult if services are combined with physical products in complex service bundles or service packages. In these cases a separation into material and immaterial elements is only theoretically possible. An example may be a complex machine and software, which is sold with an encompassing maintenance service contract.

Due to an increased bundling of services, Engelhardt et al. (1994, 31) propose an integrated view (see Figure 2-28). Services and products are defined as a continuum for bundled services and products. The two dimensions are the degree of integration and nature of the output generated. Both dimensions influence the service production and delivery.

![Figure 2-28: Integration of service and product characteristics](image)

2.3.3 Management of Business Networks

For inter-organisational e-services the management perspective on networks is relevant. The management of a company needs to be aware of the strategic options of cooperation and their implications on their management, if they want reap the ‘alliance advantage’ (cf. Doz and Hamel, 1998) in order to make a sound decision on a company’s strategy and resource configuration. From a myriad of terms business networks is chosen to describe for profit inter-organisational arrangements. A strong argument for network coordination forms is provided by Siebert (1991) who argues that networks are more efficient than market and hierarchy by combining the positive principles of the other two forms (see Figure 2-29).
Figure 2-29: Hybrid nature of business networks combines benefits

Figure 2-30: Overview on perspectives on networks

Two influencing factors defining the nature of business networks are the nature of the relationship and the intensity of exchange between units (Semlinger, 1993).

The term Business Networking (cf. Österle et al. 2000) describes the trend towards stronger inter-organisational collaboration, coordination and communication and the support thereof through ICT. Business networks encompass inter-organisational forms like traditional value chains and network forms (see Figure 2-30). Business networks form the basis for external e-services. Fleisch (2000) proposes a 3-layer-model of Business Networking:
The model focuses on the identification of relevant units within the cooperation relationship, the process execution relationship (coordination), and the information system exchange relationship (communication). On the strategy layer, the relationship between business units, their goals, actors, business models, contracts and resources is the main focus. On the process layer, the inter-business tasks, their sequence and their coordination mechanisms are in focus. The IS Network contains architectures that combine data, applications and communication elements (see Figure 2-31).

An approach to design, manage and develop business networks is Business Engineering. It is a structured approach to improve or radically change existing business systems via an integrated approach that systematically transform enterprises (see Österle and Winter 2000, 18). It requires entrepreneurial, business, technical, social and leadership competencies. A core element of Business Engineering is the process focus. Österle (1995) identifies processes as the key to successful transformation.

### 2.3.4 E-markets in the Supply Chain

Electronic Markets (e-markets) can be viewed from an institutional, functional and instrumental ICT perspective. This may be one reason for a myriad of definitions and similar words describing this phenomenon. Examples for similar terms are exchange, electronic commerce, electronic business, electronic marketplaces, electronic marketspaces (cf. Picot et al., 2001). E-markets were postulated as more efficient from a transaction cost perspective compared with the coordination form hierarchy (see Malone and Rockart, 1991). The OECD (1999) estimates that 7.5% of the cost could be saved in the business-to-consumer market through electronic coordination. The saving in the bigger business-to-business market can be assumed to be even greater if disintermediation will happen on a larger scale (see Hofmann, 2001, 43).
From a *functional view* a market can be defined as an economic place for exchange where supply and demand meet to build prices (Gabler, 1993). An e-market can perform different market function variants for match making as well as varying depth of the processes coverage. In a narrow functional definition an e-market "facilitates the market transactions of information, contracting, settlement and after sales service" (see Schmid, 1993). The term transaction signifies steps to exchange goods, services, and rights against funds and is not interpreted as a database transaction. The importance of e-markets arises from linking processes between organisations. The value proposition of e-markets lies in trade facilitation between new or existing partners by matching supply and demand, facilitating transactions and providing an institutional infrastructure (cf. Bakos, 1998). They can provide an increased information transparency, define a customer oriented product range, protect commercially sensitive information, avoid media mismatches, enable efficient operations, can be based on fair, monitored and enforced rules, increase global reach of trading partners, and enable a higher richness of content and processes to interact with partners (see Economist, 2000, 76; Bakos, 1998, 35). Figure 2-32 shows the transaction phases and different functions (see Bakos, 1998; Malone et al., 1987; Giaglis et al., 2002).

<table>
<thead>
<tr>
<th>Phase</th>
<th>Process elements and market functions</th>
<th>Provider examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information</td>
<td>Market information (e.g. Product catalogues, agents), product description and trading partner search (e.g. infomediaries, agents), price discovery, contracting partner information (e.g. infomediaries, rating).</td>
<td>SGSonSITE, avantrust (operations stopped)</td>
</tr>
<tr>
<td>Intention</td>
<td>Store, multi-vendor-catalogue and auction types to define price and conditions</td>
<td>free-markets</td>
</tr>
<tr>
<td>Contracting</td>
<td>Trusted 3rd Parties, process support, archiving, legal infrastructure</td>
<td>ixos, SGSonSITE</td>
</tr>
<tr>
<td>Settlement</td>
<td>Financial, logistical, governmental compliance, SLA management, regulatory functions etc.</td>
<td>inet-logistics, escrow</td>
</tr>
<tr>
<td>After-Sales</td>
<td>Customer service, complaint management, information, software updates, and training</td>
<td>intraware</td>
</tr>
</tbody>
</table>

*Figure 2-32: Transaction phases and market functions*

The range of traded goods handled via the e-market is defined by the types of inputs and the processes covered in the procurement process.

From an *institutional view* an e-market is an organisation that establishes and runs an e-market. This role will be called Market Maker as it is the constituting institution for an e-market. One can differentiate open and closed e-markets. The latter limit their members by establishing entrance barriers. Depending on the role of the Market Maker it can be a neutral or a buyer-driven or supplier-driven e-market. Further, the Market Maker can be one organisation or a consortia or cooperation of actors. The pricing ranges from fixed prices, via auctioning and tendering to dynamic pricing.
From an *instrumental ICT view* e-markets are formed by inter-organisational software (Zbornik, 1995). They require technical communication, integration, security, systems management, e-market information (e.g. partner directory, product offering), and settlement functionalities (see Zbornik, 1995, 229). In parallel the transaction language and protocols need to be defined. An ideal e-market supports all phases of a transaction in an electronic form (see Schmid 2000, 14), uses market mechanisms to coordinate partners (cf. Williamson, 1991), and is open to new participants.

E-markets are a 'subset of electronic commerce defined as any kind of economic activity, which is based on electronic connections' (Picot et al., 2001, 337). The e-markets market based exchange mechanism is an n:1:m relationship. The Market Makers use individual or packaged software (e.g. CommerceOne MarketSite). Most of the software also can support 1:n or n:1 configurations for consortia or company internal transaction platforms. The technology can allow even 1:1 relationships via an e-market supported by e-marketplace infrastructure. This can be seen as an example for the interpretive flexibility of ICS (see Orlikowski, 1992). The term electronic market place is used to refer to the ICT infrastructure aspects (*instrumental view*).

A morphologic grid of e-market describes the nature and purpose of an e-market (adapted from Eckert et al. (2002, 3) see Figure 2-33).

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transaction Phase</td>
<td>Initiation</td>
</tr>
<tr>
<td>Access</td>
<td>Open</td>
</tr>
<tr>
<td>Orientation</td>
<td>Horizontal</td>
</tr>
<tr>
<td>Market Maker</td>
<td>Seller</td>
</tr>
<tr>
<td>Trade Content</td>
<td>Production Goods</td>
</tr>
<tr>
<td>Pricing Mechanism</td>
<td>Fixed</td>
</tr>
<tr>
<td>Relationship</td>
<td>1:1</td>
</tr>
<tr>
<td>Value Chain Depth</td>
<td>One tier</td>
</tr>
</tbody>
</table>

*Figure 2-33: Morphologic grid of e-markets*

With the widespread use of Internet technologies the development of e-markets became easier and more promising over the last years. Several hundreds of e-markets existed worldwide in 2002 (cf. Barratt and Rosdahl, 2002). However, many of them are still under construction or were stopped before becoming operative. Potentially, e-markets offer support to manage the relationships between companies in any of the possible configurations. In practice however, they fit best for the many-to-many type.

Technical, change management, strategic and political issues have prevented a rapid diffusion and adoption of perfect markets as defined by economic assumptions (cf. Bakos, 1998). Only a few operative e-markets generate enough revenue from transactions, other services or
sources of revenue to be profitable. Barriers like the lack of trust, knowledge, understanding, loss of power and flexibility or required technology investments of potential e-market participants are still preventive.

A closer look at most e-markets reveals an ecosystem of e-market partners covering different roles. Partners often cover multiple roles and roles are added continuously in the evolution of an e-market. The roles can be identified and delineated by considering the phases of an e-market life-cycle (cf. Durante et al., 2000; Wise and Morrison, 2000).

The life-cycle consists of six phases: Invention, design, pilot, run, development, and retirement phase. In a workshop with Triaton in Singapore in May 2000 the following role model was defined to support e-markets (cf. Klueber et al., 2001a):

The idea to build an e-market can arise from many sources; however the ultimate driving force is often the Market Maker, who identifies inefficiencies in the supply chain between buyers and sellers. He brings the different roles together by aggregating the e-market offerings to suit buyers’ and sellers’ needs and defines the market rules.

In the design phase the Market Maker might be supported by Professional Service Providers to finalise the business concept (cf. Hamel, 2000). Professional services are a superset of all kinds of consulting ranging from strategy to systems integration. The outsourcing of human intensive professional services like procurement or legal advisory is summarised in this category as well.

Professional services might also be of help in the building phase when infrastructure providers and others are required or take on permanent responsibilities for ongoing activities like legal or tax advisory. To provide an attractive informational and transactional content a Content Provider might be required. This role can be fulfilled by an association or a professional content aggregator (e.g. Requisite). E-service Providers can be used to enrich the offering and compose end-to-end solutions by adding modular and standardised services for the payment and logistics processes or other third party e-services like trust services. In the pilot phase Integration Service Provider roles enable end-to-end electronically integrated solutions. Application Service Provider roles must be fulfilled by the Market Maker or third parties. The e-market place infrastructure should ideally be built on standardised components, document standards and protocols if the company itself is unlikely to establish its own de-facto standard. Examples of standards providers could be associations like UN (e.g. EDI) or RosettaNet. Platform Providers are hardware, software and security providers. Many software companies, most of them start-ups, have identified the opportunity of e-market suites in the late 1990s and started developing solutions to offer software for Market Makers. Financial partners that provide capital are influential but their role does not have to contribute to the direct service offerings by the e-market.
2.3.5 Economic Theory

2.3.5.1 Network Effects
Direct network effects signify a positive correlation between benefit and number of users, which is achievable through a rising number of network members (cf. Buxmann, 1996). What is known as Metcalfe's law is a measure for the direct network effect. It is a rule of thumb that postulates that the value of a network rises with the square of the number of users \( n^* (n-1) = n^* n - n \), based on the assumption that the value rises proportional with each new user (see Shapiro and Varian, 1999, 184). In addition, commonly used standards can generate indirect network effects (e.g. more application solutions can interpret XML standards), which signify an increase in the availability of complementary goods or services. Critical mass defines the number of participants necessary to enable the e-service to operate efficiently. It is essential for an e-service provider to achieve the critical mass in order to regain investments. Further possibilities arise when the offering of intra-company shared services are extended to an external customer base as an e-service. The term network effects is preferred towards network externalities which have more an economics and not a business focus (cf. Buxmann, 1996).

2.3.5.2 Theory of Increasing Returns to Scale and Economies of Scope
Conventional economic theory builds on the assumption of diminishing returns based on a negative feedback leading to a single equilibrium for prices and market shares at the most efficient use and allocation of resources (see Arthur, 1994, 1). However, in many situations in economic reality, positive feedback mechanisms enable multiple equilibrium points. These mechanisms do not have to be the most efficient in an economical sense. Random economic events may lead to the choice of one particular path and produce a lock-in effect that might not be the most efficient solution, but will dominate those that are more efficient due to the positive feedback. Examples of these random events could be some early customer wins, a good management decision or other macro economically small events. One can find classical examples in technology, information, and knowledge intensive businesses (e.g. the QWERTY
2. Theoretical Foundations of E-services

keyboard managed to survive the more efficient Dvorak layout; the VHS video system dominated the superior Beta system). After a critical mass of customers is used to one product architecture collective switching cost can prevent an acceptance of more efficient ones (see Arthur, 1994, 3; Shapiro and Varian, 1999, 185). Diminishing returns apply to the agricultural and manufacturing business, where input factors are limited and unlimited demand increases prices. This is not so, for the information and knowledge-based area of the economy, which is subject to increasing returns (see Arthur, 1994, 3). In these areas, the investment is high, but unit costs continue to fall and profits increase. This logic applies to information technology products, software, telecommunication products, pharmaceuticals, and other products and services that are complicated to design and manufacture.

The effects of random choice between two competing technologies lead to path dependencies and ultimately to increasing returns for the winning technology (see Arthur, 1994, 3). The decision for technology A or B decides the winning architecture. An example in the software industry is the competition between Mac OS and Microsoft Windows that led to a dominance of Windows and a considerable second order lock-in of the business ecosystem of developers, software and hardware producers, which further strengthened Microsoft’s domain over time. The group of users who are familiar with one operating system are an example for the demand side lock-in effect. If they want to change to another set of applications based on an alternative operating system, they experience large switching-costs in terms of time and money to learn to use a new system. This leads to the ‘early winner’ phenomena and first mover advantages envisioned by Alfred Marshall in 1890. ‘Information as a costly input into production leads to increasing returns’ (see Arrow, 1998, 403). This assertion is based on the cost-free reproduction of information (see Appendix C). If one seeks to profit from this effect, then information systems and information products are fundamental elements to improve the position of a single company, a business network, or an economy. This is one motivation for exploring these rules in the context of e-services in procurement. Arrow (1998) or Shapiro and Varian (1999) provide more details on information and knowledge intensive businesses.

Economies of scope occur if a company can dilute costs by increasing the range of products or services produced (cf. Tigre and La Rovere, 2003). The cost dilution relies on synergy effects of common required investment, input and capabilities to produce and distribute different outputs. An example is Amazon.com that extended its product range based on the similar software and capabilities from books to software, music and toys etc.

2.3.5.3 Economies of Scale

Economic theory uses economies of scale to analyse the production functions of a company. Constant economies of scale are the standard case, meaning that by doubling the amount of all inputs, companies will double the output as well. Decreasing economies of scale signify a less
than proportional output when input is increased. The biggest lever towards a profitable business is to identify and use increasing returns to scale. This is the case when one can leverage the investment at no additional cost. The most interesting element for digital products or services is the bundling of demand-side and supply-side economies of scale (see Hofmann, 2001, 80). If demand-side economies of scale trigger a positive feedback loop, the company or network can realise supply-side economies of scale once they reach a monopolistic state. This helped to build the market dominating Microsoft-Intel alliance. Arrow (1998) argues that, for knowledge and information intensive products increasing returns of information can foster innovation. This can explain how, in contrast to common economic thinking but in line with common experience, imperfect competition is the rule for networks. If the output is information based the fixed costs are high but the marginal costs can be low (cf. Shapiro and Varian, 1999).

2.3.5.4 Role of Standards

Standardisation processes are not easy to design or influence. If a company is able to achieve this, it can build long lasting economic returns; companies like Microsoft and SAP provide examples from the software industry. In the service sector Dun & Bradstreet, Internet banks like Charles Schwab are examples of companies that leveraged this effect. Standards play an important role in defining a company’s success. They facilitate the communication and exchange of information, goods, and funds through eliminating sources for mutual adjustment and errors. One can differentiate between open and public versus company specific standards to analyse the development around e-services.

Standardisation on a technical and semantic level (e.g. on the basis of XML) can help to increase efficiency, whereas standards on a business process or coordination level might restrain the flexibility. In addition to technical standardisation, it is possible to have standards on an organisational level (e.g. coordination services like brokers and infomediaries (see Hagel and Singer, 1998; Gemünden and Walter 1995)). These help to solve the problem of multiple interfaces through a more efficient organisation by an intermediary functioning as a hub. The dilemma of falling information costs and rising information value versus rising up-front standardisation costs requires assessment (cf. Buxmann, 1996). If one offers e-services, as defined above, the benefits of consuming them should be higher than an in-house solution, as the standardisation costs are low when relying on existing or future open standards.

2.3.5.5 Transaction Cost Theory and Networking

The transaction cost theory presents a frequently used theoretical approach to analyse relationships in Business Networks (cf. Kaplan, 2001; Fleisch, 2000; Alt, 1997; Hadamitzky, 1994, 241). The theory builds upon the groundwork of Coase (1937) to explain the forming of companies as well as the exchange mechanisms between hierarchies and markets. Williamson
(1991, 1975) further refined the theory to include relational contracts in order to explain cooperative arrangements between organisations (cf. Baker et al., 2002).

Transaction costs are costs, which companies incur in the process of organising the transfer of property rights. These costs arise during the search, negotiation, decision, contracting, control and adaptation phases. Sometimes the costs related to the risks non-compliance to the terms of the contract are included (cf. Tigre and La Rovere, 2003, 104). Transaction costs measure, from an economic viewpoint, the cost to exchange outputs such as goods, services, and liabilities from one economic party to another (see Hanker, 1990). The approach relies on the following assumptions (see left box in Figure 2-35).

A transaction has both a coordinating and an exchange element (see Gebauer, 1996; 30, Hanker, 1990; Fleisch, 2000). The transaction cost model represents a method of measurement to define the appropriate governance structure in a given environment.

In the research on the impact of ICS on organisational design transaction costs are the object of extensive research. The assumption holds that a 'move to the market' is a logical consequence (see Malone, 1987; Malone et al., 1987; Picot et al., 1996, 71). It implies that, with reduced transaction costs, it becomes more economical to procure via markets. Consequently, the organisational form changes towards a less integrated organisation, which procures more specific inputs directly from markets. Clemons et al. (1993) argue instead that a 'move to the middle' is more likely. They postulate the move towards partnership relations with a few cooperative partners by arguing that long-term relationships provide higher incentives to invest in ICT and in the requisite organisational adaptations and learning processes. Based on the transaction theory, Pampel (1993, 71) concludes that 'a cooperative (..) and permanent partnerships has a high potential to increase the efficiency if the trust base is simultaneously enhanced'. Both hypotheses combined stress a shift from hierarchy to networks and markets and thereby facilitating the focus on core competencies and network organisational forms (see Figure 2-36).
A critique of the transaction cost economics (TCE) is that it is too fuzzy to lead to an actionable decision basis (quantification gap). Firstly, transaction costs are a sum of overhead costs, which organisations seldom measure or analyse. If an organisation has a clear process or activity-based costing mechanism in place, then more specific cost drivers and categories rather than transaction costs provide the basis for decisions. Secondly, the assumptions of the theory are restrictive. The assumption that production costs are constant and not dependent on the producing entity is a highly unrealistic assumption (see Hadamitzky, 1994, 243). Thirdly, the reduction to solely cost elements is too limited (see Schneider, 1987, 479). It is a static theory that does not provide recommendations for the choice of behaviour in a changing environment (cf. Sydow, 1992). Ghoshal and Moran (1996, 14) argue that TCE ignores other strategic moves than focusing on efficiencies and ignores the potential to collaborate with partners due to its assumption of the pure opportunistic nature of human behaviour.

To summarise, the ‘theoretical naivety’ (see Sydow, 1992, 168) of the transaction cost theory, limits its use to pre-structure an economic assessment of alternative coordination forms. It cannot provide design recommendations for specific situations (see Pampel, 1993, 72) and Ghoshal and Moran (1996, 41) argue its limitations lead to wrong decisions in practice. The transaction cost theory can help to structure argumentations but it is not useful as a single tool upon which to base decisions.

**2.3.6 Business Models and Business Concepts for E-services**

With less material restrictions, high novelty, more variety of offerings and higher complexity possible for e-services, customer orientation and the business model may become even more important than in traditional businesses. One of the reasons why many e-business initiatives failed, was that business models were not thought through, were not executed properly or were not accepted by customers (cf. Thornton and Marche, 2003). Since business models are a central element in the early stages of the e-services life-cycle the following section will provide an overview of literature and challenges of business modelling. Amit and Zott (2001) corroborate the importance of business models by maintaining that a ‘firm’ business model is
an important locus of innovation and crucial source of value creation for the firm and its suppliers, partners, and customers’.

According to Hamel (2000, 15) competition is ‘no longer between products or services, it’s between competing business concepts’. Similarly, Tapscott et al. (2000) pertain that ‘business model innovation becomes the basis of competitive advantage’. If these assertions hold true an assessment of the business model becomes a key issue before investing resources in offering a new service or product of any kind. Questions discussed are: (1) How does it affect general strategy (cf. Porter, 1980; Hamel and Prahalad, 1994)? (2) Which extensions for e-business and e-services might be required (cf. Hackbarth and Kettinger, 2000)?

The traditional elements in corporate finance literature and (strategic) business (unit) planning usually follow a different purpose. They focus on enhancing existing businesses but less on generating new ones. Further they do not emphasise the characteristics of e-services. The focus of the business concept as experienced in business practice is to prepare answers to the strategic questions of: (1) Where to compete (business area: niche or not)? (2) Which rules to compete on (adapt to existing or change rules)? (cf. Steinmann and Schreyögg, 1993; Porter, 1980; Porter, 1985). Typical concepts from a market-based strategy or a resource-based strategy are relevant but should not be considered in this early stage in full detail, where the main task is to define and describe the field. Therefore these more detailed considerations are postponed to the business planning phase where thorough market and resource analysis techniques are applied. Although criticised for being unclear, superficial and not theoretically grounded (see Porter, 2001) it will be argued that the business concept serves an important purpose in design of a successful e-service due to its integrative nature (cf. Hedman and Kalling, 2003).

Currently, there is no common agreement on the term business model or business concept (cf. Wirtz, 2000, 81). Figure 2-37 presents an overview on existing definitions.

<table>
<thead>
<tr>
<th>Background</th>
<th>Definition and Components</th>
<th>Author, Source</th>
<th>Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICT &amp; Conceptual Modelling</td>
<td>(..) is an abstraction of how a business functions. It provides a simplified view of the business structure that will act as the basis for communication, improvements, or innovations, and define the information systems requirements that are necessary to support the business. It functions as a plan for conducting business.</td>
<td>(Eriksson and Penker, 2000, 2)</td>
<td>Plan to conduct business</td>
</tr>
<tr>
<td>e-business</td>
<td>Is a coordinated plan to design strategy along three vectors: customer interaction, asset configuration, and knowledge leverage.</td>
<td>(Venkatraman and Henderson, 1998)</td>
<td>Plan to design</td>
</tr>
<tr>
<td>e-business</td>
<td>The first determinant of a firm’s performance (..) how it [firm] plans to make money long term using the Internet; (..) is the system – components, linkages, and associated dynamics – that takes advantage of the properties of the Internet to make money.</td>
<td>(Afuah and Tucci, 2001, 45)</td>
<td>Plans &amp; system</td>
</tr>
</tbody>
</table>

Figure 2-37: Overview on definitions on business model
2.3. Innovation and Business Strategy Lens

<table>
<thead>
<tr>
<th>Background</th>
<th>Definition and Components</th>
<th>Author, Source</th>
<th>Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>e-business</td>
<td>Essence of the way e-business is conducted.</td>
<td>(Weill and Vitale, 2001, 25)</td>
<td>How to</td>
</tr>
<tr>
<td>Process</td>
<td>What a company does and how they make money from doing it.</td>
<td>(MIT, 2001)</td>
<td>Purpose</td>
</tr>
<tr>
<td>Strategy</td>
<td>Depicts the content, structure, and governance of transactions designed so as to create value through the exploitation of business opportunities.</td>
<td>(Amit and Zott, 2001, 493)</td>
<td>Purpose</td>
</tr>
<tr>
<td>Strategy</td>
<td>Flow diagram connecting all the elements of a value chain linking producers, distributors and consumers, showing the flow of goods and services in one direction and the flow of money in the other.</td>
<td>(Frezza, 1998)</td>
<td>System</td>
</tr>
<tr>
<td>e-business</td>
<td>Summary of the value creation logic of an organisation or a business network including assumptions about its partners, competitors and customers.</td>
<td>(Klueber, 2000)</td>
<td>Value creation system</td>
</tr>
</tbody>
</table>

*Figure 2-37: Overview on definitions on business models (continued)*

The list of definitions for business models and concepts is far from being complete (cf. Mendelson and Ziegler, 1999; Merz, 1999; Hamel, 2000). Common to business models is that they aim to present a concise overview on the transformation process of inputs and the sellable output of information, products, services, and e-services (see Wirtz, 2000, 82). The quotes show that business models are seen as plans, purpose, value creation logic, system, and procedure of how business is conducted (see Figure 2-37).

From an instrumental view business concepts are refining the input of business inventions. They are part of the innovation process. Hamel (2000, 66) defines business concept innovation as ‘capacity to imagine dramatically different business concepts or dramatically new ways of differentiating existing business concepts’. Business concepts in the dominantly digital realm rely on a different kind of restrictions and business rules. This specifically applies when looking at e-services in e-business (see ch. 7.2). In accordance with Hamel (2000) the status differentiates a business concept from a business model. The business concept describes in detail elements of the new business idea, whereas the business model is already implemented in practice.

Critiques of the e-business euphoria rightly argue that during the hype phase existing knowledge and existing frameworks for thinking were rejected. Porter (2001, 73) argues that the use of new terms like e-business or e-strategy is problematic since they isolate Internet related activities from the rest of the business. It can become a potential threat when employees do not speak a common language. If different meanings are not clarified due to political or external pressures, the success of an organisation can be at risk. An example is the development of a new business model that can or will unconsciously cannibalise the existing business, if a common set of fully understood terms and rules has not been established.
Examples of dynamic business concept development in dynamic environments e.g. Triaton, Deutsche Telekom Multi-Media Systemhaus and CXT show that these companies have entered new business areas where neither business models nor business rules were yet defined. In such a dynamic environment patching can be crucial to cope with the frequent changes. It is most useful when a company’s situation can be characterised by the following conditions:

<table>
<thead>
<tr>
<th>Preconditions</th>
<th>Rules to take action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Being part of turbulent markets</td>
<td>Do it fast</td>
</tr>
<tr>
<td>Business and opportunities constantly falling out of alignment</td>
<td>Develop multiple options &amp; make roughly right choices</td>
</tr>
<tr>
<td>Emerging new technologies &amp; services</td>
<td>Run pilot to increase analysis and lower risk or create a shadow organisation (simulation)</td>
</tr>
<tr>
<td>Frequent testing of new business models &amp; rules is required</td>
<td>Get the general manager right (overview &amp; vision)</td>
</tr>
<tr>
<td></td>
<td>Script the details (Task lists &amp; check lists &amp; near term operative goals)</td>
</tr>
</tbody>
</table>

*Figure 2-38: Patching recommendations of Eisenhardt and Brown (1999)*

If the preconditions apply these design recommendations should be implanted into new business concepts. A clear definition of the underlying assumptions and rules helps to minimise the risks, while not restricting the opportunities. Consequently, the proposed concept and the technique to design business concepts take these rules explicitly into account (see ch. 7.2). Appendix G.2 provides an overview on different approaches, their underlying assumptions, and a critique of the normative nature of the business model type view.

**2.3.7 Implications for Invention and Business Lens on E-Services**

The innovation perspective presented nature of inventions, generic innovation areas and an introduction to innovation tools. This will be used to elaborate the first phase of the e-service life-cycle. The business perspective presents the underlying elements that are required to evaluate invented e-services and discusses e-service business concepts. Strategy, business networking, e-markets, and economic rules were discussed as elements of business concepts and a literature overview and classification on business concepts was presented. This input will be used to develop the concepts of e-service invention and e-service business concepts in chapter 7.

**2.4 Process and Outsourcing Lens**

The process and outsourcing lens adds the structural and dynamic component and elaborates the resource decision to outsource from a process perspective. Inputs are converted via processes to outputs and are exchanged in inter-organisational processes. This lens focuses on the ‘how’. A brief introduction into organisational structuring for processes is the basis for the dynamic process view. The processes analysed in more detail are procurement processes, service and software engineering processes, customer facing and outsourcing processes.
2.4.1 Organisational Structures for Process Design

The organisational structure received some attention during the case study since organisational design affected the performance of the organisation and is one general condition for the possible processes. In addition, e-services can cause organisational redesign on the customer side. In order to determine or analyse the organisational design possibilities and their implications a brief overview is provided. More detailed accounts are (cf. Galbraith, 1977; Mintzberg, 1979; Gomez and Zimmermann, 1993; Bleicher, 1993; Kieser, 1995).

Organisations emerged due to the distribution of work which is required if a certain level of task complexity is exceeded (see Bleicher, 1996a, 31). The organisation principles differ from functional, object oriented (e.g. region or product focused), project to process based organisations. The latter is defined by the output of a process. Matrix organisations can combine these organisational forms. An innovative matrix organisation could combine functional organisation with process based organisation elements (see Harmon, 2003, 106). Their structure can be centralised or decentralised.

Organisations are the planned and static solution to the harmonisation problem by integrating the elements. For less plannable and stable solutions coordination and situation specific solutions are required (see Bleicher, 1993, 114). The focus here stresses a systemic view of organisations (cf. Irani et al., 2000), which consists of decomposable, interacting goal-oriented entities and their relationships. If organisations are perceived as systems the structure is 'a set of arrangements by which the resources of an organisation (..) are connected through relationships' (Espejo and Schwaninger, 1996). The elements of an organisational structure can be humans, machines or combinations. The organisational structure is a static view that defines the tasks and the borders of the elements. Further it predefines the way the elements interact and exchange outputs. By forming borders an organisation also defines identity, can foster the forming of sub-cultures, and is a basis for power due to patterns of legitimation and domination. Classical structural forms are a horizontal or vertical. The first implies a lateral coordination between elements and the former a hierarchical coordination. Combined with the exertion of authority and culture a continuum can be established that ranges from hierarchical-autocratic organisations to heterarchical-participative (cf. Schwaninger, 1994a).

Categorising organisations from a development, organisation and strategy focus (Bleicher, 1996b, 13) positioned horizontal and process oriented intra-organisational structures versus alliance and virtual organisations for inter-organisational arrangements. For e-services process based and virtual organisations with partners may suit for short to medium term opportunities. For long term and stable business models alliances and hierarchical organisations can be more favourable. The decisions needs to be based on the context and the partners involved (see Figure 2-39).
2. Theoretical Foundations of E-services

Focus on Development

Focus on Organisation

Focus on Strategy

Depending on the type of service and the processes the service organisation can be defined. It can be characterised by a front-end part interacting with the external factor and a back-end service operation part. The service organisation can be depicted in two extremes (see Figure 2-40). The degree of interactivity defines the need of customer contact.

The often used organisation chart, can at best, offer only a partial status quo view of the rich interdependencies that form the mechanisms of interaction in organisations (cf. Malik, 1992). The quality and suitability of an organisation can be defined as organisational effectiveness, which depends upon managing interdependencies so as to move from functional orientation to process orientation that is from a tayloristic to a systemic paradigm (see Espejo and Schwaninger, 1996, 23). The organisational structure needs to be aligned with the strategy, partners, processes and resources but also should fit the culture and norms (cf. Gomez and Zimmermann, 1993). If a company follows a process design the organisational structure should foster the output and internal production processes. IT can enable the breaking up of hierarchies (cf. Malone and Laubacher, 1999; Hammer and Champy, 1993).
2.4.2 Process Management and Outsourcing Overview

The focus on process orientation started in organisational theory like Galbraith (1982) or Grochla (1972). The subject of business process reengineering (BPR) received wide awareness with the publication of Hammer (1990) and the subsequent books of Hammer and Champy (1993) and Davenport (1993) for the USA or Ferstl and Sinz (1993) and Osterloh and Frost (1994) for business process modelling in Europe. A process is a set of goal-oriented activities, which are to be undertaken in a specified sequence, with clear inputs and outputs, and which may be supported by information technology applications. Its value creation consists of outputs to customers (see Österle 1995, 62). Business processes are generally independent of formal organisation structures.

BPR focused on process redesign from a clean sheet, which gave rise to outsourcing and more intense use of ICT. In the 1990s the process orientation received more attention and some companies like Xerox changed their organisation to become process oriented. However, the move from a functional to process-based organisation rarely happened (see Seltsikas, 1999, 951). The implications are that self-governance and empowerment were to substitute functional control mechanism, which requires more complex mechanisms for coordination, which surmounted the ability to change of most companies.

Harmon proposes an encompassing view on the business process orientation that links to the business strategy, processes as well as ICT in a dynamic change view (see Figure 2-41).

From a process perspective the following processes will be discussed: (1) Procurement process from a buyer’s perspective; (2) Service processes; (3) Customer orientation and sales
2. Theoretical Foundations of E-services

processes; (4) Innovation processes; (5) Service engineering process for potential e-service providers; (6) Software engineering process for electronic elements for e-service providers.

A correlated subject is that of outsourcing, which can be one option to improve processes. Outsourcing describes a contractual relationship between the company in focus and an external service provider. Hirschheim and Dibbern (2002, 7) define it as the use of external agents to perform one or more organisational activities (e.g. purchasing of a good or service). The term is used here in favour of similar terms like outtasking, make or buy, virtual organising etc. as it is well researched.

Much literature focuses on IT-outsourcing (cf. Willcocks and Lacity, 1999; Clemons and Reddi, 1994; Dirlewanger, 1991; Hammersmith, 1990b) and their inherent risks and problems. Outsourcing of other formerly core business processes like parts of human resource management, accounting or procurement (cf. Möller 2000) are less frequently discussed in literature (cf. Zahn et al., 1998). A second strand is the strategic management literature focusing on core competencies or the resource-based view (Wernerfeld, 1984) of the firm (cf. Quinn, 1999a; Quinn and Hilmer, 1995; Hamel and Prahalad, 1994) (see ch. 2.3.2.1).

Harmon (2003, 83) presents an integrated view of business process management, outsourcing as well as ICT ordered by strategic importance (x-axis) and process complexity and dynamics (y-axis) (see Figure 2-42).

![Figure 2-42: Process change actions categorised](image)

2.4.3 Holistic Procurement Process as Focus Area

The purpose of this section is to describe the environment of the application area of e-services supporting inter-organisational procurement processes. It presents a holistic perspective on
procurement, which details a process perspective originating at the buyer. This approach helps to identify process needs at the starting point from a customer perspective.

Procurement is an important function of any company that produces products or services on the basis of externally sourced input factors (cf. Porter, 2001, 75). Seen from a systems perspective the value generation of a company relies on some kind of external input in order to produce the output that justifies a company’s existence. To draw a biological analogy, every organism has to organise its procurement of nutrition. Some organisms organise it independently; others need the cooperation of other organisms (symbiosis).

Procurement is the sum of organisational and process arrangements to build and maintain a business network’s stream of inputs. It extends the view over companies’ borders and includes intermediaries, suppliers and supplier’s suppliers. It starts with the need specification and ends with after-sales services (see Kalakota and Robinson, 1999, 233) (see Figure 2-43).

Similar terms not used are: (1) purchasing, which denotes an organisational perspective with a focus limited to the functional purchasing activity (2) materials management is too object-focused and often used only within one company (see Bowersox and Closs, 1996, 36) (3) logistics is too goods flow-oriented and not focused (e.g. it is used for information, financial and for physical goods logistics (cf. Szyperski and Klein, 1993; Alt, 1997).

Input factors can be tangible, intangible goods (e.g. information, rights, energy), and services, as well as complex products of partners in R&D cooperation relationships. Companies spent between 50-70% of their revenues to procure these inputs. Furthermore, improvements have an impact on the viability of the whole company or even the business network. Dobler and Burt (1996) and Arnolds et al. (1998, 33) provide an example that a 4% reduction of the procurement cost increases company profits by 40%, based on an ROI schema. In addition, improvements in procurement can lead to a higher flexibility, quality and transparency of the process, which again impact the inputs that can be procured. Lastly, procurement capabilities and know-how limit or enhance the strategic options a company has, when considering the make-buy-or-cooperate decisions.
The section starts with a brief overview on the history of IT-support for procurement processes. This leads to the introduction of five relevant dimensions that shape the e-procurement processes. The identification of these five interdependent dimensions is the result of working together with e-procurement software and service providers as well as users of e-procurement solutions in several projects. They appeared to be relevant themes in order to improve or redesign a procurement process. The dimensions of the holistic procurement process are (1) procurement goals and strategies, (2) input categories, (3) power relationship and the (4) as-is procurement process. It corresponds with Halusa’s (1996, 88) key questions for procurement processes: what to procure (2), from whom (3) and how (1, 4). The last dimension is the ICS implementation dimension that contains information systems, communication systems and internal or external e-services (5) to enable innovative processes (see Figure 2-44).

![Figure 2-44: Influencing elements on the procurement process from a buyer’s perspective](image)

This multi-dimensional view highlights the complexity of providing a solution for e-procurement. Applying a biological analogy the myriad of living organisms has also developed a myriad of input factors and processes how these are supplied. The influencing elements present a framework that facilitates the identification of the basic conditions for a choice of an e-procurement solution. A holistic perspective on procurement contains other actors like suppliers, intermediaries or other 3rd party organisations.

E-procurement can be defined as the inter-organisational ICS enabled procurement process conceptualisation, implementation, execution, management, and development. E-procurement is not new since parts of the procurement process have been automated for years depending on the industry and type of input. With Internet technologies, inexpensive networks, standards, and available applications, the extent to which procurement can be transformed into e-procurement rises. Examples of solutions are data and process integration via EDI or supply chain management software, e-markets, and e-services like auction services.

The procurement process can be innovated via software solutions and by using e-services. This offers new opportunities to enable trade relationships that use redesigned processes. The opportunities which are analysed are to become a provider of e-services or a user of advanced
2.4 Process and Outsourcing Lens

e-services and solutions for e-procurement processes. By using e-services companies can increase their flexibility to (proactively) respond to market and internal requirements.

2.4.3.1 Historic E-procurement Process Development Overview


One reason why the penetration of e-procurement has been lagging behind was that in many companies purchasing and procurement did not have strategic importance (cf. Hamm, 1998, 11). Since the importance of the procurement function has risen in recent years, an increasing pace of adoption of electronic solutions to support the procurement process across industries can be observed. The Internet has recently become a major driving force to change behavioural patterns as revealed by a study by AT Kearny (see Figure 2-46).

Figure 2-46: Potential development path of e-procurement (adapted from Hamm, 1998, 32)

Figure 2-46: Use of the Internet for external expenditure (see Kearney 2000)
2. Theoretical Foundations of E-services

They report a ten-fold increase. In an empirical study Abhay et al. (2001) have researched an 18% penetration of e-procurement activities in 2000 in the US. They defined the use of ICS at any step of the procurement process as e-procurement, which means that the penetration concerning all input categories and process elements is still low.

2.4.3.2 Dimension 1: Procurement Goals and Strategies

Procurement can fulfill different goals in a company. Historically, the main goal was to cut costs (cf. Hamm, 1998) and concentrate on the procurement of high value goods on the basis of ABC analysis (see Cater, 1999, 81). In the last years this changed with the growing importance of procurement. This is due to an increasing expenditure as percentage of revenues from 42% to 48% from 1995 to 2001 and its impact on bottom line performance. An A.T. Kearney survey found that CEOs assessed the importance of procurement (1) for shareholder value increasing from 15% to 74% and (2) for competitive advantage from 8% to 57% in the years from 1995 to 2001 (see Kearney 2000, 3).

An appropriate response to this shift is a segmentation of different supply strategies, tactics and approaches (Cater, 1999, 81). Consequently, the goals are extended towards reducing risks, maintaining strategic relationships, focusing on process streamlining and a reduction of process cost or maximising volume (single sourcing).

These goals are depicted in a strategic procurement grid (see Cater, 1999, 89), which combines the supply segmentation with the purchasing goals for goods and services. The two dimensions are: (1) risk or exposure that the products inherit for the company and (2) the cost/value ratio, which indicates the potential savings (see Figure 2-47). Additionally flexibility and revenue general come into play when considering new potentials of e-procurement and e-services.

Indirect goods represent one end of the continuum of procurable sources. Until recently these materials were not in focus of management attention since the process costs were not transparent and the value of the single purchase is low. Overhead costing, process management...
accounting, and business process reengineering highlighted these deficits. Companies have procured these items referred as indirect goods via paper based processes (see Dolmetsch, 1999).

To summarise the goals identified in academic literature (see Hamm 1998; 164 Kearney 2000; Cater 1999), consulting and research reports, and the author’s own practical experience, generic goals for the main product categories are depicted in Figure 2-48. They may deviate in a specific situation but describe a possible prioritisation to consider.

<table>
<thead>
<tr>
<th>Goal</th>
<th>Indirect/MRO</th>
<th>Direct/Plannable</th>
<th>Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary goal</td>
<td>Process cost reduction</td>
<td>Risk reduction</td>
<td>Process efficiencies</td>
</tr>
<tr>
<td>Secondary goal</td>
<td>Better control over the procurement function</td>
<td>Cost of goods reduction / single sourcing</td>
<td>Better control</td>
</tr>
<tr>
<td>Third goal</td>
<td>Standardisation of procurement</td>
<td>Improved supplier relationship</td>
<td>Improved supplier relationship</td>
</tr>
<tr>
<td>Fourth goal</td>
<td>Transaction time improvements</td>
<td>Process optimisation</td>
<td>Standardisation of procurement process</td>
</tr>
<tr>
<td>Fifth goal</td>
<td>Preferred supplier relationship</td>
<td>Maximise leverage</td>
<td>Cost reduction</td>
</tr>
</tbody>
</table>

Figure 2-48: Goals for the procurement of different product categories

2.4.3.3 Dimension 2: Input Categories

The next interdependent dimension is inputs. The term input is used to summarise goods, services, intangibles, and materials offered by suppliers or intermediaries to buyers. From a buyer and supplier perspective, this is the most critical dimension, since it defines the purpose of the exchange relationship based on a market and/or resource decision. The required inputs play an important role in configuring the procurement process, since their characteristics partially determine the processes that can be used. The input dimension also influences and is influenced by the power relationship between the parties (see Fig. 2-44).

Input categories are classified broadly into indirect and direct inputs to facilitate a clear argument. This is refined this by adding sub-categories and a brief characterisations thereof. It aims to promote an understanding of why different processes are established and what the procurement goals in acquiring these goods and services are.

Advanced ICS solutions enable new processes to be applied to product groups that were not previously procured in this way. An example is the increase in the use of electronic auctions to improve the tendering process for frame contracts covering office materials, commodities or excess goods.

The classification as indirect or direct goods and services depends on the power relationship and the specific situation of the buyer. For example, a PC can be a direct good for a PC manufacturer but is in most cases it is MRO or a capital good for a buyer like a bank. The difference between the procurement processes for MRO goods via catalogue buying and those of direct goods via collaborative commerce are elaborated in the following figure.
2. Theoretical Foundations of E-services

Goods with high risk and/or high value are more likely to be procured via direct goods mechanisms. The spectrum of goods represented by the grey area is more likely to be procured using catalogue buying and the white area using tools for direct goods (see Figure 2-49).

![Figure 2-49: Risk-value differentiation between two product groups (see Barry, 1999, 224)]

Both categories have different characteristics, which gave rise to new software applications to support e-procurement for indirect or MRO goods in 1998. Figure 2-50 shows a dichotomised view of the different characteristics of goods and process requirements.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Direct Goods</th>
<th>Indirect/MRO Goods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source</td>
<td>MRP system</td>
<td>Catalogues system</td>
</tr>
<tr>
<td>Forecasted</td>
<td>Often</td>
<td>Rarely/difficult</td>
</tr>
<tr>
<td>Order format</td>
<td>Digital (frequently)</td>
<td>Traditional (voice, fax, paper/electronic catalogue)</td>
</tr>
<tr>
<td>Order frequency</td>
<td>Scheduled</td>
<td>Unscheduled</td>
</tr>
<tr>
<td>Average value</td>
<td>&gt; $5000</td>
<td>&lt; $2500</td>
</tr>
<tr>
<td>Transit mode</td>
<td>TL, Rail, LTL</td>
<td>LTL, Parcel, Air Express</td>
</tr>
<tr>
<td>Number of suppliers</td>
<td>&lt; 250</td>
<td>&gt; 5000</td>
</tr>
<tr>
<td>% of expenditures</td>
<td>&gt; 80%</td>
<td>&lt; 20%</td>
</tr>
<tr>
<td>% of transactions</td>
<td>&lt; 20%</td>
<td>&gt; 80%</td>
</tr>
<tr>
<td>Administration cost as % of material cost</td>
<td>&lt; 0.5%</td>
<td>&gt; 25%</td>
</tr>
</tbody>
</table>

![Figure 2-50: Difference between direct and indirect/MRO goods (Killen & Associates)]

Practical work with Deutsche Telekom, Triaton, CXT and others has shown that such a simple classification is only useful to educate about new solutions on a generic level, but insufficient to lead to actionable decisions in implementation projects. A more detailed analysis at a sub-category level helps to identify other product and service characteristics, which may result in a better analysis of the processes required to procure those inputs. An alternative differentiation is a trichotomy of tangible goods, intangible goods, and services (see Hill, 1999, 446) which is theoretically clearer but less used in practice. The advantage is that it shows the
hybrid character of intangible goods, which share the immateriality characteristic of services but have a strong goods character (e.g. software or digital rights).

From a supplier's perspective, goods are physical products that are procured by a buying organisation. The following classification builds on works of (cf. Dolmetsch, 1999; Kilken&Associates, 1997; Kalakota and Robinson, 1999; Reddy and Reddy, 2001; Cavinato and Kauffman, 1999; Grochla and Kubicek, 1976, Barry, 1999; Haluch, 1999) (see Figure 2-51):

<table>
<thead>
<tr>
<th>Name</th>
<th>Synonym</th>
<th>Description, Elements and Examples</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generic MRO</td>
<td>Indirect goods/ materials/products or C-goods</td>
<td>Maintenance, repair and operating supplies. They can be up to 20% of the total value of materials and services procured (Barry 1999, 833). Office supplies, furniture, cutting tools, cleaning supplies, printed materials, presents and (pipe) fittings, uniforms, spare parts, and lubricants.</td>
<td>Products never go into the finished product or service. Account for 70-90% of the purchase orders, shipment expenses and invoices (Barry 1999, 834).</td>
</tr>
<tr>
<td>Industry specific MRO</td>
<td>Indirect goods</td>
<td>Industry specific elements like specific electrical, electronic and mechanical, tools, spare parts, production consumables, construction and building, laboratory equipment for the chemical industry.</td>
<td>Same but industry specific MRO products.</td>
</tr>
<tr>
<td>Direct production goods</td>
<td>Primary/A goods, planned components</td>
<td>Range from complex components to raw materials but exclude energy. Examples are car seats or computer chips.</td>
<td>They are critical for the output generation of the company and often receive the most attention.</td>
</tr>
<tr>
<td>Planned commodities</td>
<td>B-goods</td>
<td>Crude or refined products such as oil, chemicals, ores and agricultural products for building.</td>
<td>Purity of the product strongly influences the processing (Haluch, 1999, 810).</td>
</tr>
<tr>
<td>Planned raw materials</td>
<td>A/B-goods</td>
<td>Products converted into standard products like steel sheet, plastic resins, etc.</td>
<td>Sensitivity to mechanical properties is critical. Impurities may influence the functional properties like electrical, mechanical, hardness, etc. (Haluch, 1999, 809).</td>
</tr>
<tr>
<td>Immaterial products</td>
<td>Intangible goods</td>
<td>Software, patents, rights are examples of software or intellectual property, information products.</td>
<td>They may not require physical logistics to deliver them to the customers.</td>
</tr>
<tr>
<td>Capital goods</td>
<td></td>
<td>Business and computer equipment, printer, telecommunication products, networking suppliers, plant and physical equipment, company fleet. Depending on the industry, this category can be a big proportion of the goods procured. Examples are machines, phones, notebooks or cars that exceed a country specific value for activation.</td>
<td>Goods that become activated in the balance sheet.</td>
</tr>
<tr>
<td>Resale goods</td>
<td>Outourced items and wholesales / retail items, including original equipment manufacturer (OEM)</td>
<td></td>
<td>Goods are not modified by the buyer. The goal is to identify those with a high margin.</td>
</tr>
</tbody>
</table>

*Figure 2-51: Overview on goods categories*
Although services categories (cf. Garcia, 1999; Kalakota and Robinson, 1999; Reddy and Reddy, 2001) already account for the biggest amount spent in procurement (see Figure 2-52 for examples), their importance will increase in the future (see Quinn et al., 1997, 23). The penetration of IT in the procurement of services does not yet reflect that fact.

<table>
<thead>
<tr>
<th>Category</th>
<th>Sub-Category</th>
<th>Characteristics and Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facilities</td>
<td>Design, construction, janitorial, cleaning, maintenance and repair, moving / storage, environmental, pest control, landscaping, and security.</td>
<td>These services are required to maintain the facilities a company owns or uses.</td>
</tr>
<tr>
<td>Logistics</td>
<td>Inventory, material handling, traffic and transportation, salvage and reclamation, and warehousing.</td>
<td>Services that cover the materials flow.</td>
</tr>
<tr>
<td>Communication</td>
<td>Information technology outsourcing services, information services, video teleconferencing, photography, publication, copy, postal services, television, public relations and advertising, and telephone services.</td>
<td>Often a huge budget and major consolidation opportunities for companies with many customers like telecommunication companies. Print and copy services, postal services. Services include information flow.</td>
</tr>
<tr>
<td>Employee</td>
<td>Employment and relocation, outplacement, fringe benefits, training and counselling, uniforms, catering, cafeteria and vending, travel, hotel bookings, car rentals, car leasing, restaurant bookings, temporary workers, and entertainment</td>
<td>Procurement volume is high, if the company has a large number of mobile workers and field sales, requiring hotel, travel, and restaurant bookings or relies on part-time workers.</td>
</tr>
<tr>
<td>Business</td>
<td>Accounting and audit, financial and brokerage, architectural and engineering, market research, marketing auctioneering, consulting, and legal</td>
<td>Some of the standardised services could be procured via an e-procurement system (e.g. market research).</td>
</tr>
</tbody>
</table>

These inputs fulfil various procurement needs discernable in many dimensions. The following list provides an overview of characteristics of procurement requirements (see Figure 2-53).

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value (low)</th>
<th>Value (high)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time dependency / period of time</td>
<td>Short term</td>
<td>Long term</td>
</tr>
<tr>
<td>Value the procured goods or service</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Frequency of transaction</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Specificity of the output</td>
<td>Standard</td>
<td>Individual / customised</td>
</tr>
<tr>
<td>Interdependence</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Automation of demand and orders</td>
<td>Not plan able</td>
<td>Automatically generated orders</td>
</tr>
<tr>
<td>Describability</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Immateriality/Information intensity</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Complexity</td>
<td>Low</td>
<td>High</td>
</tr>
</tbody>
</table>

These characteristics help to define the process design, actors involved and its ICT support potential.
2.4. Process and Outsourcing Lens

2.4.3.4 Dimension 3: Power Relationship Configurations

The implications of the power relationship are analysed under the socio-political lens since political processes are less structured and object of purposeful design than other processes within this section are (see ch 2.5.4).

2.4.3.5 Dimension 4: Procurement Process Continuum Overview

Procurement processes are a subset of business process, which can be designed with a high variance depending on the requirements three dimensions presented above pose. For example, goods and services can be differentiated according to their demand pattern. On a continuum from planned procurement to unplanned or ad-hoc procurement different indirect and direct goods as well as human intensive and digital services can be positioned. Depending on their positioning the goods or services require different processes and allow for diverse ICT enabling potentials (see Figure 2-54).

![Figure 2-54: Examples of goods and service types according to demand patterns](image)

When the procurement process is conceptualised using the customer service life cycle (CSLC) perspective including logistics, information and financial flows (see ch. 2.4.4) an awareness of the process elements of other functions is superior to isolated views (see Kaufmann, 1999, 13). The CSLC perspective enriched with the relevant actors, key decision areas, and an overview of key process variants is depicted in Figure 2-55.
2. Theoretical Foundations of E-services

Figure 2-55 covers strategic sourcing, intention, specific contracting and ordering, the settlement process, and the after-sales process. The figure summarises procurement processes, which are the basis for the analysis of e-services and involved actors in the following chapters. Detailed descriptions of the sub-processes from a buyer's perspective with the involvement of the other parties can be found in Appendix D.

2.4.3.6 Dimension 5: ICS and E-services for E-procurement

Impact of ICS in general and e-services in particular can be depicted with the categories of Venkatraman 1991 (Step: 3-5), see Figure 2-56.

Integration via EDI standards has been common in certain industries since the 80s triggered by with Materials Resource Planning (MRP II) systems and tighter integration needs between companies (see Hamm, 1998, 22). In the late 90s several new application components like supply chain planning and execution systems (cf. Grünauer 2001; Kuhn et al. 1998; Kuglin

With the focus shift towards Internet based inter-organisational electronic networks the shift towards exchanging electronic documents is possible. This offers the opportunity to allow for loose coupling and maximising flexibility by increasing independency of applications without compromising on the semantics. This can be achieved by exchanging XML-based documents and allows for more flexibility than EDI based solutions.

Depending on the type of goods and process employed different documents need to be exchanged. The two extremes of MRO versus direct, planned goods are depicted in Figure 2-57.

![Figure 2-57: Potential document exchange of e-markets (adapted from Eckert et al. (2002, 5))](image)

With e-services companies have the opportunity to increase the level of outsourcing of procurement processes. Theoretically e-services can be used in any part of the procurement process. For each phase e-services could provide benefits in the strategic sourcing, contracting, ordering, logistics, invoicing, payment, support, and business intelligence. Transaction cost economics suggests that services should be outsourced when there are a large number of vendors available to provide a service, since this eliminates possibilities of opportunism (Agraval et al., 2001, 1841). The combination of multiple e-services may support complex processes or support virtual organisations (cf. Klueber et al., 1999) in the future.
2.4.4 Service Processes

The heterogeneity of services and their differing production logic from manufacturing requires different processes. This section briefly introduces to the nature and types of service processes and organisational implications on a generic level. Figure 2-58 illustrates the classical service delivery process with interaction of the external factor that could be an object or a human.

![Service Process Diagram](image)

Figure 2-58: Service process delivery process (see similar Bodendorf, 1999; Gutek, 1995)

Figure 2-58 further highlights the trade-off between product pre-configuration and end-combination. Services can range from little pre-configuration to nearly only pre-configuration, if the service is not customised and has nearly no production costs (e.g. online software download).

The moments of interaction between service provider and customer define the quality of service in the mind of the customer. The time span the service interacts with the customer is termed *service encounter* (see Schostack, 1985, 243). *Service production or delivery* is the core process that defines the long-term success of the service. Depending on the interactivity of the service different strategies and forms of service deliverable are possible. After sales support is a trade-off determined by the service delivery technology and the allowance made by customers for response times or times to re-contact the customer actively.

2.4.5 Customer Orientation, Marketing and Sales for E-services

The sales process of e-services is central to secure revenues and liquidity thereby securing the viability of the service provider. To avoid not realising the full sales potential the following section provides an overview on concepts and theory elements to foster the sales of (e-)services. Actively analysing the customer’s processes is discussed as general approach to increase a provider’s empathy. The following sections address the design options of the customer interaction on the assumption that an e-service can be sold.

Vandermerwe (1990) proposed the customer’s activity cycle as an approach that takes the customer’s perspective and analysed the potential to improve the relationship. It discerns pre, purchase and post purchase phases. A more encompassing and earlier generic model to actively embed information systems with the customer is the customer resource life cycle (CRLC) by Ives and Learmonth (1984, 1193). Their model considers a firm’s relationship with its customers and how this relationship can be changed or enhanced by the use of ICS.
2.4. Process and Outsourcing Lens

An updated and renamed version of it is called the Customer Service Life Cycle (CSLC) to position improved customer service as a key differentiator (cf. Ives, 1999; Ives and Mason, 1990). New innovative business models as well as new ICT capabilities may lead to modify the model to meet requirements of e-services in the procurement process. One process variant is that testing is done before payment. Their generic process will be the general model of reference for process classifications in this thesis (see Figure 2-59).

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Acquisition</th>
<th>Ownership (Stewardship)</th>
<th>Retirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establish</td>
<td>Specify</td>
<td>Select</td>
<td>Order</td>
</tr>
<tr>
<td>Requirements</td>
<td>Source</td>
<td>Authorise &amp; Pay for</td>
<td>Acquire</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Test &amp; Accept</td>
<td>Integrate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Monitor</td>
<td>Upgrade</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maintain</td>
<td>Transfer</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Dispose</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Account</td>
</tr>
</tbody>
</table>

**Figure 2-59: Customer service life cycle**

The use of the model has the following major advantages:

- Actively assume the customer’s perspective by perceiving the products and services offered by a company as resources or services from the customer’s viewpoint
- Provide a research tool that encompasses early phases of the customer’s decision making in order to stimulate new, innovative service offerings (holistic approach)
- Apply the model to the customer’s customer for more complex value chains
- Categorise existing competitive information systems
- Provide a prescriptive tool for generating new applications
- Provide a basis to compare different process variants
- Identify the IT support for each part of the process

If full customer process support is not achievable by a single company, it raises the need for partnering. Most of the literature in procurement (cf. Dobler and Burt, 1996; Tempelmeier, 1992) focuses on a single enterprise perspective. Instead, it is actively included that functional and organisational boundaries crossing processes can be better suited. It attempts to highlight the benefits of using e-services to enable a wider electronic process support. Cooperation is a form to organise procurement in business networks to realise organisational concepts envisioned in the early 1990s (e.g., virtual organisation by Davidow and Malone, 1992).

The CSLC model can be detailed using a more targeted approach towards e-business presented by Hackbarth and Kettinger (2000). They propose the Customer-Supplier Life Cycle model which is limited to the acquisition and ownership phase but highlights the interaction between customer and supplier.

The CSLC (cf. Ives, 1999) takes on the customer’s customer viewpoint, which is a buying organisation. In addition, the following perspectives are relevant:

- eService provider, who has an e-market as one of its customers or partners,
- supplier who has a buyer or an e-market as a customer, and
- e-market who has both buyers and suppliers as customers, as well as eService providers as partners or customers and offers e-services itself
2. Theoretical Foundations of E-services

The customer approach is influenced by the type of e-service offered and the customer target group, and the type of input exchanged.

2.4.5.1 Customer Segmentation and Interaction

Customer contact theory for services (cf. Chase, 1981) is a basis to structure the customer approach with customer encounter (ch. 2.1). Customer or market segmentation is a standard step to design a service. The purpose is to build groups of customers which are addressed by specific sales activities to increase the sales success (see Marr and Picot, 1991, 661; Homburg and Faßnacht, 1998, 422; Prahalad and Ramaswamy, 2000, 83). It can be extended by additional customer profiles to address e-business channels. Novak and Hoffman (2001, 19) discuss 16 combinations which could be extended to 25 by adding government. The elements are business, consumer, agent or intermediary, employee, and government customers and their bilateral combinations.

Two challenges dominate: First, how to identify the needs of a customer holistically and second, how to assess the potential to bring about changes at the potential customer. The change within a customer’s organisation can become a hurdle. Kling and Iacono (1989, 15) argue that ‘top managers and other participants cannot rapidly reorganise and improve computer based IS which are troublesome. From a rational perspective, such difficulties should be surprising since ‘skill and will’ should be sufficient to effect social change. But larger scale computer based IS have important institutional dimensions which limit abilities of key actors to transform rapidly some of the abstract information-processing capabilities of computer based IS into concrete systems which serve their interests’. This change inertia can be even bigger if the current solution is not causing any particular trouble. The complexity increases for procurement solutions if the potential customer has a functional organisation. The value proposition for innovation in procurement processes has to be convincing for finance, procurement, IT, human resources, and management perspectives. This situation is similar to the one described by Cooper and Zmund (1990, 135) who identified the individualistic self-interest outweighing organisational benefits in MRP implementations. This requires a clear value proposition to each of the potential groups and a multi-channel communication which has to be balanced with the costs.

2.4.5.2 Mass Customising versus Cost Explosion

Customising of services can be relatively cost neutral if done by the user. Alternatively the customer may pay for customising. In both cases there is the danger of major costs incurred due too much complexity of the offering. Insights from manufacturing and complexity management of variants should help to reduce the risk of cost explosions (cf. Luczak and Fricker, 1997; Rathnow, 1993). Prahalad and Ramaswamy (2000) point out that some customer seg-
ments might find a rich variety too complicated. They recommend that the service should be able to develop with the experience of the customers.

There is a trade off between generic recommendations like modularisation and reduction of interfaces and the goal to learn from customers via rich communication. This needs to be analysed in the specific context. To increase customer value mass customisation has been introduced as a way to address anonymous customers with a personalised service (cf. Piller et al., 2001; Gilmore and Pine, 1997; Pine II et al., 1995; Goldman et al., 1995; Vandermerwe, 1990). Focusing on the cost reduction of customer acquisition, service delivery and after-sales service much of the benefits of e-services are identified (cf. Rust and Kannan, 2002; Rust and Lemon, 2001). Software based services have the potential to reduce the costs per unit while increasing flexibility and variety through mass customising (cf. Piller et al., 2001) and modularisation of service offerings (cf. Picot et al., 2001).

Examples for means to individualise the service offerings with ICT support are customer profile oriented rule based systems, click stream analysis based on past customer behaviour, collaborative filtering based on matching with similar users and cookies to analyse the behaviour (see Zerdick et al., 2001, 238). A closer analysis of the customer segments and profiles may be required to secure a high acceptance of electronic interaction with business customers.

2.4.5.3 Marketing and Sales Processes for e-services

Peppers and Rogers (2001) recommend accepting the higher complexity of the channel management in B2B, which often leads to joint sales approaches with channel partners. In the case of CXT, this implies partnering with both software vendors and consultants. Further, they recommend taking a knowledge-based selling approach accepting a high educational component (2001, 12). The need to build trust with the potential customer is high for services and, due to their electronic nature, even higher for e-services.

The costs of relatively inexpensive online marketing can be high, if only few customers are won. For example banner ads measured by clicks can become expensive if only a small percentage will become customers. Costs of more than 1000 EUR per anonymous customer might be more expensive than personal sales (see Hoffman and Novak, 2000, 180). The choice of the communication mix is a central determinant of the costs incurred and requires alignment with the e-service offering, its business concept and business plan.

2.4.5.4 Customer Relationship Building and Retention

Learning can be used to build a customer relationship. Homburg and Faßnacht (1998) define a simple causality. Customer proximity of the service provider may increase the customer satisfaction, which may increase the customer retention (see Figure 2-60).
The influencing factors may help the service provider to shape his service. Prahalad and Ramaswamy (2000) recommend managing multiple channels of customer experience. This might be even more relevant if a service is new or complex. It can be complex in terms of a wide service scope or in terms of process change or the number of actors involved at the customer's side. Roth proposes a customer retention model targeted to e-services that aligns the target market with the operations choices (cf. Roth, 2001). The model interlinks key buying factors for Web-based procurement, relative value, e-loyalty and profitability. It stresses the links between marketing and operations management in Web-based e-services.

2.4.6 Innovation Processes for Services

The innovation process for services emerged from industry's research and development processes. The terms used are new product development (NPD), new business development (NBD) or new service development (NSD) processes (cf. Janszen, 2000; Bruckner, 2000; Fitzsimmons and Fitzsimmons, 2001). Process and service innovations often depend on each other in the service industries or follow each other (cf. Abernathy and Utterback, 1988).

The innovation or service creation process involves the idea scanning, innovation management and business concept modelling (cf. Goeke, 1998). The nature of the process is relatively unstructured and a not fully plannable. The required resources differ from the following structured service engineering process in that people are more creative, open and free wheeling.

Management of innovations in the service sector is even of more challenging and less developed in comparison to the production sector. The outputs are more difficult to patent and therefore the barrier to copy successful service models is considerably lower than with products where the patent laws apply. Inventions in the service industry take place as the first step in the service creation phase, which requires many sources of knowledge and a high degree of
creativity. The nature of invention processes is that they are difficult to standardise and non-
linear (Janszen, 2000). The consecutive service engineering and service management phases
follow different principles. It might require a different organisation (see Galbraith, 1982, 6)
(see ch. 2.3.7). Applied to the inter-organisational elements of the procurement process a
number of tools are available to support innovation.

In production and R&D research several methods have been invented and used to support the
idea generation, proposal, assessment and selection process in the decision making phase. Not
so in the service sector, where the use of ICS and innovation methods are under-recognized
(Bruckner, 2000, XIII). In his analysis of innovation in the service industry for consumptive
services, Bruckner identified that the tools predominantly serve the needs of institutionalised
R&D processes developed for industrial R&D departments. In non-representative case stud-
ies, project organisations were used for dynamic, networked and ad-hoc processes. Phase-
oriented, institutionalised processes were applied to the majority of the projects to foster in-
novation (see Bruckner, 2000, 194). The study indicates tendencies to transfer phase oriented
approaches invented in industry to services. No other tools than pilot projects and creativity
tools to support dynamic services were identified. Available tools are scenario analysis, brain-
storming, 635, road mapping, feasibility studies, start-up analysis (see Bruckner, 2000, 149).

2.4.7 Information Systems and Service Engineering

Although originating from a different domain, service engineering and information systems
development (ISD) methodologies share some similarities.

2.4.7.1 Information Systems Engineering Elements and Methodologies

Information systems development is a change process that has to cope with means, effect and
problem uncertainty (see Lyytinen, 1987, 7). A typical software engineering method consists
of a system requirement analysis, system design, software development and implementation
phase.

Business process modelling is a sound basis to define the software requirements. It is used to
bridge the language gap between users and developers (Lyytinen, 1987, 24). With advanced
modelling tools UML as a common basis for software modelling and design is becoming
widely used (see Eriksson and Penker, 2000). Software engineering project models range
from the classical waterfall model, via Boehm's spiral model, object-oriented models (cf.
Booch, 1994) to business process oriented models (cf. Sinz, 1995). They are iterative and in-
cremental or strictly sequential.

Software engineering development environments depend on the chosen software platform to
support an efficient architecture, component and systems design. Scenarios, use cases, and
document choreography are proven ways to bridge the gap between software design and us-
ers. The actual design and coding of software for e-services does not deviate from common approaches (Eriksson and Penker, 2000) except for the compliance to the chosen standards.

2.4.7.2 Service Engineering Processes

Faehnrich (1998, 5) defines service engineering as the systematic and customer-oriented development of services. It encompasses a structured approach towards developing the business case and managing the service operations set-up piloting, and roll-out for a service which should help to streamline the process by reducing the service engineering time and costs while achieving high quality and flexibility at the same time. The phases of software and service engineering are similar if one compares the classical waterfall model of software engineering with the service engineering process (cf. Cook, 2002).

<table>
<thead>
<tr>
<th>Service Stage</th>
<th>Activity</th>
<th>Software Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>Formulating the objectives and strategy of the new service</td>
<td>Requirements Analysis</td>
</tr>
<tr>
<td>Analysis</td>
<td>Considering the financial implications of the new service. Examining supply chain issues for delivery of service.</td>
<td>Software Design</td>
</tr>
<tr>
<td>Development</td>
<td>Testing the service design, training, personnel, conducting pilot runs.</td>
<td>Software Development</td>
</tr>
<tr>
<td>Full launch</td>
<td>Releasing the service to the market place</td>
<td>Installation &amp; Operations</td>
</tr>
</tbody>
</table>

Figure 2-61: Service engineering phases compared with the software waterfall model phases

The service analysis phase is often termed in practice as business case. It is to signify a set of tools to evaluate a business opportunity (cf. www.businesscase.com, 12.11.01). Finance literature describes measures like ROI, static and dynamic investment models, revenue drivers and scenarios or the net present value (see Kruschwitz, 1990; Kappler and Rehkugler, 1991; Ziegler, 2000, 219).

The management of e-services poses some specific challenges on the organisation. The service life cycle can be separated in three main phases (see Faehnrich, 1998, 5; Goeke, 1998, 10; Koller et al., 2001) (see Figure 2-62).

Figure 2-62: Total service management process (adapted from Koller, 2001)
2.4.8 Outsourcing Processes

Outsourcing refers to the use of external agents to perform one or more organisational activities (see Hirschheim and Dibbern 2003, 7). According to Venkatesan (1992, 98) companies should outsource components where suppliers have a distinct competitive advantage – for example a greater scale, a fundamentally lower cost structure, stronger performance incentives or better know-how. Kotler (1999, 15) foresees a trend towards outsourcing in his vision for 2005: 'Most companies now outsource over 60 percent of their activities and requirements. A few outsource 100 percent, making them virtual companies owning very few assets and therefore earning extraordinary rates of return. Outsourcing firms are enjoying a booming business'.

*Outsourcing* is a neologism derived from the combination of 'outside' and 'resource' describing the external procurement of services (see Dirlewanger, 1991, 117). Outsourcing of services first occurred in non-core areas of human intensive services for cleaning, facility management, canteen operations or property security (see Picot and Maier, 1992, 16). In the 1990s IT-outsourcing gained importance. Outsourcing will move more into the formerly core areas such as engineering and production as a study of AT Kearny suggests (see 2000, 3). Correlated terms are Keen and McDonald's outtasking to denote a finer granularity of outsourcing activities on a tasks level (cf. Keen and McDonald, 2000) and offshoring to describe the production and delivery of services in foreign countries (cf. Karmarkar, 2004, 101).

Outsourcing can be differentiated by the content and the intensity of the outsourcing relationship. Reiss highlights that also many internal services can be outsourced. He differentiates various forms of outsourcing ranging from central insourcing, decentral insourcing, internal competence centres, to in-house outsourcing, virtual structures and external outsourcing (see Reiss, 1998, 1314). Before a company commits to that step it should thoroughly evaluate the alternatives between make, cooperate and buy (cf. Zahn et al., 1998). The content of outsourcing ranges from minor tasks like payroll processing or hosting to complete outsourcing of corporate functions like IT or procurement outsourcing.

Willcocks and Lacity (1998) define value-added outsourcing as 'combination of the strengths of both parties to attempt to market new products and services' (quoted from Hirschheim and Dibbern, 2002, 10). They identified equity holdings, multi-sourcing, co-sourcing, spin-offs and creative contracting as possible forms. Newer developments are Business Process Outsourcing in the form of ASP or e-business solutions (see Hirschheim and Dibbern 2003, 8). Kern and Willcocks (2002) stress that the risk element of ASPs is perceived higher but in similar categories as IT outsourcing of the 1990s. The risks of suppliers not meeting expectations or revealing unexpected risks and managerial problems during operations can explain the slower adoption of ASP outsourcing than expected (see Kern and Willcocks, 2002, 514). During the whole life-cycle different forms of risks can be identified which can be mitigated.
by several processes like a sound provider selection, contracting and contract monitoring based on distinct service levels. These processes can ensure that the benefits of outsourcing.

Jayatilaka et al. (2003) propose an integrated choice model for ASP offerings based on transaction cost, resource-based, resource dependency, and knowledge-based perspectives. The model is proposed to support the sourcing decision for ASP services from a customer perspective (see Figure 2-63).

![Figure 2-63: Integrated ASP outsourcing choice model](image)

Their model builds upon theory elements that were discussed before except for the knowledge element which is covered in the socio-political dimension (ch. 2.5) and the resource dependency (see Appendix J). It will form a basis for the design and the customer approach for e-services. From a provider perspective, two approaches can be transferred to e-services: The eSourcing Capability Model defines five development levels of e-service providers and defines 93 practices to achieve the highest development level (see Hyder et al., 2002). Swinarski et al. (2002) identify ASP provider capabilities that increase the performance.

Historically, in the early 1990s basic IS/IT operations were outsourced. IT-Outsourcing is definable as the ‘complete or partial externalisation of information processing to external service providers’ (see Hermann, 1991, 8). The first wave of outsourcing solely focused on the goal of cost reduction (see Hammersmith, 1990a, 13). The characteristics of outsourcing offerings are scalability, high degree of autonomy, and open interfaces. The second wave focuses on supporting key business processes, increase partnering with other parts of the organisation, and to create a more responsive organisation, which increases the value of IS organisations to the business.

A characteristic of the relationship with an outsourcing or e-service provider ranges from a vendor-client relationship (see Hammersmith, 1990b, 11) known from early IT-Outsourcing to a partner relationship for more business central and critical services. The term partnering (or business networking) is used to overcome the arms-length conception of outsourcing and to include the potential to source e-service that have never been or are not efficiently offered in-house. A potential to increase the use of e-services is to transform physical services into electronic form. Information services and even more self-coordinating and productised e-
services offer a new potential to outsource and increase the efficiencies and effectiveness of delivery (see ch. 4.3). E-services are supporting that trend to be able to virtually integrate more services. The vision can be that companies focus on core competencies and increase agility, profitability and secure their existence by contracting external e-services.

The more easily services can be transformed to e-services, the better a company can focus on its core competencies and customers. However, the benefit from being freed to have non-core capabilities in-house should not be ‘over’ compensated by increased coordination costs to manage the relationships with the e-service partners. This has important design implications for e-services. Instead of building own competencies companies that rely on partnering may use the customer-service-life-cycle (cf. Ives, 1999) to analyse existing providers, buy the services, integrate them into their processes, use and monitor them and finally upgrade or retire a service. This can be greatly facilitated by reducing the transaction costs due to the use of standards on the communication, data, application and process level and/or using intermediaries. The capability to be able to use and integrate e-services is called e-service readiness. It describes the capability to technically, organisationally and strategically allow for the flexible integration or offering of e-services. It is a specification of the networkability defined as capability of an organisation to establish, maintain and develop relationships with other organisations in order to pursue new common business opportunities or improve the results of an existing business through co-operation (see Fleisch et al., 1999, 776). It encompasses the dimensions of structure, culture, output, human resources, processes and ICT and several subcategories and proposed values (see Fleisch, 2001, 209). A stronger emphasis on the partnering strategy is pursued by Klueber (2000c).

2.4.9 Implications of the Process and Outsourcing Lens on E-services

The process and outsourcing lens covered a wide spectrum of generic processes relevant to offer and consume e-services in procurement. The procurement processes are discussed as primary application area for e-services in this thesis. The service processes link the provider and customer side of services and the customer focusing processes and activities detail the conditions and processes to sell services. The software and service processes build a basis for the design of e-services from a provider perspective.

The chapter closes with the link to outsourcing literature. It puts e-services in the context of well researched area of (ICT)-outsourcing. Moore summarises the interrelationship between processes, outsourcing and the need for innovation by stating that ‘as commercial processes commoditise in a developed economy, they are outsourced or transferred offshore or both, leaving onshore companies with unrelenting pressure to come up with the next wave of innovation’ (Moore, 2004, 87). If one follows this management literature oriented statement the close relationship between process orientation, outsourcing and innovation becomes apparent.
and shows the link between the innovation and business as well as the process and outsourcing lens. The process and outsourcing lens presented generic processes. The theories support the invention and offering of customer-oriented e-services thereby aiming to increase the understanding and success potential of e-services.

2.5 Socio-Political Lens

The importance of the socio-political perspective for ICT and potentially for e-services can be supported by the work of Kling and Saatchi (1982, 5), who see 'computer systems as information processing tools and social objects, which may be highly charged with meaning'. ICT does not only include technical and economic focus but 'encompasses the social and political context the technology is developed and used, the going concerns of the organisation using it, and the extent to which financial, technical and staff resources support it'.

This section complements the business and innovation as well as the process and outsourcing lenses by less directly controllable and influenceable elements (cf. Bleicher, 1997). The socio-political lens complements the discussion by the behavioural issues of learning and learning failures, knowledge management, trust, power and politics, culture as well as coping with change. The issues were raised in business practice and aim to facilitate the structuring of the findings, explain behaviour or propose design recommendations for the management of e-services.

2.5.1 Knowledge and Learning in IT-based environments

Knowledge is a subset of intangible resources of the resource based theory. Human knowledge is a highly subjective and soft resource which is the basis and result of learning processes. Drucker (1992, 95) sees knowledge as the primary resource for individuals and for the economy overall. Organisational learning is considered an element to increase competitive advantage, innovativeness, productivity and effectiveness in uncertain technological and market circumstances (see Balasubramanian 1995, 1). Knowledge and learning were one perspective to analyse the performance of CXT since it set out to be a future oriented business that wanted to define its market. Learning is here seen as an interactive-systemic process whereas knowledge is conceptualised from a factor oriented view (cf. Schneider, 1996).

2.5.1.1 Learning form Customers

Following Huber (1991, 89) learning occurs in organisations 'if through its processing of information, the range of its [organisation's] potential behaviours is changed'. The importance of learning rises if uncertainty and the rate of change are high. Learning is a response to be able to react flexibly to changes in the internal or external environment.

Learning can take place as single-loop, double-loop or deuteron learning, as defined by Agyris and Schöns (1978). Whereas single loop learning defines mere adaptations within an exist-
2.5. Socio-Political Lens

ing system, double loop learning changes the goal system, actions and the operative system itself. The higher level of deuteron learning constitutes learning about problem solving which focuses on improving learning capability itself. It serves to secure creativity, innovation and ability to change (Picot et al., 2001, 468). The different forms of learning can be discerned according to the impact they have on operations, the scope of operations or learning itself. Tigre and La Rovere (2003, 111) stress that double loop learning is especially relevant in e-commerce settings to transform organisations successfully. They claim that ‘electronic commerce depends essentially on dynamic learning [double-loop] in the incorporation of new hardware and software tools, new partners and constant alteration of routines and procedures’.

To learn from customers is propagated to be a promising strategy. The identified customer types to learn from are existing customers, competitor’s customers and internal customers (cf. Berry and Parasuraman, 1997). Customers will be in the role of a co-creators (cf. Prahalad and Ramaswamy, 2000). If a company can achieve an intensive interaction with customers it can learn and adopt faster to meet their requirements. Examples are software development communities, establishing self-supporting communities (e.g. Cisco) or by managing other intensive exchange relationships with customers. For business-to-business intermediaries this could be extended to the whole supply chain including suppliers and partners of the e-service provider. The learning from customers can be achieved by a rich communication with customers via multiple channels. A further implication is that the information captured is stored, monitored and disseminated within the e-service provider and its partners (cf. Berry and Parasuraman, 1997).

2.5.1.2 Knowledge and IT

Quinn (1992) and Quinn et al. (1997) foresee knowledge management in the service sector as a key for innovation when supported by information technologies. The authors promote increased management of complexities through intelligent use of IT. Disintermediation, economies of scale and scope are easier to achieve if IT is used wisely. Earl (1994) stresses the IT-enabled knowledge management as a basis for strategic management. He proposes a combination of social and technological actions. The proposition is that knowledge as strategic capability requires knowledge systems, social and technical networks, knowledge works, and learning organisations.

Walsh and Ungson (1991) have identified six retention sources of organisational memory that form containers for knowledge which can be stored by ICT if employees document the knowledge electronically. They discern individuals, culture, transformation, organisational structures, ecology, and external sources such as competitors or government. This implies that created knowledge is embedded in organisational sources and individual memories.
2. Theoretical Foundations of E-services

2.5.1.3 Linking Knowledge Management and Learning

Information processing differs depending on the receiver. Information is context bound and thus dependent on the subjective interpretation based on the experience, needs and behavioural patterns of individuals or groups, if the receiver is a person.

The actualisation of information is the basis of knowledge creation. Knowledge creation forms a separate process, as depicted in Figure 2-64. By using a production oriented input-throughput-output model of the production of information, the acquisition of knowledge comes through information (see Wolf, 1996, 1). Knowledge is required in order to act upon information. Relating and updating of know-how or know-why is necessary to build new knowledge (see Berners-Lee, 1999, 71) and describes a learning process.

![Diagram](image)

*Figure 2-64: Relationship between information, knowledge & their use in enterprises (cf. Wolf, 1996)*

If the receiver is a machine, the information processing usually depends on pre-coded intelligence. The same information can define different activities in different programmes, and the reactions might be time dependent. For example, a change in the value of a stock triggers an order to buy this stock, but is only valid within a defined time span. This requires a high standardisation of the semantic content to allow for an automated information processing and coordination via information. To achieve an automated action on a pragmatic level a higher form of agreement is required (see ch. 2.1.2). Learning can thereby increases the potential behaviours and their adequacy which facilitates to cope with or initiate change.

2.5.1.4 Impact of Knowledge Management

From an e-service provider’s perspective knowledge and its management are salient tasks in developing new services. Von Krogh et al. (2000, 128) see it as task of knowledge creation, where simply confirming existing knowledge is not sufficient to create competitive advantage. If the purpose of an e-service is to shape the future, it requires a different mindset, form of conversation, and information exchange between service development participants.
2.5. Socio-Political Lens

Von Krogh et al. (2000, 128) researched the knowledge creation steps in multiple international companies. They defined five knowledge creation steps as to invent, create a concept, justify the concept, support the building of a prototype, and cross-levelling of the knowledge. Additionally, they propose a vertical axis to describe knowledge enablers which are linked to the knowledge creation phases. They found that if a company actively fosters these enablers, it will facilitate the knowledge creation. Both axes define a 5x5 grid, designed to support classical R&D processes in dominantly manufacturing companies (see Figure 2-65).

Jayatilaka et al (2003) identify knowledge integration, risks, and requirements as basis to propose an ASP customer choice model. If the available sources of knowledge are scarce or expensive, the capability to deploy it is low, and the degree of knowledge utilisation is low. Outsourcing to an ASP may be an option. In alignment with strategy, the gap between required knowledge and knowledge leverage defines the gap that could be closed via ASPs. If no firm specific knowledge is required, the customer lacks specific ICT knowledge, and a 3rd party provider offers a wider knowledge. Under these conditions contracting third party ASPs is favourable (see Figure 2-66).

2.5.1.5 Problems of ICS Learning and Change

Learning and change are two closely related topics to maintain a viable organisation (cf. Schwaninger, 1994b). One application area of interest is information system development (ISD). Even though a myriad of ISD methods exist, the rate of failure in software develop-
Theoretical Foundations of E-services

ment still remains high. Lyytinen and Robey (1999, 86) conclude that ‘advances in development technologies are not sufficient to improve the rate of successful system implementation. Rather, ISD projects remain susceptible to failures because organisations fail to learn from their own experience’. They further stress, based on two case studies, that failure in ISD can be self-enforcing. They identified that the existence of barriers to learn leads to failures to learn. These failures reinforce the persistence of invalid ‘myths-in-use’ which lead to learned failure, which in turn increases the barriers to learn (see Figure 2-67).

Assuming that information systems development has properties similar to customised e-service development this theory can be used to explain reasons for performance problems and ways to overcome these (see ch. 9). The model highlights the deeply rooted causes of learning failure that causes ‘smart people to do stupid or sub-optimal things’.

ISD or e-service organisations are unwilling to adjust their practices fail to produce beneficial results (see Lyytinen and Robey, 1999, 87). The learning from external sources such as methods or consultants is often prohibited. Internal barriers are tensions, power plays, and time shortages. Lyytinen and Robey (1999) introduce the ‘theories in use’ as a ‘set of assumed causal relationships between actions taken during ISD and desired outcomes’. They may differ from the ‘espoused’ theories, which might not be in use. Characteristics of theory in use are that they are ‘simple, weakly validated and subject to arbitrary interpretation and modification’. If the vicious circle of learning failures is in operation change becomes difficult. Senge et al. (1999) identify challenges inhibiting the grow of profound change (see Figure 2-68).

<table>
<thead>
<tr>
<th>Challenges of Initiating</th>
<th>Not enough time</th>
<th>Walking the talk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not relevant</td>
<td>No help (coaching and support)</td>
</tr>
<tr>
<td>Challenges of Sustaining</td>
<td>True believers and non-believers</td>
<td>Fear and anxiety</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Assessment and measurement</td>
</tr>
<tr>
<td>Challenges of Redesigning and Rethinking</td>
<td>Strategy and purpose</td>
<td>Governance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Diffusion</td>
</tr>
</tbody>
</table>

Figure 2-68: Challenges for profound change
2.5.2 Trust in Outsourcing and Digital Transactions

One change inhibitor to outsourcing of business critical transactions is trust in the provider. Trust can be seen as a mechanism to reduce social complexity from a systems perspective (cf. Luhmann, 1974). Arrow (1974) defines trust as 'lubricant for economic exchange', which is what e-markets aim for. The challenge however is that the trust can sometimes not be build on single transaction but requires a system redesign on business and ICT level. Sydow and Loose (1994) even goes further to posit 'in a world of increasing uncertainty and complexity, flat hierarchies, more participative management styles and increasing professionalism, trust is thought to be a more appropriate mechanism for controlling organisational life'.

In contrast to most other relationships trust in systems is required which do not primarily involve people the customers know. 'Trust [in abstract systems] is vested not in individuals, but in abstract capacities' and 'is based on faith in the correctness of principles of which one is ignorant, not upon faith in the moral uprightness (good intentions) of others' (see Giddens, 1990). In that sense the digital transaction is not co-present like the traditional mail delivery.

Preconditions for fully automated transactions are means to reduce uncertainty. One is to establish trust in the transaction partners (cf. Tan and Thoen, 2000). Petrovic et al. (2003) propose a model to analyse and increase the trust in digital transactions (see Figure 2-69). They define influencing factors that can increase the trust in the system like information, reputation, and guarantees.

![Figure 2-69: Trust in inter-organisational and electronic business relationships](image)

In human relationships trust building mechanisms are required in the sales and contracting as well as in the transaction phases. In the sales of complex e-services traditional human based and trust building mechanisms are required. In the transaction phase of e-services the trust in an electronic system needs to be established.
Petrovic et al. further propose trust in systems, transaction partners, and control systems. Additional trusted third parties that assess the business model could be a benefit reducing the relationship and trust building costs and time.

2.5.3 Power and Politics

The following section provides an overview on power base relations within organisations, within the supply chain to deduce implications on the use and importance of the diligent use of power.

2.5.3.1 Influencing Factors of Power and Politics in Procurement

An important element to understand procurement relations between organisations and the internal functioning of organisations is the concept of power. It can support the analysis of the status quo and the development potential of (inter)organisational relations. It can support the assessment of the willingness to change and is a means to predict behavioural actions of the involved actors if changes are intended. Farrell and Schroder (1999) have identified a strong relationship between specific power bases and derived influence strategies in the buying process for services. If one can identify relationships between power and influence this lever can be used to change current business relations in supply chains.

The actors must engage in political processes to change the power configurations. Politics form the behavioural and dynamic view to influence the power configurations. The task of corporate policy is to harmonise external interests with internal objectives to define a dynamic flow balance between external and internal environment to guarantee the organisation's autonomy (see Bleicher, 1996a, 104). Corporate policy is bound by external partners to fit with the internal behaviour which is formed by the values and norms of the corporate culture. If there is a misfit barriers of acceptance may hinder the strategies and measures of the management of the organisation (see Bleicher, 1996a, 192) (see ch. 2.5.5 on culture). Political activity is necessarily related to assumptions concerning the distribution and exercise of power and consequently the ability to influence events or actors.

The concepts of power and politics can be used between buyer and supplier, as well as that of intermediaries like wholesalers or distributors or in intra-organisational settings. When simplifying the situation to three actors: buyer, intermediary and supplier, the different power bases can influence the structure of the relationships in different ways.

This section applies existing concepts of power to the inter-organisational procurement setting. The purpose is to provide an instrument to describe, analyse and assess the potential to change the relations between actors. The concept of power is closely linked to trust (cf. Thorelli, 1986) and change of existing rules, relations or structures.
2.5. Socio-Political Lens

The common application of power is to analyse internal relations. Power is not used here with a negative connotation (e.g. nuclear power, political power, totalitarian power). It will be used as a positive means to achieve actions intended of the actors. Power is ‘the potential ability to influence behaviour, to change the course of events, to overcome resistance, and to get people to do things that they would not otherwise do or would become very difficult to achieve’ (see Pfeffer, 1992, 30). The following traits shape power in inter-organisational settings:

- Power is created by a resource dependency, which builds on different power bases such as knowledge, information, brand, reputation, hierarchical order, control of uncertainty, rights, etc.

- Power is relational (see Hosking and Moreley, 1991, 140; Klimecki et al., 1994, 121) and not a characteristic of an entity. One can only possess more power in relation to other people or organisations. Power is needed when one wants to change the course of things and cannot do it alone. History and context shape power. A power difference only exists if both actors agree to the relation and the less powerful actor(s) accepts the power base difference. Power defines the relation between autonomy and dependence.

- Power is dynamically shaped in political processes. Actors or organisations can, depending on their skills and context, erode or strengthen existing power bases. This enables them to change the current status. Political processes are resolving power differences between actors or change the power distribution.

Power differences are resolved through more or less conflictual processes by networking, negotiation, influence and exchange (see Blau, 1964; Hosking and Moreley, 1991, 120). The power assessment is equally important to identify things that cannot change or are unlikely to change, if a more powerful actor objects.

The analysis of power relationships is critical in procurement, but was often limited to buyer-supplier relationships. Figure 2-70 visualises four typical power relationships and corresponding strategies. In a more complex environment of a business network it requires an adaptation towards more actors.

![Figure 2-70: Power analysis in procurement (see Arnolds et al., 1998, 319)](image)
Apart from its impact on the structural design, the power relationship influences the implementation of structural changes in a supply chain and the design of its inter-organisational processes. Depending on the power base of driving actors various configurations are possible. For example, the business network in the automotive industry differs from that of the pharmaceutical industry by not having strong wholesalers, which protect the direct access to customers as one country manager stressed. These differences can be explained by a different history, governmental regulations, power bases, relations and ways to exchange of goods and deliver services.

The relevance of the power dimension lies in influencing the design of the business processes and the structural configuration of actors in their business network-forming phase. Power bases influence the forming, storming, norming, and performing phases of a business network. Several power bases have been identified for groups: reward, coercive, legitimate, referent, expert and position power (see Fiedler, 1967, 68; French and Raven, 1968, 262; Hosking and Moreley, 1991, 141; Thorelli, 1986). These have rarely been transferred to inter-organisational procurement relationships.

### 2.5.3.2 Implications of Diligent Use of Power for Actors in e-procurement

Structures and processes in procurement are changing, influenced by e-procurement initiatives from corporate, software and e-service provider background. The question is how can one achieve corporate goals better by using power diligently? The opportunity for entrepreneurs to make change happen is in using their business models and networking power to play according to the rules of e-business (cf. Kelly, 1998; Shapiro and Varian, 1999). The power bases for forming and managing business networks elaborated in Appendix D.8 are summarised in Figure 2-71.

<table>
<thead>
<tr>
<th>Power Base</th>
<th>Description</th>
<th>Sources of Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position</td>
<td>comes from an actor's position in a particular network of relationships and the power it can give him to manipulate and mobilise resources</td>
<td>history, reputation, brand, size, ecosystem and relative competitive position</td>
</tr>
<tr>
<td>Legitimate</td>
<td>derived from a formal authority</td>
<td>national or international law</td>
</tr>
<tr>
<td>Expert</td>
<td>(Believed) Knowledge, skills, experience of a person or an organisation</td>
<td>domain knowledge or capabilities</td>
</tr>
<tr>
<td>Reward and coercive</td>
<td>Members of groups have to comply with specific rules and are rewarded or punished accordingly.</td>
<td>group rules, regulations or market share</td>
</tr>
<tr>
<td>Business model</td>
<td>influence another organisation through a superior business model and its penetration in the market</td>
<td>capability to innovate, knowhow, communication and implementation</td>
</tr>
<tr>
<td>Information</td>
<td>actor has or is perceived to have special information that other actors desire</td>
<td>Access to information</td>
</tr>
<tr>
<td>Networking</td>
<td>People or organisations with perceived privileged connection to powerful individuals or organisations</td>
<td>personal contacts, ability to form new contacts, and ability to work with networks</td>
</tr>
</tbody>
</table>

*Figure 2-71: Overview of power bases in business networks*
Several tactics of reducing resistance of e-service adoption can be derived from the MIS literature (see Appendix D.8). The tactics have implications on the management, processes and success potential of e-services. A possible use of the political analysis can be derived from interaction theory (cf. Markus, 1983). The adapted recommendation would suggest the following procedure:

1. Identify your actors and assess their interdependencies (see Markus, 1983, 441) to diagnose functional requirements and organisational settings the system or e-service is used in.
2. Define the power bases and their current relational impact
3. Deduce potential resistance of the actors
4. Create possible influence strategies of changing unfavourable power situations and avoid resistance (see Markus, 1983, 441).

Power analysis helps to identify the strength of resistance to change and ways to overcome it. Although it requires additional work before starting to implement or use a system or e-service (see Markus, 1983, 441) believes that 'the results produced from the application of the interaction theory of resistance are often substantially better than those produced from the application of the universal heuristics derived from other theories' as it takes into account the specific context of a given socio-technical system.

The analysis allows identifying lock-in situations caused by non-standard solutions and switching costs towards new processes and solutions that are grounded in history. Power bases help to assess the past, which has implications to future behaviour and possibilities. Based on that analysis a market entry strategy for an e-service may need different approaches depending on the power relationship situation in focus. In an industry that can be characterised as oligopoly a neutral start-up may not have a chance to change the current structure even if its business concept is superior. If it cannot compensate the lack of position power with other power bases, benefits and subsequent influence strategies, the success is unlikely. Resolutions may be to wield power by increasing the accessible power bases (e.g. through cooperation with a powerful partner through networking power) or by choosing an alternative industry.

2.5.4 Cultural Perspective

Another emergent issue to understand the internal decision making process and the collaboration and interaction within and between organisations is the cultural perspective. It appeared that an understanding of the forming of sub-cultures is required to describe and influence the existing structures at CXT. Additionally, the understanding of different cultures and subcultures of customers and partners may help to act and communicate more efficiently and increase the commitment.
Culture has been defined as 'a learned way of perceiving, thinking, and feeling about problems that is transmitted to members in the organisation' (Schein, 1984 cited in Walsh and Ungson, 1991, 63). In contrast to the organisational design it is widely accepted that the culture of an organisation is not fully manageable (cf. Bleicher, 1996a), but is an element that influences the performance of an organisation. Corporate culture 'forms the perceptions and preferences of the members of an organisation in their choice of goals and measures. It 'transports behavioural values and norms from the past into the future' (see Bleicher, 1996a, 105). The corporate culture enables informal integration of tradition, past and present within the socio-technical system. Thereby it forms the basis for future innovation or builds barriers for innovation.

Schein (1985, 15) discerns three levels of an organisational culture with decreasing level of transparency. The first level represents artefacts like technologies or work organisation, the second are values and norms, and the third are basic assumptions like the relation to the environment or assumptions about reality and time.

Markus (1983, 432) states that the culture of an organisation can be power-oriented, cooperative or following theory Z. The employment contracts can be professional, bureaucratic or semi-professional. The chosen interpretive paradigm assumes that individuals and sub-groups have different objectives and tasks. They can be expected to try to achieve these local goals as opposed to the global organisational goals whenever differences exist (cf. Dalton, 1959). The phenomenon of sub-cultures is important when dealing with organisations in order to understand the differing behaviour of groups and departments. Sub-cultures emerge if the level of interaction and the intensity of personal experience is low. The lack of interaction fosters the building of own values, identities and convictions. Subcultures are easily formed similar to the formal organisational system (see Bleicher, 1997, 231). It often happens that groups of departments show similar behaviour. J. Martin and C. Siehl identify the possible relations between subcultures and corporate culture as enhancing, orthogonal or countercultural. The latter can be conflict-ridden.

Ashby's law postulates that only variety can absorb variety. Applied to cultures within dynamic and instable environments it suggests differentiated corporate cultures and subcultures can be favourable. Bleicher (1997, 246) presents a life-cycle perspective on the relationship of corporate and subcultures in an organisation's life cycle (see Figure 2-72). A start-up company usually starts in quadrant I where subcultures are weak since they are oriented to the founder or founding team (strong corporate culture). The move to quadrant II is characterised by growth and a strong identification with the company's emerging corporate culture and its founder. Quadrant IV is critical since the complexity grows and strong subcultures emerge. This might become dysfunctional, if the corporate culture becomes weak and subcultures dominate (quadrant III). The organisation may get bureaucratic. If subcultures get too strong
increasingly protective actions against other subcultures dominate. A move to quadrant I and a dismantling of the organisation may begin.

Factors that promote coherent cultures are small closely connected organisational units, continuing groups with little fluctuation, promotion from the own organisation and continuity of strong leadership. Schein posits that management can influence the building of subcultures. The outcome can be positive by increasing the capability to cope with the external variety or negative by decreasing the variety through a lack of differentiated subcultures and a coherent corporate culture.

2.5.5 Summary of the Implications of the Socio-political Lens

The socio-political lens summarises the literature on the human and behavioural side. It addresses the less directly manageable and emergent aspects. Knowledge is discussed as both output of e-services and a requirement of an e-service provider to adapt to its environment. Learning, change and trust are discussed as soft factors in the context of information-intensive output as they can become potential hurdles for a successful e-service adoption. Power is discussed in the context of ICT and procurement as a central aspect to bring about change and to understand the influencing potential to increase the success of e-service offerings. Trust and power relations are even more relevant in inter-organisation relationships since formal order and control mechanisms do not apply. The section closes with a brief synopsis on the culture and culture aware management.

2.6 Discussion of the Lenses

The discussion revealed a body of literature that is applicable if e-services are seen from a holistic and change perspective. The presentation of the data and the analysis will use the five lenses and more importantly the underlying theories allocated to the lenses presented above.

E-service specific literature is reviewed in chapter 4 and enhanced by the own proposal of the terms and initial frameworks to prepare the presentation of the data and to provide a theoretical basis for the discussion in the analysis part of the thesis.
3 Choice of Research Approach and Methods

This chapter provides the reasoning for defining the scope ('what') and the design ('how') of the research. Further, the rationale ('why') for the research (see ch. 1) is complemented by personal experience of the researcher and the conceptual framework (ch 3.2).

The chapter starts with an overview on the research approach (ch. 3.1) followed by the justification of the research area, the goals, the conceptual framework, and the research questions, which define the scope (ch. 3.2).

The second part addresses the design of the research (ch. 3.3) and the resulting research process (ch. 3.4). It includes the justification for the chosen methods, data collection techniques, analysis, and the chosen process. Appendix A supplements this chapter in presenting the argument leading to the choice of the research methodology as well as an assessment of the value of the research and its design dependent implications on interpreting results. This chapter closes with a summary of the choices.

3.1 Research Approach Overview

This thesis is based on an understanding of management and IS research as applied social sciences (cf. Ulrich, 1981). It focuses on socio-technical relationships and rejects a positivist approach, accepting the premises of a post-positivist approach (cf. Lincoln and Guba, 1985). Some of the premises are that business reality is too complex to be efficiently simulated or modelled or that human behaviour is too erratic, context-sensitive and difficult be reproduced (see Appendix A).

The research questions were defined in close collaboration with business practice. They focus on learnings and implications of inventing, designing and offering early e-services. The research explores the nature of e-services and how they can be designed and applied to business practice resulting in economic benefits. The focus area for e-services is a holistic procurement process. By involvement in real-life projects the researcher was able to explore the situation from a provider, consultant and user perspective complemented by academic objectives.

The research goal is to gain explanatory and predictive insights into the design and offering of e-service influenced business reality within the limits of social research. By focusing on understanding practical situations, decision and action alternatives the research aims to generate future-oriented concepts and design recommendations for meaningful practical action. The research methodology chosen to achieve these goals is interpretivism (cf. Walsham, 1995).

The chosen methods to answer the research questions are an amalgamation of action research, qualitative methods and case research (see 3.2.1). The approach dominantly follows canonical action research (AR) as defined by Baskerville and Wood-Harper (1998). It aims to obtain meaningful scientific insights and simultaneously improves the structures and situations in
3.2. Research Scope

business (cf. Kock, 1996). The favourable application of an elective multi-method and multi-
theory approach to study information systems as discussed in the research design can be cor-
roborated by several authors (cf. Fitzgerald, 2003; Chisholm, 1998; Sydow, 1992; Orlikowski
and Baroudi, 1991; Creswell, 1994). Chisholm (1998) stresses that AR fits best if interorgani-
sational relationships are studied. Creswell (1994, 174) argues that multi-method approaches
help to reduce inherent bias if only one method would be used. Next to triangulation, the
scope of the research was extended and the complementing effects were used (see Greene et
al., 1989). Multi-theories were required to encompass the new and underresearched field of e-
services (see ch. 4.2).

The results are insights into the interaction between organisations, e-services in inter-
organisational e-commerce settings, the life cycle of e-services, and information system archi-
tecture implications, change, and learning. This touches the very core of business IS. This
assertion can be backed with the German-speaking research community (see Heinzl et al.,
2001, 226) who see the following top research themes for the years 2002-2004, which are
central to the thesis as well: (1) Enhance knowledge of network economy and e-commerce,
(2) Enhance knowledge of interdependencies between IT and organisations, and (3) Enhance
knowledge of ICS architectures.

The following sections explain what the chosen research area is, what influenced the choice
(ch. 3.2), and how the research was conducted in terms of methods, fit, data, data analysis and
research process (ch. 3.3 and 3.4).

3.2 Research Scope

Multiple influencing factors lead to the identification of the research area, the choice of the
research goals, and research questions. Since these choices largely determine the research
methodology, applicable methods and ultimately the type of research outcome the re-
searcher's basis for the scoping decision complement the motivation presented in chapter 1:

- Prolonged project work of the researcher of over 2 years at the Institute for Information
  Management at the University of St. Gallen on inter-organisational information systems in
  procurement, collaborative planning and sales processes (cf. Klueber and Alt; 1999; Klue-
  ber, 2002; Klueber and Alt, 2000; Klueber et al., 2000): Early publications on e-services
  were submitted to conferences (see Klueber et al., 1999, Klueber, 2000, Klueber, 2002).

- A personal focus and history on virtual organising (Klueber, 1997b; Klueber, 1998), co-
  operation (Klueber, 1997a) and a research interest in IS and its business value and social
  acceptance (Klueber, 2000; Klueber, 1999b; Klueber, 1999a).

- Request by managers of CXT to support their e-service development and their interest to
  pursue academic goals in parallel.
3. Choice of Research Approach and Methods

- Only vague understanding of e-services experienced in practice: Often ASP services, online-support or digitalisation of services were understood as e-service. Only a few years later e-services were considered as amalgamation of a trend from products to services called servicification (cf. Drejer, 2002).

These presuppositions and experiences formed the initial framework of ideas (cf. Checkland and Holwell, 1998b) on what the research is about, what epistemology could be useful and what the expected results could be. In an iterative and explorative process these initial ideas and dispositions were refined and finally formed the research scope.

3.2.1 Choice of the Research Area and Research Goals

A general condition and challenge for research on this topic is to manage its complexity. Complexity can be defined as the number of elements, relationships and interfaces between the elements, the number and type of interactions, as well as the sequence of state transitions (cf. Malik, 1992). This topic combines IS, information technology, management, organisational, and social research on strategy, process and information system layers, with multiple actors and possible relationships they form in different life cycle phases. This leads to a high complexity, which is further intensified by the high pace of change in technology, business models and actors as well as their mutually influencing nature.

Simon (1981) suggests building relatively independent modular units or objects as one way to manage complexity. Applied to research it requires delineating the project into interdependent yet self-contained modules to cover the topic. In order to achieve that, the research area, its elements and relationships need to be defined. Figure 3-1 shows the generic interrelated entities of this topic of research in a static view. The primary interaction that shapes the research question is the redesign and improvement of the inter-organisational procurement process of a buying organisation.

![Figure 3-1: Actors of the research area and their relationships](image_url)
3.2. Research Scope

The research addresses the potentials and their implementations that allow e-markets and e-services to facilitate that relationship to the benefit of all participating parties. The relationships this thesis explores are the possible transformation of (1) human-to-human to (2 & 5) either human-to-machine or (3) fully automated machine-to-machine communication, which may substitute (1) by some electronic interaction. Specific roles can be identified when the interactions 2, 3 and 5 are applied to the area of e-services in a holistic procurement process. These are e-service provider, buyer, supplier and an e-market as (virtual) intermediary.

A further way to manage complexity is to define dimensions. The analysis covers technical but even more social impacts in different life cycle phases of e-services. The analysis framework of the five lenses (see ch. 2) uses dimensions to cope with the complexity.

Another means to manage complexity is to choose a certain paradigm (cf. Lincoln and Guba, 1985) and research methodology, which is discussed in Appendix A. The interpretive research methodology was chosen to retain the holistic and meaningful characteristics of the real life events concerning e-services. This approach supports the achievement of a sound understanding and is a prerequisite to develop an intersubjectively tested theory (see Walsham, 1993, 6).

The core of the research is on socio-technical systems and their impact on the design and use of IS (cf. Checkland and Holwell, 1998b) and services (cf. Gutek, 1995). Checkland and Holwell (1998b, 10) describe the IS discipline as messy. They maintain that this 'messiness' is due to 'the relative novelty of the discipline, the gap between theory and actual implementation, and the impact on the culture of organisations and related disciplines like management theory, organisation theory, sociology, systems theory, cybernetics, political science, social psychology'. Service theory is similarly heterogeneous and includes many schools of thought and approaches (cf. Corsten, 1994b; Gutek, 1995; Bruckner, 2000).

The research goals within the chosen research area are to (1) explore the nature of e-services and to (2) elaborate sound concepts, models and frameworks to increase the success potential of e-services in their life cycle and facilitate cautious prediction. It is a consequence to respond to earlier attempts of e-services that did not find a wide customer basis (see HP's initiative in 1998) or an encompassing academic discussion.

The research covers the roles of the service provider and that of an intermediary re-selling the e-service. It also actively involves the perspective of the users of e-services who define the success or can give hints why an e-service failed to provide a beneficial service. The focus on procurement was chosen due to the availability of and access to planned or running projects and customers.

The phenomenon of e-services is described from a management, social sciences, information and communication technology, and economics perspective. This limitation has been achieved through discussions and problem identification with practice. The uncertainty of
what e-services are, what benefits they provide and what ICT infrastructure they require dominates questions on technology, economics, and social phenomena like acceptance. Largely omitted are detailed discussions on topics like security and legal issues since they need only to be solved, if the phenomenon establishes itself. Similarly, technological details are left out since they may change too frequently (e.g. comparison of different XML standards). A main aspect is the social phenomena that define business concepts, business models, design methods and cooperation between companies and people during development and use of e-services. The resulting processes and ICT are subject to interpretation, which influences the development and adaptation process of e-services (cf. Orlikowski, 1992; Zuboff, 1988; Walsham, 1995).

3.2.2 Research Questions and Conceptual Framework

Research in IS and management systems can be considered as applied disciplines. Consequently, research therein should be directed at improving practice (cf. Keen, 1987; Ulrich, 1981). Ulrich (1970) sees the research goal for applied science to support and facilitate the design of business reality. The research should ‘focus on understanding practical situations and providing decision and action alternatives in order to generate future-oriented concepts and design recommendations for meaningful practical action’.

The research question (RQ) arising in collaboration with practice was: How can e-services successfully used in our organisation? How can we offer e-services successfully? This lead to formulate the central research question: How can a greater acceptance and success of e-services be achieved (RQ1)?

Miles and Hubermann (1994, 18) suggest building a conceptual framework to focus on the key areas of the research. It identifies key factors, constructs and presumed relationships between them. The conceptual framework guides the choice of the research questions and highlights the interrelatedness of research question, data and underlying research methodology. The core elements analysed are the interrelation between e-service provider and e-service customer (buyer or seller) shaped by the e-service provisioning process and contributing to the e-service success. This research focus in the inter-organisational setting described above helped to define the selection of the data and the relevant literature. Using this data the following research questions of

- What constitutes e-services in procurement (RQ2)?
- What concepts are relevant to support their life-cycle (RQ3)? and
- How can e-services innovate procurement processes (RQ4)? (see Appendix K)

were derived and answered. The results to RQ2 and RQ3 together with the data and literature were used as input to answer the explorative main research question of how can a higher ac-
3.3. Research Design

The choice of the research questions were driven by the above defined focus and the explorative and qualitative nature of the research approach as well as the chosen research methodology. The missing elements to complete the description of the research approach are the data sampling, the chosen methods, the data analysis, and the resulting research process, which will be detailed in the next two sections.

3.3 Research Design

The research design comprises in accordance with Creswell (1998, 2) the decisions on the entire process of the research from conceptualising a problem to writing the narrative representing the logical sequence. The choice of the applied research methods and the data collection process is influenced by the methodology and the interpretative paradigm chosen but not ultimately determined. Craig Smith (1989 in Walsham, 1993, 14) emphasises that epistemology as part of the research methodology and research methods are interrelated. Strauss and Corbin (1998, 3) define research methods as ‘procedures and techniques for gathering and analysing data’ which provide the means to achieve the results. Research techniques such as passive or participant observation for data collection represent the choices on the lowest level of the research design (cf. Baskerville and Wood-Harper, 1998). The main methods for interpretive research are AR, case study research, ethnography, and grounded theory (see Meyers, 2003). Meyers continues to posit that ‘case study research can be positivist (cf. Yin, 1994),
3. Choice of Research Approach and Methods

interpretive (cf. Walsham, 1993), or critical, just as action research can be positivist (cf. Clark 1972), interpretive (cf. Elden and Chisholm 1993) or critical (cf. Carr and Kemmis 1986). Except for ethnography elements of the other methods are applied according to the underlying interpretive methodology to achieve the explorative and explanatory research goals. This approach resembles Eisenhardt’s (1989) combination of grounded theory building and case study but is based on a post-positivist methodology. It is based on the assumptions of social construction of information technology as described by Sahay et al. (1994).

Since the purpose is to explore and understand emerging e-services in its context the chosen approach is a qualitative one that allows taking account of emergent shifts of focus. A quantitative approach was declined (see Appendix A) mainly due to the early stage of research on the emerging phenomenon of e-services with little comparable data as well as a lack of existing specific theory and common understanding (see ch. 2 and 4). Confirmingly, Eisenhardt (1989, 548) suggests that ‘when little is known about a phenomenon, current perspectives seem inadequate because they have little empirical substantiation’. Further the research questions and the data sources suggest a higher fit with an emergent, qualitative approach that builds findings from the data analysed (see 3.3.2). Qualitative research refers to experiences, behaviours, organisational functioning, cultural phenomena, meaning and interactions (cf. Strauss and Corbin, 1998). The approach of qualitative research is a ‘nonmathematical process of interpretation, carried out for the purpose of discovering concepts and relationships in raw data and then organising these into a theoretical explanatory scheme’ (see Strauss and Corbin, 1998, 11). The approach also views the researcher as part of the phenomenon under investigation. In line with humanistic enquiry it is argued that the researcher’s understanding arises from direct involvement rather than detached observation (cf. Hirschmann, 1986). The characteristics, purpose and application of qualitative research and specifically the action research and case study method within the thesis are outlined below.

3.3.1 Choice of Principles of Qualitative Research and Research Methods

Qualitative research was mainly developed in sociology. It is used here to highlight the social dimension of the introduction of e-services in socio-technical systems. Qualitative research is preferable to positivist research if the nature of the research problem focuses on understanding meaning or the nature of socio-technical phenomenons and intricate details such as thought processes are in the focus of the research (see Strauss and Corbin, 1998, 11). Meyers (2003) concludes that ‘grounded theory approaches are becoming increasingly common in the IS research literature because the method is extremely useful in developing context-based, process-oriented descriptions and explanations of the phenomenon (see, for example, Orlikowski, 1993)’. Grounded theory has the advantage that it supports the discovery of theories and simultaneously grounds it in empirical observations or data (cf. Martin and Turner, 1986).
3.3. Research Design

The core analytical and empirical parts of the thesis use principles of grounded theory in order to build a rich picture of the analysed qualitative data. This allows then for inductive and context-based theory building. Grounded theory can be defined as 'theory that was derived from data, systematically gathered and analysed through the research process' (Strauss and Corbin, 1998, 12). In earlier work Glaser and Strauss (1967, 1) stated that 'it fits empirical situations, and is understandable to sociologist and laymen alike. Most important it works – it provides us with relevant predictions, explanations, interpretations and applications'. Therefore the approach uses empirical data to construct new theory elements for yet under researched fields of social sciences. Instead of the traditional positivist approach of logical deduction from a priori assumptions it does not verify theory but it supports the inductive generation of theory. Glaser and Strauss (1967, 3) proclaim that 'it is a way of arriving at theory suited to its supposed uses'. Sahay et al. (1994, 251) explain that using an inductive process the researcher is concerned with generating evidence which can then become the basis for producing theoretical statements.

The principles of grounded theory are used here to develop and refine new or existing concepts for e-services. Strauss and Corbin (1998, 103) define a concept as 'labelled phenomenon'. It forms the basis of a theory. It is 'an abstract representation of an event, object or action/interaction that a researcher identifies as being significant in the data' (1998, 103). Concepts are the basis for theorising from data by integrating various concepts through statements of relationships. They provide added value to practice since the generation of categories and their properties for general and specific situations is an activity business practice usually cannot deliver. Thereby this work can contribute to reduce misunderstandings and to overcome learning failures. In the sense of Strauss and Corbin (1998, 25) 'a theory does more than provide understanding or paint a vivid picture. It enables users to explain and predict events, thereby providing guides to action'. These guides are here called techniques (cf. Österle 1995; Klueber et al., 2000) to emphasise their practical nature and their guiding power for new situations (see Appendix K). They are not simple cause and effect procedure models but require context specific applicability tests and adaptations. The procedures of grounded theory are used to refine the concepts new concepts or ones derived from literature. Further method elements and general principles of qualitative research were drawn from the work of Miles and Humberman (1994) and specifically form interpretive research (cf. Walsham, 1993; Walsham, 1995; Klein and Myers, 1999).

The proposed research delves in-depth into complexities and processes on little-known phenomena. It aims to reveal real, as opposed to stated, organisational goals, concepts and relevant variables. In such settings qualitative methodologies are best suited according to Marshall and Rossmann (1999, 57).
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3.3.1.1 Action Research Method

Some authors argue positivist research does not apply to socio-technical systems at all, as they are cogently open systems which are not suited for control oriented positivist research principles (see Lincoln and Guba, 1985, 329). Orlikowski (1992) or Checkland and Holwell (1998a) recommend to base qualitative research about the nature of socio-technical systems on action research (AR) principles. AR combines real world action with research reasoning and theorising by becoming an agent of change. Kurt Lewin (1946) is identified as inventor of AR in his search for an appropriate way to study social systems (cf. Probst and Raub, 1995; Dickens and Watkins, 1999; Baskerville and Myers, 2004). Lewin conceptualised it as a 'specific research approach in which the researcher generates new social knowledge about a social system, while at the same time attempts to change it' (see Kock et al., 1997, 5). AR amalgamates the scientific paradigm with the consultant paradigm. Gummeson (2000, 19) states that both paradigms might overlap and simultaneously provide benefits to research and practice. If AR fosters the development of competencies in '(1) interpretation and judgement, in (2) establishing problem-solving procedures, (3) acting in contingent and uncertain situations, (4) learning from one's errors, (5) generating workable new constructs from one's experience' as Susman and Everet (1978, 599) maintain then it qualifies as a suitable research method within the chosen research methodology as the RQs focus on these results to explore e-services.

AR is suitable for intensive in-depth studies, which enable the researcher to get deep insights and use multiple sources of data. Due to its active participation and influencing of contemporary phenomena it provides benefits in accessing natural contexts. 'Action research aims to contribute both to the practical concerns of people in an immediate problematic situation and to the goals of social science by joint collaboration' (see Rapoport, 1970, 499). Kock et al. (1996) claim slightly more intervention-oriented that the goal is to 'obtain meaningful scientific insights and simultaneously improve the structures and situations in business'.

The motivation and application for AR can further be stressed by a citation from Checkland and Holwell (1998b, 9): 'The process of knowledge acquisition which has the strongest truth claim in the research progress of natural science, is based on testing hypotheses to destruction. But the application of this process to phenomena beyond those, for which it was developed, namely, the natural regularities of the physical universe, is methodological. For research into social phenomena, there is increasing interest in 'action research' in various forms. In this process the researcher enters a real-world situation and aims both to improve it and to acquire knowledge'.

Figure 3-3 summarises the five core characteristics of AR for business systems as defined by Probst and Raub (1995) based on Elden and Chisholm's work (1993). One example demonstrates the application within this research.
3.3. Research Criteria

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Exemplary implementation in this research</th>
<th>Sections</th>
</tr>
</thead>
<tbody>
<tr>
<td>AR is interdisciplinary</td>
<td>It involved working with the different departments of the organisation.</td>
<td>Ch. 5</td>
</tr>
<tr>
<td>AR is problem oriented</td>
<td>The research area and problem to be solved was derived in practice and accepted by management as central contribution to the specific context.</td>
<td>Ch. 5</td>
</tr>
<tr>
<td>AR is action oriented</td>
<td>The output of the research was applied to the practice (e.g. method, concept definition, middleware classifications)</td>
<td>Appendix K</td>
</tr>
<tr>
<td>AR requires a cyclical process</td>
<td>The service development process and the techniques were proposed, applied and monitored during the active time.</td>
<td>Ch. 7</td>
</tr>
<tr>
<td>AR requires participation from practice</td>
<td>Achieved through the joint work effort in practical projects and the joint reflection about the results of the interventions.</td>
<td>Ch. 5-9</td>
</tr>
</tbody>
</table>

*Figure 3-3: AR Application at CXT*

The chosen form of canonical AR can be classified according to the dimensions of Baskerville and Wood-Harper into process model, structure, researcher involvement and primary goals. (1) The process model was iterative and in some instances only linear where the context contingencies of the case did not allow for iteration. (2) In the structure dimension the rigorous application of Susman and Everett's (1978, 588) five process steps were applied where possible. (3) The role of the researcher is therefore that of a participant observer (cf. Gomez, 1981) as well as participant actor, who tries to describe and influence the system in focus from within. In the terminology of Baskerville and Wood-Harper the researcher used facilitative and collaborative involvement. The former applied when the author was considered as an expert in the field of business development for e-services. In situations where other actors possessed the expert role the researcher had only a collaborative role. The work relation with the research subjects was of cooperative nature and covered facilitation of the subjects but responsibility for the decisions which interventions were taken rested on the research subjects (cf. Baskerville and Wood-Harper, 1998, 95). (4) The primary goals were organisational development and contribution to scientific knowledge. The research includes descriptions of a socio-technical phenomenon and design recommendations to improve the situation. AR is applied to actively embed the research process into real life situations.

Intervention is a characteristic of AR that differentiates it from participant observation. A further characteristic is the little, if any, control of the environment in contrast to positivist experiments approaches (see Kock et al., 1997, 5). AR has been the dominant mode of data gathering and interaction within the CXT case. CXT was a longitudinal research study where the researcher had a part-time employment as a business development manager for the CXT e-market.

The main topics intensively covered using AR were:

- International standardisation work in the Global Trading Web as a sub-committee member in the e-service and the 'regulation' task forces. The groups were staffed with selected members of the then 60 e-markets using Commerce One's software. The group met on a
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quarterly basis from 2000 to 2001. One active contribution was the proposal of the e-service framework and its application in practice.

- Partnership program design and partner relationship management which was conceptualised, introduced and managed in an iterative process but results are not included here.
- E-service innovation, business concept and service engineering process for e-services (e.g. for logistics and payment processes) was applied.
- Customer needs assessment and pre-sales support including presentations at universities and academic groups to assess and improve the external communication helped to identify and improve communication barriers and positioning of CXT.

The application of AR requires to manage the dialectics between immediate research clients, who directly benefit from the research while it is being conducted, and the IS academic community in general (cf. Kock, 1999). The main distinction between AR and consulting is its active collaboration with practitioners and the deliberate intervention of the researcher with the objective to enlarge the stock of knowledge of the IS community (cf. Meyers, 2003). The purpose of providing direct benefit due to solving highly relevant issues to the company being researched fosters the openness, involvement and depth of accessible data sources.

In compliance with Checkland and Holwell (1998b), the author believes that there can be no separation between thinking about and having experiences in the world. Real life experiences are necessary to interpret, but also to create ideas and concepts, which in turn make sense of (new) experience. This leads to a permanent interaction between both. One can depict this in a learning cycle. Invention of ideas (theory) leads to practices (use of ideas), which in turn leads to the invention of new or refined ideas (theory). A more complex adaptation of this learning cycle has lead to the writing of this work. The author used existing theory elements to define the basic concepts. These were applied to practice which lead to refined substantive theories which are valid in the analysed context and time.

A critique of AR is that it increases the dependency, the potential of being biased, and decreases the credibility of findings due to conflicts of interest. These negative side effects are reduced as the finalisation of the thesis happened more than two years after the actual involvement in the company. This enables the researcher to thoroughly analyse the data and gain more distance from the case specific personal issues, the involvement and political issues within the company. Similarly the time passed helped customers of CXT to be less biased since the key people at CXT changed and negative impacts on the business relationship could be ruled out. Further the feedback from the actions taken was included into the evaluation and learning phases.

In order to assure that research conducted in the tradition of AR can be considered as scientific, Checkland and Holwell (1998a) postulate that the area of concern (research area),
framework of ideas (research themes), and the research methodology are specified ex-ante. In contrast to positivistic research, the applied research method is not as strict but should include phases of reflection on the area and research themes, and its presentation should be in an inter-personal understandable manner. Reflection and iteration of the canonical AR cycle were applied where the context allowed it (cf. Baskerville and Wood-Harper, 1998). Validation of AR is primarily achieved by 'its relief of the immediate social problem setting' (see Baskerville and Wood-Harper, 1998, p. 104). This could be demonstrated for the e-service framework (see ch. 4.2.4), the e-service invention process (see ch. 7.2), the concept of e-services (see ch. 7.3) as well as a first modification of the e-service engineering method (see ch. 5.3.5.2). Further results did not pass the reflection phase due to the termination of the involvement in the CXT environment or were not included in this work.

3.3.1.2 Case Study Research Method

Case studies in qualitative research are most widely used and are 'well suited to understanding the interactions between information technology related innovations and organisational contexts' (see Darke et al., 1998, p. 274). They are useful where 'terminology and common language and set of definitions are not yet clear or widely accepted' (see Darke et al., 1998, p. 279) which is still the case for e-services. Case studies are empirical inquiries which 'investigate a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and the context are not clearly evident' (see Yin, 1994, p. 13). Yin (1994, p. 9) posits they are most appropriate (1) for 'how' and exploratory 'what' questions and (2) when the researcher has limited control over behavioural events. These conditions match the research questions and the complex research area of e-services. Case studies can be used to study and understand the complexity of individual situations in their context.

The multiple case study design approach as explained by Yin (1994) has been chosen in order to investigate e-services in their natural business setting (and cultural context) (cf. Meyers, 2003). Yin (1994, p. 106) proposes four dominant modes of analysis for case study research: (1) pattern-matching, (2) explanation-building for explorative research, (3) time-series analysis, and (4) program logic models. The first two were used to analyse the case study data within the interpretative methodology. Depending on the degree of similarity between cases a literal replication or a theoretical replication can be achieved in the pattern-matching mode. Theoretical replication applies, if the circumstances are considerably different but a replication is probable if conditions were similar. The explanation-building used qualitative techniques such as coding and categorising (see ch. 3.3.4), when emergent issues arose from the data. Following Yin (1994, p. 120) the single cases were first analysed as entities and then a cross case analysis was pursued.
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The selection of several smaller supplemental cases (theoretical sampling) served the purpose of triangulating the findings between cases and the findings of the AR-based work. The goal is to compare situations or identify new phenomena or aspects relevant to the life cycle or success of e-services. In contrast to the AR study of CXT and its environment the author was here only in the role of a passive or non-intervening observer who tried to identify the motivations, expectations, experiences and results of other companies using or offering e-services to improve their procurement processes. The selection was targeted to complement the 'internal' view of being considered as an employee of CXT. The interview data was supplemented by (public) document analysis about the case context.

Case study research was applied to triangulate the results of the CXT AR study in the period from 2000 to 2003 with customer, supplier, rival and competition cases (data triangulation). The data gathering was constrained to limited semi-structured interviews and document research as well as the reviews by the interview partners. The cases were chosen from provider (e.g. SGS) and user (e.g. SIG) perspectives. The external view helps to identify if the problems were only inherent within the CXT and Global Trading Web environment or if similar perceptions, meanings and constructs are used and similar hurdles are discovered in other similar environments.

The critique of case study research and qualitative research in general is that it lacks parsimony, rigour and become overly complex (cf. Eisenhardt, 1989). The questions were made explicit before the interviews and the interpretation strategy was defined to reduce the self bias (see Stake, 1995, 95) but interviewees were free to deviate. The triangulation cases helped to reduce the suspicion of idiosyncracity (data triangulation) and the other research methods (method triangulation) increased the achievement of valuable substantive theory results that might become elements of formal theory.

3.3.1.3 Research Question and Research Method Match

The 'how' and 'what' research questions can be answered by using qualitative methods (see also Appendix A). In accordance with Yin a high fit of the research questions and qualitative methods is achieved if the researcher focuses on contemporary topics in an explorative way and has little control over behavioural events (see Yin, 1994, 6).

The following table presents an overview of the interpretive methods matched to the research question according to the life-cycle stages of the research (see Figure 3-4). The main method in the early phases of research was the application of principles of grounded theory to identify and explore the research area. In the later phases AR and case studies dominated. However, due to the cyclical and iterative nature of the research the methods were practically used in parallel but focused on addressing different outcomes according to the appropriate life-cycle stages.
3.3. Research Design

<table>
<thead>
<tr>
<th>Research Question</th>
<th>Life-cycle stage</th>
<th>Methods available</th>
<th>Methods applied</th>
</tr>
</thead>
<tbody>
<tr>
<td>What are e-services in procurement?</td>
<td>Identify area of concern</td>
<td>Literature, Research, Observation, Understanding, Grounded Theory</td>
<td>Literature, Research, Observation, Understanding, Elements of Grounded Theory</td>
</tr>
<tr>
<td>Which concepts are required to develop e-services?</td>
<td>Explore</td>
<td>Grounded Theory, Case Studies, Ethnography, AR</td>
<td>Elements of Grounded Theory, AR, Observation</td>
</tr>
<tr>
<td>What are possible means to increase acceptance and success of e-services?</td>
<td>Generate theory elements</td>
<td>Grounded Theory, AR, Case Studies</td>
<td>AR, Case Studies (Grounded Theory)</td>
</tr>
<tr>
<td>How can e-services be developed? How does e-service development differ? (see Appendix K)</td>
<td>Apply theory &amp; test results against new areas of concern</td>
<td>Grounded Theory, Case Studies, Ethnography, AR</td>
<td>AR, Case study</td>
</tr>
</tbody>
</table>

Figure 3-4: Research question – research method matrix

Galliers (1993, 96) confirms a tight fit of case study, AR, and interpretive interviews for research on organisational level and focus on processes and methods. The choice of methods for inductive theory building is corroborated by Eisenhardt who argues that ‘building theory from case study research is most appropriate in the early stages of research on a topic or to provide freshness in perspective to an on a topic’ (see Eisenhardt, 1989, 548). Proponents of the other methods have argued similarly (cf. Strauss and Corbin, 1998; Baskerville and Wood-Harper).

3.3.2 Data Collection

The data collection can be divided into four sequential phases. In contrast to positivist research not a random sample approach but an active choice of cases is made that can meet the objective (see Sahay et al., 1994, 252). Starting in August 1998 several cases laid the foundation for the empirical part of the thesis (phase 1). Initial cases with Deutsche Telekom and with HiServ guided the researcher to identify the critical questions when establishing e-services in the early phases of their life cycle. Additionally, e-procurement consulting projects for multi-nationals provided insights into practical procurement processes, integration needs, and IS requirements in different industries.

The topics covered e-procurement processes, business models for e-services, and e-business architectures in order to define the problems, elaborate the concepts, and propose first solutions to these problems in collaboration with practice. In parallel the search for adequate theory elements complemented phase one of the thesis. The research was conducted by means of in-depth collaboration with business practice. It is documented in working papers of the Institute of Information Management of the University of St. Gallen and key insights are documented in the inter-Business Networking method (cf. Alt et al., 2000a) and a book on business networking (cf. Österle et al. 2000). The results are part of a shared work effort by seven researchers at the Competence Center for inter-Business Networking (www.ccibn.unisg.ch)
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together with eight international companies from Europe and USA from 1998-2000. The data is documented in protocols, presentations and reports (see Appendix B for details).

Phase 2 started with the choice of CXT as main focus for the AR-based data gathering. The researcher worked for CXT and conducted intensive (participatory) AR (see Whyte et al., 1989, 514) for a period of 18 months. This formed the test bed for the initial understanding gained in the CC iBN (phase one). It was the second action-based iteration within a similar context. By choosing this approach it was possible to study a contemporary phenomenon in its natural context (cf. Yin, 1994, 13; Benbasat et al., 1987; Meyers, 2003). This high level of involvement and parallel academic reflections provided an excellent means to achieve a deep understanding of the challenges the organisation was facing. May (1997) supports the value of this approach by stating that 'we believe it to be the case that the probability that findings (and interpretations based upon them) will be found to be more credible if the inquirer is able to demonstrate a prolonged period of engagement (to learn the context, to minimise distortions, and to build trust), to provide evidence of persistent observation (for the sake of identifying and assessing salient factors and crucial atypical happenings), and to triangulate, by using different sources, different methods [of] the data that are collected'. Details of phase 2 can be found in Appendix B.

Phase 3 used additional contexts and insights to rival or replicate the CXT case findings in 2001. The research was conducted as mini-cases to provide greater certainty of the findings (Yin, 1994, 50). In depth-interviews from 60-120 minutes, their documentation and reviews by the interviewees (member checking) were conducted with software suppliers (Ariba, CommerceOne), providers of e-services (SGS, tariffic, CommerceOne), corporate research at IBM, and users (SIG, Danzas, chemical company). Details can be found in Appendix B. In order to capture most of the interviewee's meanings and interpretations the interviews were audio-taped and transcribed as recommended by Yin (1994, 50), if the interviewee agreed to be tape recorded.

Phase 4 complemented the data of CXT by interviewing competitors and customers of CXT in 2003 after the AR-based involvement of phase 2 and 3 (see details in Appendix B). The final interviews were directed towards the perception of CXT's services, e-services in general and experience with e-services. These interviews were structured to encompass the motivation, business models, project results and the dimensions of the D&M'92 IS success model. Two more interviews with the head of the successor company e-trade solutions and the former project manager of the first phase of CXT were added to complete the case history beginning of 2004. AR and case study research methods were applied to iteratively define the data sources. When AR-based intervention was not possible participant observation was used to gather the data. Figure 3-5 summarises the resulting theoretical case sampling logic according
3.3. Research Design

to the accessibility and fit to rival or confirm the main study and CXT customer findings (cf. Glaser and Strauss, 1967).

<table>
<thead>
<tr>
<th>Case Category</th>
<th>Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customers</td>
<td>UBS, H+S, SeetalSchaller, B+R, LB Logistikbetriebe</td>
</tr>
<tr>
<td>Non-customers</td>
<td>Danzas, SIG</td>
</tr>
<tr>
<td>Competition</td>
<td>Siemens, Ariba</td>
</tr>
<tr>
<td>(Software) supplier</td>
<td>CommerceOne</td>
</tr>
<tr>
<td>E-service providers (latent new entrants)</td>
<td>Tariffic, inet-logistics, SGS</td>
</tr>
<tr>
<td>Substitution</td>
<td>E-services of suppliers (e.g. B+R, LB Logistikbetriebe)</td>
</tr>
</tbody>
</table>

*Figure 3-5: Overview of the case study-based data sources*

The data sources covered the customer and non-customer, software supplier, direct competition, and substitution thereby covering Porter's (1980) five competitive forces, if the additional e-service providers are considered as potential new entrants.

3.3.3 Data Analysis

The collected data is used in several ways to achieve the desired results. The interview data is refined to form concepts (see ch. 7), assess the success according to the D&M'92 model and was input to the definition of the emergent *e-service success model* from the customer's perspective (see ch. 8), and extend existing theory by elaborating substantive theory on factors contributing to e-service success from a provider perspective (see ch. 9). Due to the restrictions on time and the time-dependency of CXT's specific situation, this research builds on existing concepts and theories (see ch. 2) to achieve an initial understanding and economise on time to define constructs, categories and concepts (see Strauss and Corbin, 1998, 115). The dangers of bias, problem of commonly held meanings and associations, which could prevent the researcher from seeing what is actually there, is reduced by two longer breaks from working with the data.

3.3.3.1 Theoretical Basis for Data Analysis using Principles of Grounded Theory

In social research a concept can be understood as 'an abstract representation of an event, object or action/interaction that a researcher identifies as being significant in the data' (see Strauss and Corbin, 1998, 103). Conceptualising is seen as 'the process of grouping similar items according to some defined properties and giving the items a name that stands for a common link' (p. 121). It is an act of abstraction from the wording of an individual situation. Concepts can be derived via empirical experience or theoretical comparisons from related research (Strauss and Corbin, 1998, 96). Concepts and sets of relational statements are abstractions to define a common language to answer the first and second research questions. Specifying the properties and dimensions of concepts aids the capturing of specific data.

The generic definition of concepts for qualitative research by Strauss and Corbin (1998, 103) is refined to better suit the research goals to increase the success potential of e-services in
3. Choice of Research Approach and Methods

business practice. Concepts are understood here with Husserl (1931) as cognitive tools that capture the blend of experience and imagination. The language for concepts serves to communicate new experiences and functions as a vehicle for guiding new thoughts (see Von Krogh et al., 2000, 85). The definition of Husserl is applied, but supplemented by the active identification of new concepts from the data and the structuring of concepts provided by the researcher derived from Strauss and Corbin’s definition of the term.

Conceptualising involves forming categories and subcategories of concepts and defining their properties and dimensions (p.118) (see Figure 3-6).

![Figure 3-6: Semantic map of concepts](image)

In doing so categories become ‘think tools’ to ponder upon and develop them further. Breaking them down into ‘subcategories, properties and dimensions details the when, where, why, who, how and with what consequences of an observed or proposed category’ (see Strauss and Corbin, 1998, 114). In most categories the subcategory level is not achieved. Categories or concepts are not the data itself, they are theoretical abstractions form the data. Subcategories give a concept a greater explanatory power and enable the reader to envision a richer picture.

Categories are ‘concepts, derived from data that stand for phenomena’ (see Strauss and Corbin, 1998, 114). Another source for category names is existing theory where applicable or in vivo terms from the data. Categories can stand for problems, issues or events, which are of relevance to the respondents. ‘A category is a conceptual element of the theory whereas a property is a conceptual aspect, characteristic or element of a category that elaborates a category’ (see Glaser and Strauss, 1967, 36). Dimensions represent the location of a property along a continuum or range. For example, the research has highlighted that revenue models are a category of the business concept. It can be composed of subcategories that define the revenue model. Its properties can be further specified in several dimensions like time or usage dependent fees. Also behavioural and time dependent elements can be added. For example, the auctioning service of CXT included several shifts of the revenue model depending on the maturity of the service and the behaviour of competition.

The analysis strives to generate, verify, and refine categories in the process of open coding (see Strauss and Corbin, 1998, 101). By naming the phenomena they become accessible for academic work. The labelling of things provides them with defined properties and dimensions. Coding puts names on events, objects, and happenings (see Strauss and Corbin, 1998, 109) thereby improving understanding and analysis. After the labelling phase they are con-
3.3. Research Design

solidated and refined with what Strauss and Corbin (1998) term microanalysis as process to discover new insights from data. This process uses comparison and questioning. In performing it memos were added to the transcribed interviews and relationships between labels were established.

The properties and dimensions of e-services as well as the concepts to manage e-services were defined using this approach. The process contains the identification of a variety of conditions, context of actions/interactions and consequences associated with the phenomenon (see Strauss and Corbin, 1998, 136). This information was used to apply it to practice by proposing categories and procedures. Similarly issues and terms used in practice were used to refine the categories. The analytic tools used during open coding process were questioning, theoretical comparisons (see Strauss and Corbin, 1998, 94) and systematic comparison with two or more different e-services.

Iterative testing and applying of developed concepts through discussions and presentation of results to respondents supports the process of axial coding. It can be defined as relating sub-categories and categories to each other via relational statements. It leads to further insights into the use and application of the concepts (see Strauss and Corbin, 1998, 126 and 143). The purpose of axial coding is to answer why, how come, where, when, how, and with what consequences certain events or situations occur.

Selective coding helped to integrate and refine categories to achieve the theory building in the sense of Strauss and Corbin (1998, 143). Selective coding assured the quality of the research if one reviews the categories in terms of internal consistency and logic. This implies that poorly developed categories have to be completed or declined for of data that is not required or not economically feasible. A further step undertaken to increase quality was to send the cases back to the interviewees or business partners to ask for their confirmation of the correctness of the transcript and derived conclusions. The quality was further increased via theoretical comparisons with additional literature case studies towards a formal theory but only on a smaller scale. The main work is done for one case and its environment. Therefore it is mainly substantive theory that can be produced using this approach and this data (see Glaser and Strauss, 1967, 67).

The documentation, coding and identification of categories and relationships were supported by the NVivo software tool. It is software for qualitative research to code and analyse unstructured data from many sources. The purpose of using software for computer-aided analysis is to 'reduce analysis time, cut out much drudgery, make procedures more systematic and explicit, ensure completeness and refinement, and permit flexibility and revision in analysis procedures' (Tesch, 1989). NVivo supports memos, data links and the development of categories, sub-categories and their values. A key advantage is that the categories can be added when
analysing the data. Coding and categorising can be done in parallel which supports the identification of emergent themes.

The transcripts were refined by assigning categories to data and inventing new categories for emerging issues using the node system of NVivo. The node system supported the processes of labelling concepts, categories and sub-categories as well as the axial and selective coding. Memos were used to develop further insights that were derived from data. The software helped to structure coding, search and retrieval processes in a better way than manual work with cards or simple word processing software could have done. The software further provides functions to aid the analysis of data. The previously defined structure of concepts was used to analyse the responses from the interview partners from an ex-post view 16 months after the AR-based involvement in the case and several months after the data collection for the additional triangulating cases. Data collection and analysis followed a pre-structured open interview, which was based on the insights gained from previous work. The NVivo software was used to identify and elaborate emergent themes. This approach helps to cope with the data overload and time requirements (cf. Miles and Huberman, 1994, 83). It is possible since research question, conceptual framework and focus were already defined (see ch. 3.2).

3.3.3.2 Analysis of the Case Data Using Action and Case Study Research

The concept development to support the life cycle of e-services in chapter 7 is based on document analysis, presentations, e-mails, notes, discussions with key people and workshops within CXT and its customers. The data collection follows the principles of AR. The researcher used the proposal of concepts to enter the real world situations to define missing or refine existing categories and constructs (cf. Checkland and Holwell, 1998b). The source of identifying new or refining existing concepts was the case data itself. Axial coding has been applied in an AR mode to define e-service invention dimensions and to refine the business concept (see ch. 7.2 and 7.3). The responses from practice were used to reflect upon modifications and improvements of the categories. The developed categories were further compared with rival or complementary cases to identify similarities or mismatches. Other concepts such as the e-service knowledge enabling concept were only developed after a reflection phase about the AR study data and by adopting existing theory (see ch. 7.4).

The use of existing categories and concept names was done cautiously to prevent commonly held meanings dominate the interpretation of the analysed data by blinding the researcher to identify new aspects that arise from the data. By externalising the relationships between categories, subcategories and through the definition of dimensions and properties, concepts are clarified and their intersubjective understandability is increased. Through discussing the concepts the ranges of potential interpretations expressed by respondents are explored. For example, the category of a business concept was positioned against business model and business
3.3. Research Design

case from literature, tested in practice and refined. The elaborated subcategories are the business architecture, theory of the business, IT-architecture, revenue model, list of benefits, marketing concept and legal constraints. For each category and subcategory the dimension and their properties were broadly described. The sources were literature, data, and reasoning in an iterative process (see ch. 3.3.5). The concepts include ways to depict the results which aid the definition of the category (e.g. feedback diagrams for the theory of the business). Through this process patterns and more complex concepts emerge which lay the foundation for theory building (Strauss and Corbin, 1998, 121).

The exploration of the success of CXT's e-services from a customer perspective was performed through transcribed interviews using the software tool NVivo (see ch. 8). Here the process of open coding and axial coding was applied to identify the achievement of success and identify emergent themes. Additional findings and learnings from the view of the customers and other cases are used to assess the success and acceptance of e-services at CXT. The semi-structured interviews were structured according to the e-service success model and the project context for the customers of CXT (see Appendix B). The application of the DeLone and McLean IS Success Model resulted in the successive proposal of the e-service success model. Within the chosen research methodology only a process logic of success could be proposed following the argument of Markus and Robey (1988). Instead of a statistical variance model for success that defines a cogent and invariant causality of the success elements qualitative research allows only to achieve the level of a substantive process theory. The weaker claim of process theory is that the predecessor is only necessary to cause the outcome (e.g. success). It is consistent with the mutual influence of events and processes that connect them assumed in interpretive research methodology (see Wollnik, 1995 and Appendix A). In variance theories statistically significant confirmation is required that the predecessor is a sufficient and necessary outcome (cf. Mohr, 1982). Markus and Robey (1988, 592) argue that in the past process models were unjustly neglected in favour of variance models as process theories have the following advantages: (1) In social phenomena invariant relationships are rare - process theories enable researchers to identify patterns in empirical data that variance models miss. (2) They can predict patterned regularities over time and allow identifying emergent patterns. (3) They accept the complexity of mutual causal relationships and a limited form of prediction of a likely outcome under a certain condition. Chapter 8 elaborates the discussion suggesting limited prediction of the success model depending on the set of conditions.

The additional cases were selected to test the success dimension, evolving concepts (see ch. 7) or emerging themes that evolved from the coding of the data (see ch. 9) in other contexts. The coding phase used the categories developed from preliminary cases (phase 1) and concepts derived from literature as initial input. In addition, some emergent categories were identified in the data. Examples of concepts that evolved from the coding process are the negative effect
of communication deficits with customers and frequent organisational changes (see ch. 9.1). The CEO and contact persons changed several times. With the new persons new styles, norms and behaviours were introduced which slowed down knowledge creation, progress, and lowered customer satisfaction. Another example of an emergent theme is the identification of the importance of utilisation which led to propose the management concept of utilisation (see ch. 9.3). The purpose of using rival cases from a different context was to achieve a higher level of analytic generalisation (see Yin, 1994, 30) by identifying the degree of replication of the themes and issues identified in the CXT case through a cross-case analysis.

The techniques are presenting the business practice tested procedure models and tools to achieve certain results in the e-service development life-cycle (see Appendix K). The final analysis result is to identify additional process steps like contracting, inspection and logistics. The reasoning for this extension is based on findings of the CXT case environment. The solution offered was only partial and not all of the potential benefits from a holistic perspective were able to be offered and sold to customers. Adding e-services for the proceeding and the succeeding procurement process steps can be a way to increase the benefits for potential customers and improve the value proposition of a new partner between buyer and supplier (see Appendix I).

The closing of the research was achieved due to the time dependency on the internal and environmental context of CXT. Further the open coding did not provide more insights within the AR study as all major participants were captured and no major shifts seemed to take place on the customer and on the supplier side (see Strauss and Corbin, 1998, 136). Other rival cases like SGS (see ch. 6.4.1) confirmed similar issues like customer acceptance or a lack of integration infrastructures or control issues and negative effects of offering shifts imposed on customers as factors preventing from greater success.

3.4 Research Process

The chosen research design within the interpretive paradigm is shaped by the emergent nature of e-services and the acceptance of mutual influence and multiple-realities. This section describes how the design was applied to form the research process. With Lincoln and Guba (1985, 208) it can be stated, ‘what will be learned at a site is always dependent on the interaction between investigator and context, and the interaction is also not fully predictable; and because the nature of mutual shapings cannot be known until they are witnessed’.

Consequently, the chosen research methodology was open to accept new insights and apply multiple theories to be able to grasp emergent situations and present a multi-facettted view of the phenomenon. The chosen design is therefore cyclical and follows on an aggregated level the AR-based process proposed by Checkland and Holwell (1998b). It starts with the definition of the area of concern (or research area) (ch. 3.1) and is followed by the definition of the
3.4. Research Process

role the researcher plays within the real-world problem situation (A) (ch. 3.3.3). The research starts with establishing the roles of the researcher and the research partners followed by the declaration of the framework of ideas (F), which defines what constitutes the 'knowledge' about the phenomenon researched (1998b, 22). In this research F consisted of assumptions about increasing the transparency in the process of inventing and offering e-services in procurement. The envisioned outputs are 'think tools' to facilitate the life cycle of e-services and change of existing situations to increase the success of e-services. The chosen way to produce the outputs was to use an interpretive methodology (M) to observe and intervene in real-world situations with the objective to derive concepts, frameworks, models and processes as 'think tools' in this specific context in an intersubjectively understandable way. Checkland and Holwell (1998b, 23) argue that F contributes to achieve a higher rigour and research quality in contrast to other AR approaches by using a declared-in-advance epistemological framework. The methodology (M) specifies the way of deriving the targeted results including the research methods and techniques. The steps 2-4 can be refined in cyclical evaluations (see Figure 3-7). The iteration (step 5) was not always rigorously pursuable and not all findings were suitable for AR-based intervention (step 4), due to context and time dependencies or access constraints, if the subject exceeded the agreed upon focus area.

The actual research process actively relies on social methods such as principles of grounded theory to include the social aspect of ICS as authors with an interpretive focus recommend (cf. Orlikowski, 1992; Sahay et al., 1994; Walsham, 1993; Meyers, 2003). The process shows many similarities with the process described for sociology research by Glaser and Strauss (1967).

Through the application of AR, principles of grounded theory and case study it was possible to provide a richer picture than using only one method and be able to perform method triangulation. They all are applicable to emergent phenomena and are ordered in decreasingly active involvement and potential to influence the situations (cf. David, 2002). The case study based interviews have the least impact on the interviewed companies. The AR process has the big-

Figure 3-7: The aggregated view of the applied research process

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3. Choice of Research Approach and Methods

gest impact on the organisations studied. Susman and Evered (1978) describe the AR process in five steps: 1) Diagnosing, (2) action planning, (3) action taking, (4) evaluating, and (5) specifying learning (see Baskerville and Wood-Harper, 1998; Street and Meister, 2004; Kock et al., 1997). Figure 3-8 presents an overview of one intervention according to the canonical AR process.

<table>
<thead>
<tr>
<th>Phase</th>
<th>Activities during the E-service Invention at CXT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnosing</td>
<td>Identify a missing e-service innovation and prioritisation</td>
</tr>
<tr>
<td>Action planning</td>
<td>Set-up, prepare a workshop with relevant participants within CXT</td>
</tr>
<tr>
<td>Action taking</td>
<td>Conduct workshop to identify existing and future e-service opportunities and prioritise them</td>
</tr>
<tr>
<td>Evaluating</td>
<td>Discuss workshop results with participants and reflect upon findings if initial structuring was suitable and which additional insights were derived.</td>
</tr>
<tr>
<td>Specifying learning</td>
<td>Refine and document findings. Present them as results of the workshop (practical impact) and refine e-service invention concept and define technique (academic impact).</td>
</tr>
</tbody>
</table>

Figure 3-8: Example of an AR-based intervention (see Appendix M for an example of results)

In accordance with Baskerville and Wood-Harper (1998, 107) the criteria of multiple iterations is not considered as ultimately required in IS or e-services if the results from the first outcome tend to be sufficiently satisfactory. The AR-based active influence was limited to the refinement (1) of concepts such as e-service or business model, (2) e-service development method (see Appendix K), and (3) the e-service invention during active involvement at Deutsche Telekom, HiServ and CXT. The limitations were: (1) agreed upon collaborative activity with the management of CXT, (2) time restrictions, and (3) the ability to actively influence non-core areas in the study situation. Principles of grounded theory were applied in the analysis of the AR study data, its customer cases, and the additional cases.

The implementation of the research process started with a broad focus to identify the key concepts. It commenced with workshops and interviews at Deutsche Telekom and HiServ in 1998. The identified problems lead to research in the area of procurement process redesign and available software solutions. Studying the literature and elaborating first findings with business practices shaped the insight that a high uncertainty and a lack of deeper understanding of the concepts and ways to manage e-procurement projects were prevalent in many organisations in the late 1990s. The result was a first list of issues and concepts that refined the framework of ideas (see above). The focus of the research moved towards e-services since the partner companies of the competence center iBN were striving for additional revenue potentials by leveraging existing technology and skills. Further evaluation of existing documents and analysing conversations with people to elaborate the language-in-use were sources for the delineation of the research area and the definition of research goals. Simultaneously the research methodology, research questions and method were refined.
3.4. Research Process

A literature analysis to understand the existing body of research revealed that scientific literature was premature and diverse in 1999. The review is used ‘to enhance, rather than constrain, theory development’ (see Strauss and Corbin, 1998, 49). The choice was made to use existing theory from related areas ordered in the five lenses to accelerate the process of elaborating practical concepts and techniques. However, the review was not extensive as ‘(...) there is no need to review all of the literature in the field beforehand, as is frequently done by analysts using other research approaches. It is impossible to know prior to the investigation what the salient problems will be or what theoretical concepts will emerge’ (see Strauss and Corbin, 1998, 49). Existing formal theories were used to generate substantive theories (see Glaser and Strauss, 1967, 34). Miles and Huberman (1994) are suggesting analysing the data first and then applying formal theory. By adopting this suggestion one can be more faithful in the data. Thereby substantive theory can be used to challenge or extend or generate new formal theory.

This input allowed to design the conceptual framework, which drives directly the sampling and indirectly the analysis of formal literature. The focused data collection of phase 2 and the analysis started to validate the results gained in the data collection and reflection period from 1998-2000. The applied research process can be depicted in a simplified cause and effect diagram, which delineates data collection, analysis, and outcome (see Figure 3-9).

![Figure 3-9: Linear research process overview](image)

The procedure to generate substantive theories was a process of joint collection, coding, and analysis of data in an emergent and cyclical process (cf. Glaser and Strauss, 1967, 45). It focuses on the main research object in the case of CXT striving to build a sustainable business based on e-services. Additional cases were included to close the research by choosing similar, rival or complementary cases. The choice of cases was guided by a high accessibility, theoretical relevance, and accordance with the purpose of the research (see ch 5).

Figure 3-10 summarises the elements of the research process in a historic order including feed-back loops. It builds on the idea of Miles and Huberman (1994) to depict the qualitative data analysis in a causal network with a vertical time dimension. The key building blocks are external theory input from academic sources, data collection, research design process, data
3. Choice of Research Approach and Methods

analysis and conclusion. This started the research structuring as described above in a cyclical process in adjustment with the data choice and data collection processes. The key elements are the interplay of research goals, research methodology, research questions, conceptual framework, methods, research goals and data. The choice of the main study as focal case for the data collection and research refinement took place in 2000.

Figure 3-10: Overview on the iterative research process

Existing literature complemented and influenced the data collection and inductive analysis of elements of the phenomena and concepts studied. The literature helped to identify critical
3.4. Research Process

elements or opened the possibility to test existing constructs, models, and concepts within the AR study of CXT. The iterative research process had a strong impact on the theoretical sampling plan. With the AR-based emergent findings the theoretical sampling of the rival cases and the environment cases evolved (phase 3 & 4). For each case the write-up, coding, within report analysis was performed (see grey shaded indication of multiple instances of the analysis box in Figure 3-10). The purpose of the rival cases was to test or complement the findings from the CXT study. The purposes for selection the environment cases were to complement the study data by adding other perspectives on the same case and a comparable situation of the Siemens Click2Procure e-market. After the within-case analysis the cross-case analysis using the NVivo software was started.

The parallel use of AR and case study research allowed gaining a deep understanding of the challenges e-service providers were facing. The CXT data followed the iterative AR-analysis process (see left area of the analysis section of Figure 3-10). The interviews with the customers in 2003 helped to include the perception of the key customers and their assessment of the success achievement. This case study-based data analysis was driven by interviews and document analysis using grounded theory leading to case write-ups and ultimately cross-case comparisons (see ch. 3.3.3), which resembles Eisenhardt's (1989) approach to theory building from case study research. The underlying research data processing strategy is that of analytic induction (see Goetz and LeCompte, 1981, 57). It starts with 'scanning data for categories of phenomena and for relationships among such categories, developing working typologies and hypotheses upon an examination of initial cases, then modifying and refining them on the basis of subsequent cases'.

The writing of within-case reports after the conclusions were drawn from either AR or case study research helped to produce textual representations. Interview partners were confronted with their data and the resulting direct analysis (see member feedback box in Figure 3-10). The cross-case analysis enriched the argument and increased the credibility of the results and their extendibility to other contexts. The concluding final report and its reflection on the academic implications fuel the dissemination into academia. The AR-based intervention was applied while working with HiServ, Deutsche Telecom, and more intensively with CXT. The iterative and emergent nature of the inductive research process that started with the real-world problem situation is in contrast to positivist research and differs from many qualitative approaches (see Miles and Huberman, 308). The author chose the more difficult approach to be able to explore the field more thoroughly and derive substantial theory findings and practical solutions for the research questions identified together with practice.
3.5 Summary of the Research Approach

The previous chapters covered the practical setting and the theories applicable. This input shapes the research area and the framework of ideas as well as the chosen methods within the chosen methodology. E-services are central to the data, other categories can relate to it, the term is sufficiently abstract, can explain variation, substantive theory can be developed from it, and the explanations are consistent. These characteristics qualify e-services as the central research category according to Strauss and Corbin (1998, 147). Figure 3-11 combines the results of the process of aligning research goal and questions which mutually influence the characteristics of the research methodology.

This chapter detailed the research approach and presented the chosen combination of research methods. AR, case study research and principles of grounded theory research are combined to define the data sources and answer the research questions. The interpretive paradigm dominates the design of the data analysis phase. The principles of grounded theory were applied to guide a refined analysis of the AR and the case study oriented data gathering and analysis. The process of developing concepts starts with existing literature and uses grounded theory to refine the concepts. AR-based data collection resulted in interventions and subsequent learning for practice and academia. This iterative design was used in the CXT study to enable learning and elaborate several concepts. The findings that derived form cross-case analysis and the reflection of these external sources onto the CXT case were not based on AR principles due to the termination of the active collaboration with CXT at the end of 2001. The chosen purposeful amalgamation of research methods helped to integrate different sources of data and analyse the data in a structured way thereby increasing the rigour and intersubjective understandability of the findings. Developing the framework of ideas, using canonical AR, and following principles of grounded theory to define concepts compensates the potential critique of a lack of rigour of qualitative research.

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Figure 3-11: Alignment of research goals, methodology and question

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4 Foundation for E-services in Procurement

This chapter lays the key foundations for the ensuing case data and analysis chapters: The starting point is an analysis of relevant actors, and their generic roles and goals in an e-service aware setting (ch. 4.1). Section 4.2 proposes a refined working definition, design principles, and a framework for e-services. The last section discusses existing success and success models, which will be used to analyse the success of e-services in practice (ch. 4.3) (see Figure 4-1). The proposed structures aim at facilitating the readability of the following chapters. This is achieved by elaborating the core elements to answer the research question.

![Figure 4-1: Chapter overview](image)

4.1 Roles and Goals for E-services

Despite the buzz words and neologisms, it can be agreed with Eccles et al. (1992, 1) that action is always the managerial imperative. Action can be influenced when a profound understanding of the motivation, identity, and goals of decision-makers and employees is achieved. This general statement holds especially true in the environment experienced in the case studies of this thesis, where the degree of uncertainty was high, changes were frequent, and politics turned out to be an important factor (see ch. 5). Customers' generic goals and processes are relatively stable bases for orientation of new e-services and serve as an introduction into the theme. This section presents generic goals of key actors to enable the reader to comprehend why and how the actors would want to develop or consume e-services.

From a business perspective the thesis addresses not only existent or future e-service providers but also their potential customers, namely buyers, suppliers, and intermediaries (e.g. e-markets). Schwanninger and Espejo define generic business goals for organisational fitness as development and viability (on normative level), new or existing value potentials (on strategic level), and profit and liquidity (on operative level) (see Espejo and Schwaninger, 1996). Figure 4-2 presents a customer oriented view of a generic company's goals.
Transferred to the procurement process enabled by electronic means, the actors involved need to understand each other's goals and align them on strategic and operative levels to generate win-win situations. The e-service providers offer e-services as innovation to generate revenues. E-service customer's use them in order to increase profits or cut costs and secure liquidity. Both have a similar goal categories and goal relations on an aggregated level. Understanding these goals and the actors' possible motivations to innovate procurement processes is the initial step for the ensuing discussion. Practical experience at CXT has shown that it is necessary to analyse customers even more thoroughly, as e-procurement often spans several functional areas in which actors pursue different functional goals (see ch. 9.1.1).

A role signifies a set of expectations and requirements that the business environment, an organisation, a process team or even individuals have of a person, another team or another organisation. The roles of the buyer, supplier, e-service provider and intermediary were identified as relevant in the discussion and intervention with business practice. The role specific goals that were ascertained in practice are supplemented by those postulated in literature (see Deise, 1999, Hofmann, 2001, 165). Figure 4-3 summarises the generic goals for each role from a business, process and ICT perspective.

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**Figure 4-2:** Generic company goals feedback diagram (extended from Gälweiler 1987)

**Figure 4-3: Overview of role-specific goals**
4.2 E-service Framework and Concept

4.2.1 Background

The term e-service was first used by HP, which began to work on e-Speak, their development platform for e-services in spring 1995. The term received wide public attention through a large marketing initiative started by Hewlett-Packard in May 1999. HP's vision was to present the newly restructured company as an (e)service organisation, and to counter position it to IBM's e-Business initiative.

To leverage the goals of the participants (see ch. 4.1) and the trends that are present in the business environment (see ch. 1), e-services should comply with the following principles for reducing the need for coordination by integrating design oriented coordination mechanisms (see Fleisch, 2001):

- **Modular design** based on the principles of the loose coupling theory (see Orton and Weick, 1990, 217) applies to business as well as IS architecture view (cf. Cude and Browning, 1989; Hagel and Brown, 2001). From a business view, this means restructuring the organisation based on integrated, customer oriented processes into relatively small, self-contained units (modules) (see Picot et al., 2001, 230). It requires decentralised decision-making, responsibility, and predominantly non-hierarchical coordination between modules. At the IS level, small self-contained modules (objects) are connected via asynchronous messaging as loosely coupled systems in preference to tightly coupled (request/response RPC like architectures) (cf. Klein and Natis, 2000).

- **Mass Customisation** strives to combine efficiency (cost leader) with customer specific production (differentiation) (see Gilmore and Pine, 1997; Piller et al., 2001, 135). It contradicts Porter's (1985) stuck in the middle assumption. B2C e-business was the first area to apply this concept. However, its application to B2B can be essential to the success of B2B e-services. Mass customisation requires a strong standardisation of internal service production, delivery processes, and customisable features towards the customer (see Goldman et al., 1995). Configurators are a good example; they allow for customised products based on standard products (e.g. USM office products). It can be assumed e-services
are best suited when a high degree of both interactivity and information-based output are possible (cf. Zerdick et al., 2001).

- **Integration** into customer's processes requires a standards-based approach to keep transaction and processing costs as low, while still providing a high value proposition (see Österle et al. 2000). Standards-based means using standard procedures for developing and describing the e-service, its representation (e.g. in BPML4WS), and its delivery using standard documents, protocols and APIs.

- **Service character** of e-services implies an interaction by an external factor in the form of persons or machines (esp. information systems). Furthermore, e-services have information character, and the simultaneous consumption demands a customer oriented service operations system (cf. Johnston and Clark, 2001).

### 4.2.2 E-service Interpretations

Since HP introduced the term, authors used it differently. One can differentiate marketing, ICT, and service perspectives (see Figure 4-4):

<table>
<thead>
<tr>
<th>Topic</th>
<th>Background</th>
<th>Source</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Platform for e-services or any asset that you make available via the Net to drive new revenue streams or create new efficiencies.</td>
<td>ICT Provider (HP)</td>
<td><a href="http://www.espeak.hp.com/architecture/whatis.shtm">www.espeak.hp.com/architecture/whatis.shtm</a>,</td>
<td>1999</td>
</tr>
<tr>
<td>Way of electronically delivering something of value to a customer that will solve some problem or provide some usefulness to make their life easier</td>
<td>IT (Stafford, 2003)</td>
<td>(Stafford, 2003)</td>
<td>2003</td>
</tr>
<tr>
<td>Further stage of e-commerce</td>
<td>Marketing (Bolton, 2003)</td>
<td>(Bolton, 2003)</td>
<td>2003</td>
</tr>
<tr>
<td>Web services are a new breed of web applications. They are self-contained, self-describing, modular applications that can be published, located and invoked across the Web. Web services perform functions, which can be anything form simple requests to complicated business processes (…)</td>
<td>ICT Provider (IBM)</td>
<td>(Mohan, 2002)</td>
<td>2002</td>
</tr>
</tbody>
</table>

*Figure 4-4: Overview on e-service definitions*

In 2000, due to the confusion and own branding interests of some authors, companies and market researchers believed that the term Web service will survive instead of e-service (see Plummer and Smith, 2000, 2). One of the reasons was that it was backed by more powerful players like IBM and Microsoft than purely HP alone. Most software providers have added Web services to their software capabilities portfolio since then. However, the permeation has not achieved the desired level, since salient elements, such as a standardised process language or a mechanism to share these processes, are not yet available (cf. Linthicum, 2004). In academia, the term e-service is still used (cf. Rust and Kannan, 2002) and a new call for papers of the Information Systems Journal for a special issue on e-services in 2005 indicates its exis-
4.2. E-service Framework and Concept

tence in the near future. Since the end of 1999, the number of definitions of Web services has exploded (see Appendix E for an historical overview). The majority of the reviewed definitions are technology driven. In contrast to these, the focus on e-services chosen here is on customers and business processes, which, however, does not omit technical aspects.

4.2.3 Working Definition

The term value-added service was excluded for two reasons. Firstly, it is too constrained to the telecommunications and logistics background (cf. Laakmann, 1995). Secondly, it requires some form of primary service, which the customer can perceive as a core service. This may not always apply to the type of services analysed. The term Web service carries a connotation of necessitating Web access; this is usually associated with a user connecting to the Internet via a Web browser and the HTML protocol. As such, the term omits the potential for connecting computers and smart assets or intelligent things (see Fleisch and Dierkes, 2003; Fleisch, 2001, 274), enabling fully automated communication and software agents to work with one another without the use of a browser and human interaction. Web services are connected with a specific form of technical implementation which excludes the use of other standards. Furthermore, the image of 'just another access tool' is too limiting, as the word should indicate that it is about defining models to employ software as services. The term e-service is intentionally not tied to graphical user interfaces, since main benefits can be built on application-to-application communication. E-services are proposed as settlement innovations for new or transformed business tasks delivered in the form of a service. A more precise working definition of e-services is:

**E-services are modular, recursive (software application-based) services that rely on Internet-based open standards and technologies to solve a specific business need. They seamlessly integrate with the business (or private) customer's processes and systems via direct electronic interaction with the service consumer.**

The modularity of e-services refers to their design principles (see 4.2.1) and recursiveness (see 2.1.3) to build complex e-services by combining (1) more e-services for wider process coverage (horizontal bundling) and (2) several functionally dependent e-services (vertical bundling). An example of the first is offering an e-service that covers a whole procure-to-pay cycle instead of several separate ones. An example of vertical bundling is the collaboration of infrastructure e-services with business process outsourcing e-services that use lower level infrastructure e-services.

'Internet-based' signifies the use of open standards and technologies such as Internet protocols and its principles of an open accessible network at little or no cost (cf. Hagel and Brown, 2001). It includes Internet, Intranet, and Extranet, and combinations of these as possible networks. Further, Internet-based standards may be applicable depending on the content of the e-service.
E-services rely by definition on software applications but may include human interaction in the service offering or delivery process. They are business-need oriented, meaning that they are targeted to solve a specific customer need via direct, electronic interaction. They achieve this by seamlessly integrating with the customers' systems to perform their service delivery. E-services substitute or enhance existing tasks to the benefit of the customer. Direct electronic interaction poses some requirements with respect to the customer's technical e-service readiness (see ch. 2.3.3.2). Business-to-business relationships are the focal segment: they can be characterised by higher ICS competency and capabilities, and willingness to invest in a high performance infrastructure if the business benefits are high enough.

The following description of e-services builds on applied systems theory and process management bases (cf. Ferstl and Sinz, 1993; Leymann et al., 2002; Harmon, 2003). A prerequisite for using an e-service is that its objectives and tasks are clearly defined. If this is the case, a customer can assess an e-service. Figure 4-5 shows the proposed views to design, manage, and offer e-services on an aggregated level.

![Inside View Outside View](image)

**Figure 4-5: Views on e-services**

From an inside view, an e-service is described by its core process, which consists of a sequence of tasks performed for its service customer. It further contains the business and ICT architecture. From an outside view an e-service has defined interfaces and protocols for input and output as well as an interface for process management and coordination with other e-services (cf. Huendling and Weske, 2003). The process management component suffices, if composite e-services are not intended.

Characteristics of e-services from a business view are:

- They derive their value from (partial) digital value creation. They receive and/or provide the required information in a computable form for receiving and sending systems.
- They govern operative physical, information processes or other e-services, and accumulate, process, and distribute that information based on information processing tasks (cf. Horvath, 1994; Ferstl and Sinz, 1993; Malone and Crowston, 1994; Fleisch, 2000).

The top two level e-services fully enable users (buyers/sellers/trading partners) to directly or indirectly settle business transactions, including third party business process steps (e.g. transport, finance, customs). A transaction in economic terms describes a process of clarification
and agreement on the exchange of goods or services, which proceeds logically and often in time the physical exchange of goods or services (cf. Williamson, 1975, 104; Picot, 1982); if the output is digital then the exchange can be included.

From a technical perspective they rely on the following design principles:

- They are scalable, platform independent, and have loosely coupled connections, a high degree of autonomy and have open standards-based interfaces. The service components themselves are highly standardised (see Österle et al. 2000, 44) (static view).

- They interoperate with other e-services based on open Internet messaging protocols and can form hierarchies of e-services that are structurally similar (recursiveness). They can dynamically register themselves, describe themselves in a standardised form, identify other e-services, actively notify, reset or compensate transactions (see Österle et al. 2000, 44). A dynamic service quality monitoring is possible (dynamic view).

An e-service can cover a complete business process, an information-transmitting transaction, or a semantically lower level infrastructure service. Its addressees persons accessed via graphical user interfaces (e.g. Internet browsers) or applications accessed via message exchange. The actors can be partners, buyers, suppliers or any trading partners in a business network.

A prerequisite for achieving the desired standardisation of the exchanges between e-services and other actors and applications is agreeing upon data and document formats, shared semantics, interface, and coordination logic on a pragmatics level, which will be used. Standardised actors, coordination via workflows and business processes as well as interfaces, documents, and protocols are three architectural elements for lowering bilateral coordination and customising needs. Fully customised solutions are only considered as e-services in the sense of the thesis if they rely on economies of scale and digital value creation. Only then the potential to leverage the investment and offer services with decreasing production and service provisioning costs is achievable. Transferring the concept of economies of scale to the service sector may provide a high potential for e-services. This is possible with automated electronic services since simultaneous consumption and the collocation are properties that can be solved more efficiently in a spaceless electronic world.

4.2.4 Framework for E-services

Since definitions, offerings and application areas are manifold, the need for a framework to structure and compare different e-services arises. After providing an overview of existing approaches, a more suitable framework for the purpose of the thesis which structures e-services according to customer needs will be presented.
4.2.4.1 Existing Frameworks

Zwass (1996, 5) defined one of the first frameworks for higher-level services using the Internet and its standards as basic communication infrastructure. He outlined a hierarchical 7-layer model that builds on an infrastructure layer, a service layer, and a products and structures layer, which offers new functionality for Internet-based applications (see Figure 4-6).

<table>
<thead>
<tr>
<th>Level</th>
<th>Function</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Products and Structures</td>
<td>Electronic marketplaces and electronic hierarchies</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Electronic auctions, brokerages, inter-organisational supply-chain management</td>
</tr>
<tr>
<td>6</td>
<td>Products and systems</td>
<td>Remote consumer services, infotainment-on-demand, supplier-consumer linkages, online-marketing, electronic benefit system(s), Intranet-based collaboration systems</td>
</tr>
<tr>
<td>5</td>
<td>Enabling services</td>
<td>Electronic catalogues/directories, smart agents, e-money, digital authentication services, digital libraries, copyright-protection services, traffic auditing, smart-card systems</td>
</tr>
<tr>
<td>4</td>
<td>Secure messaging</td>
<td>EDI, e-mail, electronic funds transfer</td>
</tr>
<tr>
<td>3</td>
<td>Hypermedia/multimedia object management</td>
<td>World Wide Web with Java</td>
</tr>
<tr>
<td>2</td>
<td>Public and private communication utilities</td>
<td>Internet and value-added networks (VANs)</td>
</tr>
<tr>
<td>1</td>
<td>Wide-area telecommunications infrastructure</td>
<td>Guided- and wireless-media networks</td>
</tr>
</tbody>
</table>

Figure 4-6: Hierarchical framework of electronic commerce

A drawback of the Zwass framework is that it is not e-service specific enough to guide the structuring e-services. It lacks domain specific categorisation and clearly defined levels (e.g. the electronic catalogue services can be marketed as separate e-services). Klueber (1999) presented an early fine-grained 7-layer differentiation that builds on principles of semiotics, cybernetics and, coordination theory. It differentiated knowledge, coordination, business process, information, transaction, data and basis layers. The framework was applied to practice in a competency assessment effort to define the business model of Triaton as e-service provider and proved helpful (see Klueber and Kaltenmorgen, 2000b, 13). One drawback was that the participants required a considerable amount of time to understand the framework (e.g. the fine-grained delineation of transaction and process). Further, the theoretical basis of cybernetics, coordination theory, and semiotics is not common business knowledge and therefore requires educational effort before being applicable to business thinking. These obstacles, combined with an insufficient focus on customer processes, gave the impetus to search for ways of simplifying the concept to narrow the perceived acceptance gap.

Hagel and Brown (2001, 107) define a three-layer architecture for Web services. Their framework details infrastructure services summarised in the service grid that should foster the
4.2. E-service Framework and Concept

development of higher value application Web services (see Figure 4-7). They further add relevant communication and software application standards. They proclaim that ‘freed from the straitjacket of existing enterprise-centric IT architectures, companies won’t have to acquire new assets to grow (a slow and often treacherous process); they will be able to rent them, as Web services, from third parties’ (see Hagel and Brown, 2001, 113). Not ownership but orchestration of ICT resources and new business organisations are envisioned by the authors with the support of Web services.

<table>
<thead>
<tr>
<th>Application services</th>
<th>Service grid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Service</td>
<td>Service management utilities</td>
</tr>
<tr>
<td>Application Service</td>
<td>Provisioning, monitoring, ensuring quality of service, synchronisation, conflict resolution</td>
</tr>
<tr>
<td>Application Service</td>
<td>Resource knowledge management utilities</td>
</tr>
<tr>
<td>Application Service</td>
<td>Directories, brokers, registries, repositories, data transformation</td>
</tr>
<tr>
<td>Application Service</td>
<td>Transport management utilities</td>
</tr>
<tr>
<td>Application Service</td>
<td>Message queuing, filtering, metering, monitoring, routing, resource orchestration</td>
</tr>
</tbody>
</table>

**Figure 4-7: Two layer web service architecture**

The framework examples show that the notion of e-services has existed for several years and that structuring them becomes complex. This in turn motivates a customer-oriented and less technical approach since additional structuring was a business and academic need.

4.2.4.2 Design Principles for the Classification of the E-service Framework

In collaboration with members of the Business Services Sub-committee of the Global Trading Web Association® (GTWA), a simplified classification was elaborated in 2000 that, retrospectively, finds support through similar proposals (cf. Dayal et al., 2001; IBM, 2000; Hagel and Brown, 2001) and elements of Zwass (1996). The motivation for the framework was four-fold: It should help to (1) establish a common understanding, (2) classify e-services, (3) evaluate their value proposition for e-markets or trading partners, and (4) compare actual providers. The intention was to share this information within the GTWA.

The dominant design goals included (1) simplicity and provider-neutrality, (2) classification according to business needs, and (3) the possibility to add industry and geographic dimensions for refinement. A business need could be information, knowledge, coordination, process
or infrastructural problems which are resolved by the e-service. Supplemental design goals were (4) recursive structure (cf. Beer, 1981), (5) autonomy or modularity (cf. Beer, 1981; Berners-Lee, 1999), and (6) independence of horizontal layers (cf. Berners-Lee, 1999). Design goals 5 and 6 help to avoid monopolies and increase competition, if the categorisation was to be widely accepted. A recursive structure helps to aggregate e-services that follow the same design principles and standards. The proposal was sent to forty GTWA members.

The framework builds on the principles of layered communication architectures, which define a task area, its elements and relationships. Each layer fulfils a set of well-defined functions and functional interfaces between layers as well as protocols between processes of the same layer (see Müller et al. 1997, 35). The layers should be logically complete in terms of the application or technology used, with lower layers offering their services to higher layers. The interfaces and functions should remain constant in order to secure the possibility to exchange e-services easily.

The Transmission Medium layer describes the lowest infrastructural level of the physical elements up to level four of the ISO-OSI model. It covers the two lower layers of Zwass’ architecture. As standardisation on these layers is well developed, it will not be discussed here except for composite e-services. For example, service level agreements (SLAs) have to cover all levels to guarantee an end-to-end and vertically top-to-bottom SLAs (see Appendix I.3).

Figure 4-8 provides an overview of the three focus layers of e-services that build upon the transmission medium layer, which will be discussed below.

---

**Figure 4-8: E-service framework to categorise e-services from a customer viewpoint**

Business Collaboration Infrastructure (BCI) e-services either complement the infrastructure of trading partners and e-market operators with additional e-services that aim to support B2B tasks, or represent services that an intermediary wants to offer to trading partners. One can define these service elements as B2B EAI e-services that help to bridge the heterogeneity and
4.2. E-service Framework and Concept

Semantic differences between separate units. They can contain services such as security, document look-up, and global service registry (e.g. UDDI.com), messaging, data services, repositories for document types, ASP services, and identification services for B2B commerce.

BCI e-services enable the Business Process Outsourcing (BPO) e-service layer, which cover services that externalise business processes to third party service providers. The third parties can also be another unit within one company. The core characteristic of these services is that they predominantly operate transaction services, irrespective of whether they are classified as support or primary processes in Porter's value chain analysis terms (cf. Porter, 1985, Porter, 1980). In the field of procurement these services are classified as Procurement Service Providers (PSP) which is forecasted as a high growth business opportunity (cf. BME, BMÖ and Accenture 2003).

The BPO level can provide input to the third level of the e-service framework and simultaneously can receive additional information upon which to base decisions on. This layer is termed Information and Knowledge (I&K) e-service layer. Examples of procurement processes are information e-services that combine information of multiple e-service and applications or sourcing information providers. Apart from information, the knowledge acquisition element covers online training and community services to economise corporate education and training processes. Figure 4-8 summarises the three levels and examples of supporting standards.

In contrast to the ISO-OSI model (see Müller et al. 1997, 35), where the principles of layered communication architectures are strictly applicable, the proposed framework has the following deviations and limitations: (1) horizontal communication can occur directly between e-services and e-service customers without using the top-layer (e.g. like TCP/IP), (2) the immature status and the complexity of standardisation does not yet provide sufficient layer protocols between process and information layers for all industries, despite developments in the area of ebXML, RosettaNet and Web services, and (3) transaction independent information and knowledge services may require services of the BCI layer only and thereby omit e-services of the BPO-layer (e.g. external information sources provided to trading partners like tariff information). Only the two lower levels of the three-layer e-service framework deliver a well-defined functional support to the higher level. The three layers proposed are meta-layers that may contain sub-layers in future research, once the communication protocols between e-services have matured (see ch. 2.1.5.1). The limitations stem from the more difficult standardisation of the semantic level of communication and the higher dynamics of changes. Several standards, however, are striving for a solution (e.g. Web services, ebXML).
4. Foundation for E-services in Procurement

4.2.4.3 Business Collaboration Infrastructure Level for E-services (BCI)

Infrastructure e-services extend the traditional outsourcing relationship that covers the building, running and maintaining of information systems by a third party (Picot and Maier, 1992, 16) towards offering e-business specific know-how and assuming responsibility of the semantic content of the service (e.g. Dun & Bradstreet guarantees the semantic unequivocally of its DUNS® number). Typical examples of categories for e-services are:

1. Business Document Exchange of CXT which describes specialised communication and document handling services for business documents and integrates with back-end systems. It facilitates the use of e-services on the BPO layer by mapping and converting different standards or custom documents. It supports multiple protocols and routing functionality.

2. Security solutions which provide security services required for higher-level e-services. It supports the functionalities of confidentiality, message integrity, authentication, copyright-protection, and non-repudiation (see Zwass, 1996, 6).

3. Directories for standardised norms and data such as XML document repositories or standardised data like Dun and Bradstreet’s DUNS® number. An example is an UDDI Server, which forms the basis for the discovery of Web services.

**BCI e-services enable higher-level e-services by providing services to outsource (parts) of the technical basis infrastructure. This includes but is not limited to administrative, registry, repositories, security, communication, and document routing services.**

Examples of complex Business Collaboration Infrastructures in the area of e-procurement were Ariba’s Commerce Services Network® and Commerce One’s MarketSite Service Framework in combination with the Global Trading Network (for more details see comparison of business models in Appendix G.2). The latter does not exist in this form anymore.

4.2.4.4 Business Process Outsourcing Level for E-services (BPO)

E-services categorised in the Business Process Outsourcing (BPO) layer do not confine themselves to IS-related services only. One can outsource almost any business process and coordinate it via electronic mechanisms and/or digitalise its inputs and/or outputs. This, of course, defines the e-service character. It may include operative processes, which involve human interaction and physical goods (e.g. transportation). Functional requirements are that services provide support for complete processes or tasks ranging from former corporate functions to inter-organisational services like e-markets or supply chain collaboration e-services. Examples for e-services targeted to single customer relations (n:1) are the outsourcing of payroll processing or transportation e-services. Examples for coordination e-services are e-markets or supply chain collaboration platforms (e.g. e-services to exchange and manage collaborative design projects) following the n:1:m relationship model. The instances can implement the
4.2. E-service Framework and Concept


**BPO e-services** contain single or complete processes and sound electronic transaction chains, which enable the seamless, media mismatch free coordination of partners and/or resources via electronic means. The BPO e-service provider takes on responsibility for the processes and offers content-based service level agreements.

Transaction chains signify automated process elements in the information, bargaining, contracting, settlement, and after sales phases of a business relationship between two or more organisational units.

This e-service level is applied to the holistic procurement of MRO goods and services, as well as planned production goods and related processes. The example of inet-logistics (www.inet-logistics.com), a virtual 4th party logistics provider, stresses the potential and the feasibility of BPO e-services (see ch. 5.3.5.4).

### 4.2.4.5 Information & Knowledge E-services (I&K)

This highest level category summarises e-services for pre- or post-business transaction information, meta-information covering several e-services, as well as knowledge management and knowledge transfer e-services. The focus is on the information management element, although a strong need to integrate the knowledge management elements for future research and practice can be assumed.

**I&K e-services** provide pre or post transaction value to e-service consumers. The value lies in providing user-oriented business critical information or knowledge.

The output of I&K e-services includes decision information, which could be business relevant 3rd party information on new products, new partners (e.g. provided by software agents (see Zwass, 1996, 6)) or infomediaries (cf. Hagel and Singer, 1998). Another output class is proactive information on real-time synchronous processes or historic information on past transactions. Finally, aggregated information or information on processes that may involve several e-services is the third category of information e-services (Business Intelligence Information).

The latter two build on the lower two e-service layers whereas the 3rd party decision information builds only on the BCI layer. Specific XML-based standards emerge like XML for Analysis (XMLA), Extensible Business Reporting Language (XBRL) for finance reporting or XML Metadata Interchange (XMI) to facilitate reporting and monitoring services (see Schwalm and Bange, 2004). Knowledge transfer can be provided by virtual universities, online-training and education offerings. These may only rely on the BCI layer services.

### 4.2.5 E-services Characteristics and Delineation with Correlated Terms

E-services can be divided into fully automated e-services (**full e-services**) and semi-automated e-services (**hybrid e-services**). **Full e-services** rely on electronic coordination, output, and de-
livery whereas hybrid e-services require at least in one of the three dimensions human interaction. The need for semi-automated e-services may arise from (1) a phased implementation, (2) lacking e-service readiness for full e-services or (3) a deliberate decision that full automation is neither possible nor desirable. Froehle and Roth (2004) term the mode of technology enabled interaction with customers as ‘face-to-screen’ compared to traditional ‘face-to-face’.

For hybrid e-service proprietary machines such as ATMs are excluded. Web services can be one form for full e-service implementations without human interaction. Figure 4-9 differentiates the two e-service types and their dimensions. It stresses that hybrid e-services may rely on one or two physical elements of the three dimensions. Some authors are added to highlight that the approach taken encompasses several isolated views on e-services.

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**Figure 4-9: E-service type comparison**

A further level of detail is to differentiate simple e-services and complex or composite e-services. The former perform single tasks and the latter can perform multiple tasks or whole processes and may encompass different e-service layers (e.g. in a composite Web service implementation (cf. Zeng et al., 2003)).

Another differentiation of e-services with high practical relevance is the degree of integration of an e-service. Three forms of integration to interact with an e-service are identifiable in practice (see Figure 4-10): (1) Integration of e-services via a link to a Web site that is accessed via a Web browser. Here, e-services require a new identification for each service use or single sign-on functionality. The link integration form requires only minor integration efforts and provides a high flexibility to change providers, while allowing only semi-automation. (2) Integration via standard interfaces, protocols and messaging facilitates the coordination and requires a medium up-front integration effort; it can be low if the customer has an adequate collaboration infrastructure and capabilities that supports the required standards. (3) Customised solutions with proprietary interfaces and data formats require a high
integration effort, which is traded off by a potential for a higher strategic differentiation for
the user and the provider of the e-service (see Figure 4-10). However the e-service character
dwindles for type (3) since efficiency gains for provider and customer are low.

<table>
<thead>
<tr>
<th>Type</th>
<th>Key Benefit</th>
<th>Integration Effort</th>
<th>Interaction Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Link</td>
<td>High flexibility to change provider, low differentiation</td>
<td>low</td>
<td>person-machine</td>
</tr>
<tr>
<td>(2) Standards-based</td>
<td>Medium flexibility, medium differentiation</td>
<td>medium</td>
<td>machine-machine</td>
</tr>
<tr>
<td>(3) Customised</td>
<td>High differentiation, low flexibility to change</td>
<td>high</td>
<td>machine-machine</td>
</tr>
</tbody>
</table>

Figure 4-10: Integration options

E-services require delineation from the related terms EC systems and ASP systems. EC sys-
tems or e-business applications are defined from a functional view (cf. Wigand, 1997). They
define a focus area of interorganisational trade transactions and a set trade of processes to be
supported. E-services instead take on an instrumental view that focuses on implementation of
Internet-based software and service elements. E-services are seen as a solution mechanism
based on standards and benefits that lead to the success of the e-service during its whole life
cycle. E-services stand for a class of software and service system that offer solution mecha-
nism that are based on standards and deliver benefits to customers focused on the success of
the e-service during its whole life cycle. The key differentiating elements are the combination
of software and service elements, a clear customer-provider relationship, business responsibil-
ity on the 2nd and 3rd level of the e-service framework, and the process independence. The
focus processes analysed here are interorganisational procurement processes for MRO goods.

Application service provisioning (ASP) solutions share similar characteristics with BCI
e-services. Common with e-services is that ASPs can be deployed internally and between
business partners. It has been argued that e-services form an extension of ASP services (cf.
Klueber, 2002). From an institutional view an ASPs is a company or organisation that offers
application hosting to multiple entities (via the Internet), while maintaining ownership of and
responsibility for deployment of software licenses, hardware and people required for opera-
tions (see Jayatilaka et al., 2003, 211; PricewaterhouseCoopers and SAP, 2001). In contrast to
e-service providers ASPs are offered with limited consulting, implementation and customisa-
tion. The nature of a pure ASP offering is hosting and managing software that is freely ob-
tainable on the market and thus directly available to the ASP customer.

In contrast e-services extend the scope of the ASP model technically by requiring an integra-
tion concept, if the e-service is not integrated via human actors (hybrid e-service). E-services
on the second or third level of the e-service framework add business responsibility, which
requires business competencies (e.g. partial outsourcing of procurement functions may in-
clude specific procurement know-how) and compensating transactions.
E-services can be differentiated by offering unique content or process-outsourcing capabilities combined with operational excellence and can include ASP capabilities. This requirement for the BPO and I&K e-services enhances the ASP model by adding the possibility to source business task or process fulfilment externally from e-service providers.

Figure 4-11 highlights the differences between a typical ASP and a higher level e-service.

<table>
<thead>
<tr>
<th>Phase Engineering</th>
<th>Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Operations</td>
</tr>
<tr>
<td></td>
<td>Individual customers</td>
</tr>
<tr>
<td></td>
<td>&gt;2 Customers</td>
</tr>
<tr>
<td>ASP</td>
<td>Purchased software</td>
</tr>
<tr>
<td></td>
<td>Hosting and managing, no content responsibility for customised software</td>
</tr>
<tr>
<td></td>
<td>Hosting and managing of multiple clients with the same software solution</td>
</tr>
<tr>
<td>E-service (BPO / I&amp;K level)</td>
<td>Own development or customised purchased software</td>
</tr>
<tr>
<td></td>
<td>Only mass customised e-services.</td>
</tr>
<tr>
<td></td>
<td>Content, customising and integration required. Responsibility of the business semantics (BPO) or the semantic correctness of information (I&amp;K). Semantic SLAs apply. E-service partner has content, process, ICT competencies and capabilities.</td>
</tr>
</tbody>
</table>

Although in practice boundaries can become fuzzy a comparison of a human resource e-service with a pure ASP solution highlights the difference: The software vendor SAP Switzerland sold in 2001 to IBM in the role of an ASP hosting partner a payroll processing software. This would be a classical ASP scenario. The service becomes an e-service, since Zurich Financial Services customises the software to the needs of their target market and uses their customer knowledge to process payrolls electronically as a seamlessly integrated outsourcing service for SAP customers (cf. Klueber, 2002). The complexity from a technical and business perspective is one explanation for the difficulties of establishing successful e-services.

4.2.6 Generic E-service Categories Overview

Further refinement and development of more fine grained overviews and comparisons between e-service (providers) is achievable by organising sub-categories along process clusters and detail them in separate views in accordance with (1) industries, (2) global reach of the service provider, and (3) company size to which the service is targeted. This classification has been elaborated in the work with practice.

Figure 4-12 shows a categorisation of processes and services that e-services can support. The classification uses company processes and subprocesses to identify potential e-service areas and potentially different providers for each box. The thesis will further detail the areas with a white background. The industry dimension is only indicated by an arrow on the top.
An early practical example of an e-service provider was the CommerceOne owned USA based e-market (CommerceOne.net). It offered own and integrated the following e-services in early 2001 (Feb. 2001) via links into their e-market: FindMRO.com (offline), Open Ratings (www.openratings), WebEX (www.webex.com) and YellowBrix (www.yellowbrix.com). Further examples of past and existing service providers are summarised in Appendix F.

4.2.7 Concept of E-services

According to the definition of a concept the sub-categories and elements of e-services are summarised in Figure 4-13. The dimensions help to specify an e-service. The customer value sub-category stresses the requirement to address customer needs to be able to surmount barriers to change towards actively using e-services. E-services are classified according to their type, categorisation, customer value and design. The e-service design is detailed in the e-service invention concept (see ch. 7.1).

<table>
<thead>
<tr>
<th>Sub-Category</th>
<th>Properties</th>
<th>Dimensions</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer Value</td>
<td>Need</td>
<td>Qualitative improvement</td>
<td>Flexibility, Quality, Innovativeness,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Quantitative improvement</td>
<td>Competitive Advantage</td>
</tr>
<tr>
<td>Process</td>
<td>Categorisation</td>
<td>Complexity</td>
<td>Simple Tasks - Full Processes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Content level</td>
<td>BCI - BPO - I&amp;K</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Content</td>
<td>e.g. transaction or sourcing service</td>
</tr>
<tr>
<td>Electronic</td>
<td>Depth</td>
<td>Type</td>
<td>Hybrid - Full e-service</td>
</tr>
<tr>
<td>Design</td>
<td>Modularity</td>
<td>Standards</td>
<td>Single - multiple</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Integration</td>
<td>Protocol, Data, Process</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Recursive</td>
<td>Loosely - tightly coupled</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>One level - multiple levels</td>
</tr>
</tbody>
</table>

The e-service concept is the basis to define the e-services and categorise them to be able to assess the value of an e-service depending on its life cycle stage.
4.3 Definition of E-service Success

4.3.1 The Nature of Success in E-services

The ultimate goal for e-services from a provider and a user perspective is its success. In contrast to physical products, success with e-services is more difficult to define uniformly. The output of e-services can be heterogeneous and is thus difficult to measure with a few standard indicators. It can include (1) the provision of information, (2) computer mediated knowledge transfer, (3) changes to data or physical objects, (4) operating, controlling or monitoring of processes, and (5) provision of infrastructure e-services for exchanging business content (see ch. 4.2). A general definition of success in information systems is, for example, 'the extent to which a system achieves the goals for which it was designed' (Farhoomand and Drury, 1996). Such definitions cover a company internal perspective, are restricted to the IS characteristics of e-services, and are difficult to operationalise and compare with other investments.

Success in services is as difficult to define and measure as it is in the IS field. Johnston and Clark (2001, 18) define service success as ‘satisfying and retaining customers, attracting new customers, entering new markets, making a profit, reducing costs or meeting budget targets’. One approach taken by Hollis and Prybutok is to keep one specific service type, such as library information services, and combine the SERVQUAL (cf. Parasuraman et al., 1988) and DeLone and McLean IS Success (D&M’92) models (see Landrum and Prybutok, 2004) to operationalise the assessment. However, the authors do not define what service success means in their context.

A success model for e-service can, in turn, also become an e-service failure model if an analogy with findings from information systems research is assumed. This statement can be corroborated by a comment of Robinson in her assessment of information systems failures (cited in Wilson and Howcroft, 2002): ‘The difference between both [success and failure] comes about when the system does not meet the goals set for it by the actors who define it as a failure.’

Fitzgerald argues that IS research has never resolved the issue of ‘success’ due to the many influencing factors (2003, 226). The approach which attempts to measure the ‘unmeasurable’ consists in identifying appropriate surrogates in order to find a starting point for the analysis of the value of e-services to academia and business. The ultimate goal of measurement is to establish the status quo and to be able to influence the e-service success as early as possible. A working definition of success for e-services is the perceived net benefit to the actor from using the e-service and the intention to use it in future.

The following section discusses different approaches and proposes a model for measuring success as dependent variable. The purpose is to present a multi-dimensional success model and the interrelatedness of the dimensions. The dimensions group measures which are in-
tended to increase reliability and decrease the number of measurement errors which, in turn, reduces ensuing management errors prompted by false or missing data (see Palmer, 2002, 152; Churchill, 1979; Cook and Campbell, 1979). The argument focuses on the dimensions that contribute to success. Finally, the limitations of the chosen initial model are briefly enumerated.

4.3.2 Approaches to measuring Success

Common measures for success are dominated by financial measures such as profit or return on investment but can be extended to other areas such as customers, learning, and internal processes, which are used in a balanced scorecard approach (see Kaplan and Norton, 1992). However, the following limitations apply if the financial perspective dominates: Firstly, Brignall and Ballantine (1996) elaborate variables and design recommendations that map the service archetypes of professional services, service shops and mass services to a performance measurement system. One of their findings is that many service firms have a non-standard, customised output with non-routine technology which only allows for feedback control mechanisms since the means-ends relationship is unclear. The problem in such environments is that feed-forward control mechanisms are often lacking which leads to lagged reactions if the business performance is not running at a viable level. The risk increases if there is no past experience which is the case for new e-services.

Secondly, the approach of using monetary and economic measures only is simple but short sighted. It would only document ex-post success or failure (see Brignall and Ballantine, 1996, 6). Eccles and Pyburn (1992, 41) stress that one of the limitations of financial measures of performance, such as ROI, is that they are 'lagged indicators', i.e. 'the result of management action and organisational performance, and not the cause of it'.

Thirdly, other context factors, such as third party financing, substitution by new business concepts or technologies, may prevent otherwise perfectly designed and developed services from becoming an economic success. In their European survey about e-markets Lenz et al. discern financial, technological and operational measures for performance (cf. Lenz et al., 2001). They identified time-to-market, value-added services, synergy advantages, economies of scale, market efficiencies, asset intensity, adoption rate, fragmentation, and critical mass as key performance measures. Critical mass was the most relevant one mentioned by 88% of the interviewees.

For the above-stated reasons traditional performance measurement approaches will be declined in favour of more holistic and early indicators of success. Depending on the perspective taken, single or multiple measures for success exist. The literature analysed included publications on success or effectiveness with information systems, services, and e-commerce as fields related to e-services (cf. DeLone and McLean, 1992). The goal is to propose a model
that facilitates finding the answer to the main research question on how greater success with e-services can be achieved. External factors such as financing and market characteristics (e.g., market efficiencies) are excluded in order to keep a focus on key factors and maintain the practical applicability (e.g., balanced scorecard lacks the financing perspective (see Huch et al., 2004, 456)). Once the most relevant dimensions and corresponding measures of success have been defined the identification of variables that define the value of the measure can take place.

4.3.3 Application of the D&M’92 IS Success Model to E-services

The D&M’92 IS success model (see DeLone and McLean, 2002) was chosen as an encompassing and accepted approach to measuring this important but multi-facetted and highly subjective topic. The process model interpretation is applied which is compatible with the research methodology (see ch. 3.3.4.2). Most other researchers have used a quantitative variance model approach to test it empirically (e.g., Seddon and Kiew, 1994). The model includes attitudes, behaviour and impact measures (see Doll and Torkzadeh, 1991, 6).

Other approaches were less structured (e.g., Smithson and Hirschheim, 1998) or were too complex (e.g., Seddon, 1997) for structuring the data gathering for qualitative semi-structured customer interviews. The D&M’92 model was better suited to the analysis of the customers of external organisations than other more internally focused success or performance models (Smithson and Hirschheim, 1998; Grover et al., 1996). The later updated versions of the D&M’92 model were not available or not even published during the data collection phases and could therefore not influence this phase (cf. DeLone and McLean, 2002; DeLone and McLean, 2003; DeLone and McLean, 2004) but are addressed in the analysis (see ch. 8).

Their original framework of the IS success model (referred to as D&M’92) is based on the evaluation of 180 publications of theoretical and practical success factors for information systems success in the MIS field from the 70’s and 80’s. The authors claim that a well-defined outcome measure (or measures) and contributing independent variables is essential if the discipline of information systems research is to make a contribution to the world of practice (see DeLone and McLean, 1992, 61). Their model will be used to explore if and how their approach can be transferred to the field e-services.

Based on the communication theory of Shannon (1949), DeLone and McLean (1992) grouped different measures for building dimensions that can be aligned with the three levels of semiotics (cf. Saussure, 1916) (see ch. 2.1.1.2). The technical or syntactical level is defined by the system quality; the semantic level is defined by the information quality. They introduce four dimensions to define the pragmatic level that represents the impact on the receiver: use, user satisfaction, individual impact and organisational impact. Communication theory and semiotics form a basis which is considered a suitable fundament for e-services in the inter-
organisational context. The D&M'92 model combines a process and variance model logic in linking the dimensions. The alignment with the semiotic model helps to indicate to what extent it is possible to automate e-services. The pragmatic layer in particular focuses on the context sensitivity and pragmatic responses of sender and receiver. This is of premium interest in being able to achieve a high degree of meaningful automation which can, in turn, lead to high levels of efficiency and acceptance. The model summarises about 100 measures to assess the value of the aggregated dimensions. The authors recommend selecting the measures depending on the context and purpose of the assessment.

The purpose of applying the D&M'92 model to e-services is to identify the constituent elements for the success of e-services and thereby have a means for assessing the success itself. Furthermore, the multi-dimensional view can help to explain failure, as well as to identify limits of technical automation. If the model proves helpful in achieving these results, the means for positively influencing the success potential can be derived. The dimensions are aggregates of specific measures, and their identical application to the context of e-services will be briefly described:

1. The *System Quality* dimension describes measures at the technical information processing level or changes to customers' objects by the service provider. System quality covers the technical characteristics and the processing performance of the IS. Measures are flexibility of system, response time, integration of systems, reliability, robustness etc. (see DeLone and McLean, 1992)

2. *Information Quality* defines not only the quality of the e-service output itself but can be extended to the coordination of e-services. Measures include accuracy, precision, timeliness, currency, freedom from bias and comparability, to name a few (see DeLone and McLean, 1992).

3. The category of e-service *Use* extends the original category of information use by other outputs e-services may have. Not only the use of information, but also the consumption of other e-service outputs is measured. In a later paper DeLone and McLean (2002, 5) accept that use is a complex and undervalued dimension of their earlier paper. Use defines a loyalty component of e-services: It defines the impact an e-service has on the fulfilment of the daily tasks of users at a pragmatic level demonstrated by active usage. Examples of measures are motivation, frequency of use, appropriateness or the form in which they are used (e.g. push or pull e-services). For use-based revenue models this criterion is of pivotal importance to understanding, measuring and influencing overall success (see ch. 7).

4. *User Satisfaction* is a criterion relevant to hybrid e-services with human interaction or if alternative processes or procurement sources can be deployed instead to circumvent the e-service. It is well researched in information systems (DeLone and McLean, 1992) and in service literature under the term customer satisfaction (cf. Bitner and Hubbert, 1994; Bitner, 1990). User satisfaction is relatively easy to measure in interviews (Bailey and Pear-
son, 1983). Examples of measures of user satisfaction are enjoyment, satisfaction, as well as service and information satisfaction, etc. For full e-services, user satisfaction is only relevant if alternative channels are at hand, making it possible to circumvent the use of the e-service, or if the e-service delivers information that can be assessed by the users. User satisfaction can, in these cases, be measured by statements about the seamless and failure-free operations of the e-service or the dimension can be substituted or omitted.

5. **Individual Impact** on the service consumer consists not only in improved decision making but also in improved task fulfilment by using an e-service. These impacts can be measured in terms of quality, time, flexibility and knowledge-enhancing dimensions (cf. DeLone and McLean, 1992).

6. **Organisational Impact** defines the economic and the non-economic impact of e-services (cf. DeLone and McLean, 1992). The non-economic measures are difficult to assess, since the cause and effect relations at the organisational level are vague. Examples of measures are productivity gains, responsiveness, flexibility, staff redundancies or total e-service quality improvements. Examples of economic measures are return-on-investment, the cost/benefit ratio or increased profits.

In comparison with other approaches the D&M'92 model offers a more encompassing and customer-oriented approach towards assessing the success of IS. It is used as an initial model for assessing the success of e-services. The purpose of the model is to focus on the customer viewpoint as the key to success. Other influencing factors will be discussed on the basis of the customer feedback (see ch. 9).

The structuring of the elements from left to right follows the semiotic logic from syntax to pragmatics. The arrows of the model indicate process or sequence dependencies from left to right and (mutual) causal influences (e.g. usage influences user satisfaction positively or negatively).

![Figure 4-14: IS success model of D&M](image)

The application of the D&M'92 success model concentrates on the individual customer relationship (including individuals and organisation) aiming to understand how to make this relationship successful and achieve a high acceptance of the e-service. Perceived customer success with e-services is an early indicator for the overall success of the company. Feedback from customers is assumed as a valuable aid in developing and using e-services. The level of analysis is purely external. The interview partners were managers of customers of CXT one
competitor. The responses represent their experiences and opinions. The individual impact from an operative purchaser's or back-end sales staff's point of view is only indirectly covered. This decision was made to reduce the number of interviews required. The dimensions of the D&M model are transferred to inter-organisational settings. The content of the e-services is expanded from the pure MIS of the original model to information and knowledge, business process outsourcing as well as business collaboration infrastructure e-services.

4.3.4 Limitations of the D&M'92 Success Model from Literature

The D&M'92 model is applied to the research context because its dimensions and their implied relations were confirmed. The original authors analysed 14 papers that confirmed the relations implied in the model (cf. DeLone and McLean, 2002). They concluded that 'as a whole, these empirical studies give strong support for the proposed associations among the success dimension and help to confirm the causal structure in the model' (see DeLone and McLean, 2002, 4). 32 of the 34 relations were empirically confirmed as valid (e.g. Seddon and Kiew, 1994; Goodhue and Thomson, 1995; Igbaria and Tan, 1997; Guimaraes and Igbaria, 1997; Teo and Wong, 1998; Yuthas and Young, 1998). For the purpose of gaining an initial understanding of the success variables and in order to derive questions suitable for e-service customer interviews, the empirically tested D&M'92 provided a starting point for structuring the data gathering.

Despite confirmation the D&M'92 model has been the subject of profound criticism. Seddon (1997) criticises the confusing amalgamation of a process model and a variance model and bases his argument on the work of Newman and Robey (1992). Mohr defines process research as 'type of data gathering and analysis that seeks to determine the sequence of a set of events over time' (1982). In contrast, variance research consists of determining covariances (or correlations) among a set of variables but not their time sequence. The former is usually conducted using qualitative research to understand human behaviour whereas the latter requires quantitative research which assigns statistical values to the behavioural variables (see Rogers, 2003, 196). However, in a later paper, Sabherwal and Robey (1995) maintain that a reconciliation of variance and process strategies is possible, and they classify it as more insightful for the field of ISD research. Since the purpose here is to use the model for structuring the qualitative data gathering and analysis process, potential confusion will be minimised. Only the process model is applied since a quantitative analysis of variances and causal relationships is not adequate within the chosen research setting.

A limitation of the D&M'92 model is that it does not include Internet-related metrics. Other researchers such as Palmer (2002) or Piccoli et al. (2004) have filled this gap and the original authors have added e-commerce measures (cf. DeLone and McLean, 2004). The analysis re-
flects upon this newer research but it is not of primary interest to elaborate the metrics in this work.

The model is used to define success from the customer's viewpoint. Although relations with the customer could be conceived bilaterally (cf. Orlikowski and Robey, 1991) a unilateral view will be pursued during the data gathering. The reasons are that (1) a complete bilateral analysis requires an in-depth study of both roles over a long period, and (2) impossibility of having simultaneous in-depth access to the provider and customer side in the chosen context. The easier unilateral research design has been chosen in favour of a bilateral view because of the novelty of the phenomenon of e-services.

Despite proven dimensions and their correlations for information systems, the following amendments to the D&M 92 can be assumed when applying it to the chosen context of e-services:

- Inter-organisational elements and external environment are not taken into account (e.g. power and multiple stakeholders). Most existing research focuses on end consumer-oriented (cf. Sultan, 2002; Palmer, 2002) or company-internal users of information systems (cf. DeLone and McLean 1992). The latest paper of DeLone and McLean (2004) has addressed e-commerce.

- Economic success may be easier to measure and of greater importance to e-services than for pure information systems.

- Several authors have added the service dimension which will be included in the questionnaire (e.g. Landrum and Prybutok, 2004; Pitt et al., 1995; Kettinger and Lee, 1995).

- Limited customer acquisition and behaviour orientation (e.g. awareness or expectation, not explicitly discerning the voluntary or mandatory nature).

The data from semi-structured, open e-service customer interviews reveals whether the assumptions listed above play an important role for the perceived success of the contracted e-services.

4.4 Summary of the Fundamentals

The chapter presented key actors who can be identified as potential users or providers of e-services for the focus area and their goals. Two models were proposed and taken to form a basis for further discussion and elaboration.

The e-service framework structures e-services in a meaningful way. It serves the purpose of grouping e-services according to their content and their direct business impact. The framework covers e-services from business collaboration infrastructure to information and knowledge services. Its practical validity is to be supported by case experience and cases taken from literature in the following chapters (see ch. 5-9).
4.4. Summary of the Fundamentals

The grounds for an e-service success model as a means for explaining the ex-post success or failure from a customer viewpoint have been prepared by proposing the D&M'92 IS success model. In addition, two further applications will be elaborated: (1) a model should facilitate monitoring and (2) aid the design of e-services with a high success potential. The latter can be achieved by comparing the success dimensions with the assumptions and characteristics of the e-service under development. The proposed approach starts with the D&M'92 multidimensional model that focuses on the roots of economic success, which is winning, satisfying and keeping customers, as well as the interdependencies of the contributing dimensions.
Part B: Case Study Data

This section provides an overview of the cases of the data collection. The frameworks and models proposed in prior sections are applied to help structure the presentation of data. Chapter 5 describes the action research based context and data of CXT and introduces to the case issues discovered in the study based interviews with CXT's customers. Chapter 6 contains rival cases of similar or additional contexts for the purposes of case triangulation with the CXT and its customer's cases. Both sections form the basis for the data analysis in part C of the thesis.

5 Conextrade Case and Environment

5.1 Overview and Research Involvement

The purpose of this section is to provide an overview of the data on the main case and its environment. The creation of CXT, its evolution, the introduction of CXT as a new business partner, and the changes relating to processes and ICT required the author to consider the cases from a change perspective. This perspective takes both the social context and the history of the participating organisations into account. It purposely rejects an entitative, purely technology oriented and socially neutral perspective.

A framework favourable to describing the cases was chosen so as to provide a concise and yet complete interpretive overview of the case history and context. The frameworks used for structuring are similarly the underlying guidelines for structuring the research and its findings. They were not intended to be rigid, as otherwise there was a danger of them becoming 'an inhibitor to the social process taking place between researcher and interviewee' (see Walsham, 1993, 70). If the data, i.e. events and actions or issues, deviate from the established framework, the researcher attempted to be open to new interpretations.

From June 2000 to November 2001, the author worked as a Business Development Manager. The company was actively interested in developing e-services and welcomed additional academic insights on this new topic. CXT therefore supported the research. The benefit for CXT was assured, as findings from previous projects and from academia were subsequently applied and adopted. The main focus was on identifying new e-services and resolving issues arising during the e-service development processes. The relationship between researcher and researched was one of mutual exchange. On the one hand, the company influenced the research content by selecting the areas and topics to be covered. This, in turn, had direct impact on the research areas that could be covered within an AR-based study in this thesis. On the other, the preliminary research results were applied to the business context and coevolved.
5.2 Concept Elaboration in Pre-Conextrade Projects

The organisational change observed has a twofold significance for the main case study of CXT. Firstly, the organisation of CXT itself was subject to constant change, which was largely triggered by changes in the strategy, customers and information systems infrastructure. Secondly, the purpose of CXT was to change the organisational settings and information systems of its customers.

The main case is discussed in more detail, since there was a richer array of data, and the challenges of CXT shaped both the research question and the further analysis of this data. The cases of the customers and suppliers of the CXT e-market adhere to the following structure: a brief overview of (1) the company and its relation to CXT, (2) the corporate and project goals pursued (business view), (3) the socio-political context, (4) ICT and e-services, (5) the process and change view, and (6) the findings.

5.2 Concept Elaboration in Pre-Conextrade Projects

The research is founded on AR-based work conducted between 1998 and 2000 at the University of St. Gallen in the area of e-procurement, e-business architectures and supply chain management. During the work with several companies, key concepts, such as business models, e-services or e-markets, were explored and discussed in a number of publications, taking account of both a practical and an academic approach. This facilitated a prior understanding and was instrumental in defining the area of concern and a first version of the research question. More specifically, the emphasis was placed on the provider and customer perspectives of e-services for procurement processes. Literature and conceptual work initially focused on business models, e-service integration services, as well as ICS architectures and organisational capabilities which foster or enable e-service provision.

A two-year involvement with Deutsche Telekom AG helped produce insights into the need for and challenges of e-procurement. Deutsche Telekom is the major telecom operator in Germany. Topics covered were an e-procurement requirements analysis and vendor selection, business model definition for e-markets, and the defining of principles for e-business aware global ICT architectures which can deliver a high degree of flexibility. Departments involved in the projects were central procurement, product marketing for multi-media and e-commerce offerings, and the SAP Management department.

The result was a framework for integrating different application systems and facilitating strategic software architecture planning at Deutsche Telekom (see Klueber and Alt, 2000). Further results were requirements of the MRO procurement process, the inclusion of the political dimension, the role of the IS architecture and the integration of new applications into ERP systems. The difficulties inherent in meeting the requirements of acting simultaneously as a provider and a user of e-procurement solutions became apparent.
5. Conextrade Case and Environment

With HiServ (then Triaton now part of HP) the definition of business models, the networkability assessment, and the analysis of e-markets from a service integrator and e-service provider perspective were central activities. Triaton employed 2,200 employees and had a turnover of €372 million in the financial year 2002/3. It has positioned itself as outsourcing and integration specialist and runs about 500 SAP systems.

A business development projects at HiServ comprised an assessment of the need for integration and the potential alternatives of offering an e-service that facilitates integration into the customer’s ERP systems (see Klueber and Kaltenmorgen, 2000a). In addition, support in defining a business concept for this service was facilitated (see Klueber and Kaltenmorgen, 2000b). A third activity was the conducting of a networkability analysis designed to assess the strengths and weaknesses of HiServ. A consecutive project was to give methodological support to HiServ in the identification of attractive e-markets (see Klueber et al., 2001a), the ultimate aim being to market an integration e-service. The work with HiServ focused on the e-service provider side, stressing the need for sound business concepts, the difficulties involved in identifying customers and the resource and capability side needed to offer the required networkability.

A source of practical insight from an e-procurement customer perspective was a software and service assessment project to identify the best fit to the needs of a multi-national pharmaceutical company in 1999. Interviews with the company, customers and software providers in Europe and the United States of America were conducted. The project added to the experience on users of e-procurement software and additional services (e.g. catalogue services). It stressed the impact internal as well as external politics can have on the selection of e-procurement software.

5.3 Conextrade Electronic Marketplace

This section provides an overview of the outset, the issues and the development of CXT e-market for MRO goods during the AR involvement (referred to as ‘CXT case’ in the following). The case forms the basis for the definition of concepts and techniques derived from on the groundwork done on the pre-CXT cases. It is supplemented by an initial description of content, context and social processes, as the resulting issues provide the basis for the further focus of the research. The case will be described from three perspectives:

Firstly, from the financial stakeholder perspective of the owner, Swisscom, secondly, from the internal perspective of CXT and thirdly, from the external perspective of customers of CXT (see Conextrade Environment Chapter 5.4).
5.3. Conextrade Electronic Marketplace

5.3.1 Conextrade from an Investor’s Perspective

The founder of CXT is Swisscom AG, a former state-owned national telecom provider. Swisscom had a workforce of about 21,700 employees, a turnover of CHF 11.160 billion in 1999, a net income of CHF 1.8 billion, and an extensive network of international alliances and investments. International expansion was seen as a solution for growth. By 2002, the workforce had been reduced to 20,900 and the turnover rose to CHF 14.5 billion. International exposure had been pared down to a 75% share in Germany’s debitel (www.debitel.de) with about 10 million customers and a turnover of € 2.8 billion in 2002 (see Swisscom, 2004).

Swisscom’s main business operations were a fixed land line network with about 5 million customers and a mobile telephone network comprising some 3.2 million customers in 1999. In 2000, the parent firm was transformed into the Swisscom Group and more independence given to the individual companies. In addition, the corporate business development unit and its alliances had several partnerships and a business-to-consumer Internet access and information service called blue win.

During the restructuring process into a group in 2000, the central procurement department was transformed into de-centralised procurement units. The purchasing volume of all units totalled CHF 4.1 billion. About 10% was accounted for by MRO products, which were no longer bundled in organisational terms or by an aligned process such as lead buying. Central procurement had 8,900 suppliers of which 80%, or 7100, were MRO suppliers. 80% of the orders were below CHF 2,000, and the average processing cost of an order was CHF 147-160. Order-to-delivery time was 7 days on average and Swisscom received about 550,000 invoices per year (cf. Eyholzer, 2002). The forming of the Swisscom Purchasing Board (www.swisscom.com/purchasing) in 2002 was a means whereby procurement activities could be coordinated, but with no formal authority to control the actual behaviour of the units.

Swisscom funded CXT from the start, backed by the motivation of increasing revenues through providing additional services and up-selling its communication services to customers. It coincided with the strategy of other telecom communication companies who wanted to align their businesses more closely to their customers’ businesses. MRO procurement seemed an attractive area and promised many synergies, as it allowed existing services to be used and the business offering to be extended. Several European, formerly state owned telecommunication companies such as Deutsche Telekom, British Telecom or Swisscom have chosen to go down this route. An additional motivation was the ability to sell value-added services and host the future customers of the e-market.

Swisscom set up CXT as an independent company and practised relatively hands-off management to the exception of key financial figures. Only financial and reporting integration with Swisscom was set in place. CXT was relatively free to decide which services to develop or customers to target. It also had little integration with the other operative units of Swisscom,
which could have been potential customers of CXT. After the first six months of operation, political issues brought about a reorganisation at management level and the business case was called into question. Swisscom supported a change of the management team in August 2000. In response to the waning euphoria about e-procurement, the control became stronger. Expenses and budgets were controlled more rigorously. The new management continued to run the company until it was reintegrated into Swisscom IT Services at the end of 2002.

5.3.2 Outline Conextrade Case History from an Internal Perspective

CXT was the outcome of a business case developed by an internal project team commissioned by Swisscom's business development. The project drew on the support of a management consultancy, its ultimate aim being to win some of the potential e-commerce market share. The project content was to elaborate a business case for creating a business-to-business e-market for indirect goods using toll gate, a service development process of Swisscom. The core team took up work in June 1999. Their first step was to define a pre-business case. The goals for the new e-procurement offering, derived from the corporate strategy, were to sell hosting services, communication services, procurement outsourcing and so-called value added services. The team formed to develop this service was initially made up of five people. It was supported by a management consulting company whose task it was to assess the market situation in the last quarter of 1999 and to select the software partner and operational set-up. The business case comprised the defining of target customers, competitors, cooperation and implementation partners, risk analysis, resource requirements, a project plan and a rough breakdown of potential revenue streams.

Following Swisscom board's decision to fund the business case of the business-to-business e-market, the choice of the information system was made in favour of CommerceOne (CI) software in January 2000 (Phase 1). This was the same company that Deutsche Telekom and British Telecom had selected in 1999. CI not only sold the software but to a large extent also the business model that CXT intended to adopt. Part of this initial business model was to become a software reseller for CI software as well. This phase was still characterised by a project character but with many more people and a first organisation chart.

Phase 2 concentrated on building a team and setting up operations for an e-market based on the CI software, with Swisscom being the first customer. Marketing and sales operations were set up at the same time and the team moved to new offices in Zurich. The initial team of CXT comprised team members who had worked on other projects at Swisscom. The choice fell on these people, as the employee market was short and tight deadlines were to be met. The team of 15 people was subsequently increased to about 30 before the service went live. During this phase, proposals were made as to how customers and alliance partners were to be won and the marketing and communication functions were added. In March, the first letters of
5.3. Conextrade Electronic Marketplace

intent (LOI) with customers were signed, and by that time the head count already exceeded the 25 employees planned for the end of 2000.

Phase 3 began with the foundation of Conextrade AG as separate legal entity in April 2000. Conextrade is a neologism that combines the words 'connect' and 'trade'. This name aptly describes the basic business idea of providing services which enable electronic connection and trade between parties. The emphasis was then placed on winning external customers for the solution. By mid-April 2000, CXT performed its first live transactions. The first licence was sold to a customer and talks with LOI partners were initiated. Phase 3 ended in August 2000 with the subsequent decision to hire a new CEO, a new business development manager and CFO.

In Phase 4 a new core management team took over and was supplemented by new staff recruited from the corporate unit. The spirit of the company changed with the advent of the new management from an opportunity driven, laissez-faire culture to a stronger and more directly controlled company with less freedom. This was negatively received by some of the employees. The drive towards stronger financial control and the top-down definition of tasks was accompanied by frequent organisational changes and a purposefully vague strategy which was said to be required due to a perceived dynamic environment. During this phase, CXT struggled to win new customers and raise the interest of potential customers who had already had an LOI, had been lost or had not initiated their projects. After its formation as privately owned limited company (Conextrade AG), it moved offices in Zurich to a new location where it had room to expand at the end of 2000. This phase was dominated by streamlining the business and organisational changes. The limited expansion strategy pursued resulted in the following:

CXT did not integrate people from the central procurement department of Swisscom although discussions took place with this in mind. The reason was that CXT's management did not see a favourable benefit-risk relation and thus decided not to actively pursue this option. As meetings were postponed several times, key employees left for other companies or moved to other units within Swisscom, making this option unviable. The purchasing board was established without direct involvement of CXT. One of the many political hurdles was that a number of potential employees with procurement experience were unwilling to commute 100 km or move to Zurich.

In October 2000, CXT began to negotiate a merger with a German company specialised in the development of e-services. After the due diligence process the decision was made not to invest since other international investors withdrew from the deal and the risk was considered too high.

Successful change came about through the integration of another unit of Swisscom which focused on EDI transactions. The idea was to offer customers combined electronic transaction
services ranging from classical EDI to XML-based document services in 2001 which were offered by CXT.

In August 2002, the decision was made to reintegrate CXT into Swisscom IT-services. Phase 5 started in 2003 and was characterised by organisational downsizing and restructuring to become part of a bigger corporate belonging to Swisscom IT-services AG. The latter was formed in 2001.

5.3.3 Innovation and Business Lens

5.3.3.1 Innovation and Strategy at Conextrade

The first development stage of strategy of the first management was to offer an MRO e-market based on successfully operating the C1 software platform. The innovation was to become a virtual intermediary following a n:1:m model for the Swiss market that offers software and services to enable inter-organisational buying and selling.

The second development stage was to add so called value added services (e.g. payment or logistics services) and to expand from Switzerland and neighbouring countries to the European market. Worldwide customers were considered opportunistically or addressed in collaboration with other e-markets. The plan was to achieve this via alliances with other e-markets and sales partners. The strategic development direction on the content side was to include support for direct materials procurement. The customers targeted ranged from large enterprises to full service outsourcing for small buying organisations.

The initial business case was aimed at fulfilling two horizontal roles and one vertical role. CXT started with the horizontal role of a ‘Market Organiser’ for large customers, where it would only provide the technical infrastructure and software applications with the so-called transaction platform as central component. The second horizontal role CXT wanted to assume was that of a ‘Market Maker’ for SME buyers. Here the plan was to offer an e-market with suppliers to a yet undefined number of SMEs in all industries. The key sources of revenue for both were transaction oriented fees. In addition, suppliers and buyers were charged access fees, ASP fees, catalogue application and management, as well as leased lines, hosting or high end Internet connections for Swisscom. The third role was to become a ‘Market Maker’ addressing the needs of verticals. The idea was that a more customised version of the central e-market software would be able to address the needs of verticals.

Ideas for innovation initiatives were collected from management, consultants, software providers and market researchers. Often they stemmed from external sources and, to a lesser extent, from customers or the company’s own innovation and business development activities. With the change of management in mid-2000, the business and the innovation strategy became unclear. At the start of 2001, the target customers were reduced from European to Swiss
5.3. Conextrade Electronic Marketplace

only. CXT struggled to define its own strategy. The head of business development said in 2001 that a classical strategy was not possible in this type of business environment. Instead of defining a focus area CXT was still developing its business in many directions (see Figure 5-1).

![Strategic Choices diagram](image)

Figure 5-1: Overview of strategic choices at CXT

The geographic focus was rooted in the software contract with C1. It allowed open competition only in countries which had no other e-markets using C1 technology. In August 2000, the geographic focus was still on Switzerland but international customers were pursued opportunistically. This implied no active marketing and sales for non-Swiss customers. CXT received leads to two customers for verticals which resided in Germany: one in the hospital procurement and one in the transportation procurement industry. A further potential development direction, which was subsequently rejected, was offering purchasing services to external customers. A partnering strategy and a partnering programme was developed but not implemented in the organisation.

After reintegration into Swisscom IT Services, the main innovation was to offer invoicing services via the e-market. Together with existing customers, CXT defined a solution for exchanging electronic invoices via the e-market. Other business development activities were greatly reduced: The head of e-trade solutions scaled back business development activities and focused them as compared with the status in the first months of CXT's existence.

5.3.3.2 Changes to the Business Model and Communicated Role of Conextrade

By mid-2000, CXT’s official marketing definition of an e-market was that of a facilitator for electronic trade. The core service was described in a marketing brochure as the ‘operating of a complete, open marketplace with a wide range of convincing e-commerce and e-procurement solutions’. More services promised were (1) access to the Global Trading Web, which is the technical connection of all C1 based e-markets, (2) swiftness and reliability in the implemen-
Conextrade Case and Environment

The trading metaphor implied the ownership of products, financing, logistics and the definition of the product range. In reality CXT focused on providing a technical platform and adjacent services. In legal terms, the actor role and not the trader role was assumed.

By 2001, the key marketing message was simplified to the following:

'as leading trade enabler for Switzerland Conextrade optimises processes and information flows between trade organisations and companies. Companies can then (1) buy more easily, (2) sell more or (3) build their own portals. Conextrade builds on the many-to-one-to-many principle of a transaction platform of an electronic marketplace and its related services' (Conextrade Mission and Business Model, Presentation of the CEO, March 2001).

At the beginning of 2004, the successor organisation e-trade solutions began to market the invoicing service as an extension to the transaction management, catalogue management, integration, and ASP solutions.

The following notation shows the relevant elements which make up the business architecture of e-service mediated customers. It will be used to illustrate the CXT case and other cases as a slight modification of the notation of Weill and Vitale (2001):

- Actors are organisations or part of organisations shown as shaded arrow symbols
- Processes are shown as arrows with two ends
- Flows of goods, funds or information are lines complemented by arrows and letters
- Relationships are electronic (existing/planned) and primary business relations

![Diagram](image.png)

**Figure 5-2: Business architecture offered by CXT (2001)**

The service offering of CXT changed frequently. Several services were abolished before the final business case (e.g. a solution for SMEs), and other additional services, such as the auc-
tion services, were offered from October 2000 to mid-2002. The multitude of development directions and ideas led to many small changes without any one perceivable orientation. For example, one unrelated direction was the ideal to integrate a human resource broker service for IT employees.

The services CXT offered until 2003 covered basic support for the information phase of electronic transactions by offering electronic product catalogues. Transaction management and enabling the buying and selling processes of market participants support the ordering part of the settlement phase (see Schmid, 1993).

5.3.3.3 Human Resources, Capabilities and Organisational Development

The background and experience of the key units and people are provided to define the capabilities spectrum of CXT, which was rich due to a heterogeneous national and educational background of people with a relatively strong ICT focus. However, the resource requirements in terms of qualifications of the business case were not fulfilled in favour of a quick staffing to meet tight deadlines, as the employee market was short at that time. The integration of people from a closed down e-commerce unit of Swisscom helped to meet the ambitious time schedule, but may have hindered successful progress after the launch. The initial plan was to exchange people during the first months but this failed due to cultural and political difficulties, which prohibited an early substitution. Work overload due to a great number of operative tasks and strategic developments prevented management from making this decision. Therefore, the exchange of people initially planned at the management level did not happen.

Generally speaking, employees had little procurement and supplier market know-how. The complexity of the offering was not fully understood by many employees and everything was touted to be new and different from past practice. There was little sales experience in selling e-services. The sales approach was product oriented and the pricing models were complex. The sales team had an IT outsourcing, engineering and telecom sales background.

CXT's Business Development (BD) initially drew on resources of Swisscom's central BD team. Initially six people of different nationalities and experience background (IT, consulting, outsourcing, EDI, engineering, alliance management for telecoms, discrete manufacturing, insurance, and banking) were responsible for business modelling and product management.

Professional services had a consulting and project management background and came from diverse industries. They relied mostly on past experience and learnt from their first customers where the key challenges were. The focus changed frequently because the supplier side responsibility was missing, then added and removed. Change was a constant factor: The head of department was replaced, the department was given a new name and employees were frequently exchanged.
The IT employees had little ERP and integration know-how and insufficient capabilities. IT had a hosting and IT project management background. What was missing were SAP, EDI, master and transaction data integration know-how and skills. The skills of the IT people were mainly geared towards operating an ASP solution. For example, EDI connections were realised by an external consultant and with insufficient tool support. Setting up one single connection took several weeks. The situation improved after the integration of the specialised unit of Swisscom in mid-2001. The project work, however, often required adaptations to the products and the development of team member skills. Furthermore, the inter-organisational nature of the CXT business required integration with the customers’ systems.

The lack of the knowledge about the dominant software on the buyer side (namely, SAP R/3 systems) and the diverse software application landscapes on the supplier side was aggravated by a low level of integration and mapping skills. The gap arising from the lack of experts and appropriate capabilities in catalogue management was initially filled by an external consultant. The new service of supplier adoption was build internally. Additional capability gaps were software engineering, modelling and service process quality capabilities. The management of the technology partner was not well developed. The exchange was mainly reduced to selective support by specialists to solve operative problems.

The extension of the company’s own capabilities through partnering was seen as relevant but not promoted by the whole organisation. The partner program designed to attract new partners and customers was not pursued vigorously. It was assumed that in-house resources would suffice, and partners were not much involved after the management change. The win-win situation between customers, CXT and the technical solution provider was only achieved in too few relationships.

To summarise: the ICT and business modelling background was sufficient, but critical elements such as integration know-how, software engineering and ERP-know-how were lacking. In addition, procurement know-how and capabilities within the company were scarce. The identification of these gaps took a relatively long time and the staffing of single persons did not suffice. The change of the software basis towards focusing more strongly on SAP as a partner and software provider was not supported by consecutive decisions made by CXT’s management in that direction (e.g. employing SAP integration experts).

As from the start of 2000, more staff were gradually hired but mainly from internal sources. The former project leader became head of business development and alliances. The first organisation structure was recommended and implemented in line with the first business case (see Figure 5-3). It comprised 22 people, with functional departments for business development, marketing and sales, and IT and operations (e.g. content management and supplier adoption). In April 2000, CXT saw its first transaction go live via the newly set-up platform.
5.3. Conextrade Electronic Marketplace

The organisation grew into a more formal organisation that reflected the partnering oriented outset:

**Stage 1: Organisation after the establishing of Conextrade**

As from May 2000, the organisational form defined took on a functional character with two additional units (see Figure 5-3). Marketing and sales were separated, and operations were separated from IT-related activities.

![Figure 5-3: Organisational form after CXT's 'Going live'](image)

The organisation had a strong focus on business development and alliances, product-oriented sales, customer-facing implementation support and an internal IT department responsible for technical changes to the software platform. The hosting of the services was carried out by another Swisscom unit.

During the first stage up until July 2000 about 3-5 consultants supported business development. Another 3-5 consultants supported platform operations and other functions.

**Stage 2: Organisational measures after the first management change**

The next phase of changes to the organisation and the organisational structure was initiated by the change in management in August 2000. From this point onwards, a new management, which included a new CEO, head of business development and CFO, initiated change to the organisation form at 3-month intervals (see Figure 5-4). Professional Services for customer projects was renamed Business Integration Services and became an independent unit.
Stage 3: Organisation in product lines

Product lines were set in place in December 2000. It was a move to ensure more accountability and customer focus and a consequence of the isolated auction product line. The matrix organisation was not developed as extensively as some of the organisation elements had their own dedicated IT and sales people whereas others relied purely on the staffing of the functional organisation.

Stage 4: Organisational downsizing

Phase four was initiated in May 2001. It was driven by the need to cut costs and streamline the organisation, also in order to keep costs down. The management board was reduced to four people. The CEO had direct control of the so-called CEO projects. These were auctions, managed procurement, consulting and catalogue management. Professional services relocated to IT. Another downsizing measure resulted in three operative units into which the other units were formally integrated (see Figure 5-4). The product line approach was less important but target setting for the product lines became more stringent. During this phase some product lines, for example auction, were stopped.
Stage 5: Re-integration into Swisscom

The decision to reintegrate CXT while keeping the business was made in March 2002. CXT became a part of the Swisscom IT-services organisation, which merged with an IT department of AGI – an IT-service provider for a network of Swiss regional banks.

![Head of Conextra](image)

Figure 5-5: Lean organisation of e-trade solutions within Swisscom IT-Services

The headcount was reduced to below 30. The former management was replaced, and sales became part of Swisscom IT-services sales. The e-market unit started with a new head who had been promoted from professional services. Since this time a number of ASP customers and many more suppliers had been won. The new unit had considerable success in selling its services to Swisscom. The newly designed invoicing services attracted other customers without the service having to be officially marketed.

5.3.3.4 Information and Communication Systems Process Support and Changes

CXT started with the software environment provided by Cl. The software provider also initially served as business concept provider. The initial solution covered a range of software products. The components focused on the central e-market application. In April 2000, several components and projects went live:

- Hosted e-procurement solution which was an ASP e-procurement based on Cl Hosted BuySite®
- E-market software called MarketSite®
- Content Engine® for catalogue management and content management
- SAP-Integration project for Swisscom based on a middleware from Active
- ASP supplier solution for receiving and sending orders and order confirmations called Cl Supply Order®
- ASP solutions for verticals called MarketSet® were offered but never implemented

The IS infrastructure of CXT consisted of redundant, high performance operative application and databases systems, security and back-up solutions outsourced to Swisscom (referred to as hosting). It had its own redundant test system including firewall, load balancer, ASP hosting, application servers, data bases and back-up system. The IS architecture shows on an aggregated level the software solutions and business processes the applications help to perform (see
Figure 5-6). The following elements were added to depict the main IS architecture components:

- Applications are business oriented information systems which perform specific tasks in automated or semi-automated ways. They are shown as hexagons.
- EAI components, shown as rectangles, are the sum of applications which facilitate the integration of different business applications.

The software applications used initially were the e-market software called MarketSite®, connectivity software (XPC®), the catalogue management software (Content Engine®), Web access for suppliers to their orders (Supply Order®) and the ASP solution for the e-procurement software (Hosted BuySite®). The connectivity tool XPC was a limited XML middleware system that offered minimum XML-based messaging functionality. Important inter-organisational functions such as mapping or other protocols, EDI for example, were not supported.

Several major decisions on the software infrastructure were made, prompted by deficiencies of the C1 software. The content management software was substituted by a specialist product from Requisite. Large parts of the core platform were exchanged for an EAI product from webMethods called B2Bi® in 2001:

- The Supply Order component was substituted for an in house developed solution which was based on the EAI software in 2002.
5.3. Conextrade Electronic Marketplace

- The messaging infrastructure of CommerceOne XPC was substituted for a more mature and richer product from webMethods called B2Bi®

The sales process of CI Buyer was stopped and substituted in cooperation with SAP to promote SAP’s product BBP® but also to gain access to SAP’s customers and win them over to using the e-market. Figure 5-7 highlights the changes to a heterogeneous platform, using only the identification service and the hosted e-procurement solution of CI.

A key challenge to understand and evaluate the capabilities of the software as the documentation available was not sufficient and the IT department was not satisfied with the functionalities. This increased the political pressure, as CXT was unable to respond to customer demands.

5.3.4 Process and Outsourcing Lens

5.3.4.1 Sales and Marketing Approach of Conextrade

Initially CXT addressed a wide range of customers encompassed by the original business case. The sales team consisted of initially of two people on the buyer side. It was extended by an additional sales person on the buyer and on the supplier side. Companies with more than 200 employees were addressed by offering desktop purchasing applications customised in house or in ASP mode with access to the CXT e-market. CXT was to provide only the technical platform and adjacent services (‘Market Organiser’ role). Initially CXT sold C1 Software
as well. Another target customer group comprised industry specific solutions called stand-alone verticals ('Market Maker' role) which offered transaction services with the option of financial investment for every industry. The situation proved problematic as it was difficult for the sales team to sell a wide range of services, software products, and to offer services to customers who had little experience of the software functionality or no previous experiences with e-services from CXT.

The sales portfolio was reduced to services and ASP solutions, since C1 was not satisfied with the sales success of CXT. One lesson CXT sales people had to learn was that the C1 buying solution was not attractive to bigger companies. Especially as competition by the ERP vendor SAP became fiercer. SAP added functionality to their SAP e-procurement solution and it had better integration options to the SAP ERP system. This was critical in view of the fact that SAP claimed it held more than 80% of the ERP market in some industries in Switzerland. Furthermore, the sales team had to learn that SMEs were not ready to invest in e-procurement.

The offering of auction services required another ASP service and consulting approach which was initially marketed with the same sales people. After initial complications and communication problems, CXT hired the head of procurement from Swisscom's central procurement department. This went hand in hand with the reorganisation according to product lines. Auction services, therefore, became a product line in its own right, with sales, BD and IT skills.

Generally, sales rarely communicated qualified requirements from customers. On the whole, there was little feedback on BD's ideas, since the team rarely discussed new developments, which would have made customers aware of them. A factor limiting sales success was a superficial technical background, which sometimes did not enable the true potential or the limitations of the software to be communicated.

Marketing and communication to the broad market was challenging as CXT neither focused on customer size or industry nor on a product category. The different views of the management team on the communication strategy led to a reorganisation and prompted the head of marketing and communications to leave the company in mid 2001.

5.3.4.2 Service Development Process

In June 2000, there was no formal process or process owner to specify and assess the business models for channelling the resources available into relevant projects to ensure CXT's success. The starting point for improving the process of business development was to establish a suitable service development process for new e-services. The initial intention was to use the so-called tollgate process, similar to Swisscom's e-commerce venture, BlueWin (see Figure 5-8). This is a step-wise process with six mile stones (so-called tollgates) producing a saleable service.
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The so-called service development council (SDC) used the initial tollgate service development process and started in July 2000. The aim was to build a platform for the exchange of ideas, to able to assess projects from multiple functional views and to institutionalise an adapted tollgate process, if the existing one would require simplification. The relevant members from sales, IT, BD and marketing, as well as management were involved in assessing and deciding on the future of new service proposals. During the application it was found that there was no consistent basis for the decision-making on new projects. Multiple versions of the SDC existed and not all services passed the same stages. The people responsible for developing products and services were all using their own versions. Therefore, not all business service proposals were developed in the same depth and addressed the same issues.

To cope with the situation of having too many parallel service projects and heterogeneous and lengthy development processes, the decision was made to modify the tollgate process to make it a simpler and less resource consuming activity, without losing the validity of the tollgate documents. Responsibilities needed to be defined and the monitoring of progress improved. Furthermore, a structuring of the service development council meetings resulted in a clear definition of project types and roles as well as the possible outcomes, depending on the development stage of a service.

The implementation of the new tollgate process and the SDC faced several hurdles. Some functions, especially sales, rarely participated. The new CEO decided that he did not have to participate. Another fallacy was that the IT projects were not discussed in these meetings. Attempts to include these projects were blocked by the Head of IT. In the end the acceptance of the tollgate process was low. The service development council manager had no formal authority and, since the process was not widely supported by the management, it was an arena for power battles and little decision-making, which frustrated people in business development.

5.3.4.3 Service Set-up and Operation

The staffing, tasks and organisation of professional services changed too frequently for standard processes to be established. The consequences were customer-driven project teams.

IT operations did use little to none software engineering or process modelling tools. The team had mostly application responsibility. The core processes were testing, evaluation and definition of operating processes for the hosting of new software releases. A small number of employees were deployed in supporting customer projects.
The supplier adoption team used a modified and improved process of C1 to identify the most appropriate solution for suppliers and support them in their connection to the e-market.

The content management team consisted of 2-5 people who initially used C1 software to produce classified electronic catalogues. By mid-2000, the decision to find a new software provider had been made and the sourcing process initiated. In 2001, the new content management software of Requisite was installed and the provider changed. Consequently, the content management processes needed to be changed as well.

5.3.5 E-services at Conextrade from a Life-Cycle Perspective

5.3.5.1 The E-services Evolution at Conextrade

The services developed in phase 2 were based on C1 software functionality and the idea of selling the procurement software components to companies. Phase 4 can be split into two: Modifications in Phase 4.1 were to stop selling software, to offer the auctions service as hybrid e-service, and to build an ASP customised order for the supplier SeetalSchaller. In phase 4.2, external e-services were conceptualised and offered. This phase was characterised by major changes in the software architecture, by exchanging the catalogue management software and adding the EAI software. The first example of an external e-service was a proof of concept with the integration of the logistics transaction platform of inet-logistics for an ICT trade fair. In phase 5, the offering evolved towards an e-service platform.

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**Legend:**
- **e-service**
- **Hosting**
- **Partner**
- **Process**
- **Existing Electronic Relationship**
- **Planned Electronic Relationship**

*Figure 5-9: E-service evolution at CXT*
5.3. Conextrade Electronic Marketplace

The changes were frequent and major, which fuelled the confusion among the employees of what CXT was able to offer and accelerated the necessary frequent learning and un-learning cycles.

5.3.5.2 Business and Service Development Evolution at Conextrade

At the time when the researcher joined the company a multitude of potential business ideas had been conceived stemming from the initial business case developed with the management consultancy company and the company's own ideas. However, there was no common view of what constituted a business model and which direction CXT should prioritise.

The first assessment of all the customer projects, new technology, e-service development or strategic projects revealed 68 projects. At that time CXT had about 35 employees and lacked an overview of the resources required and the status quo of the projects. With the help of a consultant, a project portfolio and a common rating system were defined to prioritise and structure the project list. The work was intended to enable CXT to assess resource conflicts as well as the timing and sequencing of critical and less critical projects. The resource estimate showed a shortfall of up to 200% in resources needed to cover a number of capabilities and competencies in the different departments. Due to the time pressure during the first operative months, management's decisions were made on the basis of gut feeling. The ensuing challenge was to assess the projects and their interdependencies. To facilitate a sound and balanced decision, a formal list of 8 criteria which separated operative and strategic projects was specified. The proposal was targeted towards the following: assessing customer need, the inherent risk, leveraging existing investment, ensuring the availability of know-how, increasing customer retention, capabilities and flexibility, as well as costs reduction potential. The idea was to assess the project status and the future resources dedicated to them. However, the 8 criteria were not accepted as a basis for assessing the projects. The decision was made on the basis of a short meeting and virtually not communicated at all. Part of the reason was that, in the meantime, the old management team had been replaced and new management was unable to assess the projects of the former management in detail. With hindsight, the change in management coupled with the lack of customer knowledge prevented more profound decisions from being made.

The modelling of the business case, discussions with management, and convergent interviews with analysts from leading market researchers revealed that transaction costs would not be the main source of future revenues. In order to become profitable CXT needed to concentrate on identifying, developing (with partners) and implementing e-services to deliver additional value and revenues. E-services were therefore a vital element for this focused company. The shared belief was that CXT would benefit from a structured procedure to develop or integrate e-services. Dedicating concerted efforts to developing its own e-services, as well as providing
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external e-services together with software providers, e-service providers, and partners, was the direction the company should head for. The results of a market study on e-markets and e-services conducted by CXT and a MBA student project confirmed this direction.

The evolution of e-service development needs to be described in the wider context of the situation of CXT. Business Development was helpful in assessing and identifying more opportunities to build new services. These were planned as the basis for new revenue streams and were intended to help attract new customers by providing more benefits in comparison with electronic transactions via an e-market. The C1 software suggested that e-services were easily integrated based on the Business Services Framework (see Figure 5-10).

However, IT focused only on operating the existing e-market or its own new developments. By contrast, Sales focused on winning more contracts for existing services or developing its own uncoordinated initiatives. One example was the so-called open e-marketplace catalogue. This catalogue was derived from the attempt of Sales to provide more benefits to strategic procurement people by offering an open e-market catalogue for sourcing. It was technically difficult as the e-market software did not have an integrated price-comparison function and suppliers did not want to disclose discounted prices in an online catalogue. Sales refused to start a tollgate process, which it perceived as being too formal and time consuming. In the end, suppliers did not participate and buyers refused to pay. The internal effort and resources consumed in this process were not recovered. In retrospect, some of the technical and business barriers could have been identified before the technical set-up was prepared by IT, if the input of others and the service development process were allowed.

The goals of the organisation were not aligned. This meant that services were developed in different units in line with the respective unit’s or personal goals. These services were not supported by the whole organisation and consumed limited resources.

Some of the key services under development are summarised in Figure 5-11:
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<table>
<thead>
<tr>
<th>Business Development</th>
<th>IT</th>
<th>Sales</th>
<th>Marketing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bill presentment services</td>
<td>General catalogue services</td>
<td></td>
<td>Web Content Services</td>
</tr>
<tr>
<td>Buyers Club for SMEs</td>
<td>Procurement Self-Services (Supply Order)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Managed Procurement Services to offer procurement outsourcing services</td>
<td>Open e-market catalogue</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business Document Exchange</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auction Services: Different addresses and different messages for direct products. Software was too expensive.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASP solution for e-procurement software (implemented)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External e-service: inet-logistics services</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>External e-service: payment card integration with a bank</td>
<td></td>
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<tr>
<td>External e-service: landed cost calculation</td>
<td>EDI services and file exchange services</td>
<td></td>
<td></td>
</tr>
<tr>
<td>External e-service: P-broker (temporary IT-professionals broker)</td>
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</tbody>
</table>

Figure 5-11: Examples of limited service development collaboration at CXT

Interviews with technical people at CI revealed that little application logic existed for the offered documents. Offering e-services that use some of the documents would have required the company to have its own software development capabilities. Integrating external e-service providers would have required using the documents and extending the software by committing the company's own resources. CI itself tried to contract global service providers and sell the solution to the other e-markets. However, with increasing resistance to adopting CI's developments, not many e-markets were willing to pay for potential additional e-services. The reasons were that not many e-markets were satisfied with the functionality of the software they already had bought and were struggling to increase their customer base and raise the adoption rate of customers. Furthermore, discussions with the other e-markets revealed that processes, such as payment or invoicing, were country specific and would require major customisation.

The `SME Buyers Club' never passed the concept level. The implementation was hindered due to political difficulties since it overlapped with another offering of a joint venture of a bank, Swisscom and an insurance company.

The service offering of the successor organisation e-trade solutions showed that only a few services were finalised or are still being offered.

*The portfolio is transaction management via EDI and XML transactions, catalogue management, integration solutions, and ASP solutions. We developed a new service in 2003 which is transferring VAT-compatible electronic invoices. For this we built an additional interface (called invoicing gateway) for the supplier to deliver electronic invoices. Invoicing is the key new service that has been developed.* (Head of e-Trade Solutions, 16 February 2004)

The following two examples illustrate e-services implemented at CXT.
CXT's development of an e-service collaboration platform was initiated by the partner SAP Switzerland. The service named Business Document eXchange (BDX) aimed to enable a tighter integration with backend systems, extend CXT's own e-service offering and facilitate the integration of external e-services for a more complete process coverage (e.g. logistics). The idea was essentially a reaction to dwindling willingness of customers to invest in MRO procurement solutions at the end of 2000 and SAP's motivation to increase its sales of their desktop purchasing solution. An additional potential was to offer solutions for direct goods targeted at SAP software customers. The B2B EAI was intended to integrate or enable the development of further BPO e-services.

CXT planned to extend the existing functionality of the Commerce One MarketSite® software. The newly targeted role of an Integration Service Provider included the conversion of documents, their routing, supporting different transport protocols, document standards, and specific inter-organisational processes via specific applications. The service was limited to inter-organisational integration issues and did not cover integration within enterprises. The BDX service primarily covered the BCI-level functionality of the e-service framework and was able to form the basis for developing higher level e-services.

The business logic was that a N:1:M e-market model reduces the total number of required relationships and the total costs of managing the complexity of different data standards, communication protocols and partner specific inter-organisational processes stemming from bilateral connections and their maintenance by each trading partner in a 1:1 relationship (see ch. 2.3.4). It was the goal of CXT to establish itself as an Integration Service Provider. It had the potential to leverage the investment in proven B2B EAI software and share the savings involved in implementing and running the system with the trading partners (buyers, sellers, 3rd party service providers and partners) compared to individual 1:1 integration and maintenance projects. This should leverage the existing e-service solutions for buyers by offering additional flexibility to integrate business partners. Moreover, the software served as a basis for business process outsourcing services. For example the offering of an ASP order management e-service for suppliers. This functioned as a human-to-machine interface offering more flexibility and functionality (e.g. workflows and attachments). In addition, it enabled CXT to offer its business partners a greater choice of processes, applications, documents, and communication protocols for connecting and automating their inter-organisational business processes. After a marginal set-up fee for the connectivity, the trading partners paid according to their use of the BDX service.

Higher level BPO e-services were able to add business value using the communication functions of the BCI level. Additional e-services envisioned at CXT are shown in Figure 5-12.
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Easier integration of
- 3rd or 4th party logistics providers
- escrow and risk management
- payment, inspection, customs...

Intelligent inter-organizational processes
- Standard and business process specific workflow rules
- Guaranteed and content dependent delivery

Figure 5-12: BCI or I&K e-services opportunities for CXT

Process management services using workflow functionality can manage company or business network-specific process workflows triggered by business-relevant content of documents, which can be routed and converted by the BDX service. This functionality enables a response to more customer-specific process needs.

In parallel, CXT can integrate additional e-services to complement end-to-end, media mismatch free transactions via the CXT e-market. CXT can provide additional timely and relevant value chain information to their trading partners (information and knowledge e-services). This has the potential to form the basis for more agile and better decisions. With this functionality in place and a critical mass of customers using it, an e-market can extend its role of bringing buyers and sellers together and facilitate their transactions. Additional process support, such as payment, inspection and customs handling, can be integrated on the BPO level of the e-service framework. The extension provides for the coordination of activities or the dissemination of information across the business network through an agreed process of gathering, synthesizing, and distributing secure electronic information based on the CI XML standard xCBL between trading partners. These activities can make the management of the virtual value chain possible (cf. Rayport and Sviokla, 1995). An example of integrating an external e-service is presented below.

5.3.5.4 Example: Integration of External Logistics E-services with Inet-Logistics

With the B2B EAI software, CXT had a more flexible application for integrating external e-services. The evaluation process led to the selection of inet-logistics as a candidate for proving that it is technically possible to integrate two e-services. CXT developed a process scenario and implemented it using the process management tool of webMethods (see Figure 5-13).
The following scenario was implemented: A buyer sends a purchase order to a supplier with an added express delivery request. This triggers a process alternative at the CXT e-market offering the supplier access to enter a transportation order via the e-service transportation order management solution of inet-logistics. The supplier (or sometimes the buyer) can define a permanent outsourcing partner, select fixed rules or select through human interaction. After the transportation order is sent to the logistics provider, he uses the backend integration of inet-logistics to send the transportation order confirmation via the inet-logistics platform to the CXT e-market. The information is then sent to the supplier. Subsequently, the purchase order response delivery time and tracing number are sent to the buyer side. The buyer can then use the e-procurement system to directly access the track&trace number. The workflow management component of the webMethods B2Bi EAI also triggers several actions for exception handling.

5.3.6 Socio-Political Lens

The business and process views on e-services are complemented by a socio-political perspective. According to Kling and Saatchi, this lens ‘encompasses the social and political context in which the technology is developed and used, the going concerns of the organisation using it, and the extent to which financial, technical and staff resources support it’ (1982, 5). The information systems were generally not well documented by the provider and not well understood and communicated at CXT. Furthermore, the change and resistance to change will be highlighted. The purpose of CXT was to change procurement relations and procurement processes via an e-market.
5.3.6.1 Social Relations and Power Bases within Conextrade

This section describes the social relations between the relevant participants and their relation to ICT in time. The initial core management was constituted by the Head of CXT and the Head of Business Development who led the development of the initial business plan. The evolution of the company was initially driven by the Head of Business Development with a strong business model power base. The power base was rooted in an in-depth understanding of the business concept since he built the company up from its initial project phase. In addition, he had established a relationship power base with potential customers, cooperation partners, and the technology provider. After the switch of management, the new Head of CXT brought two additional managers and his support staff from Swisscom's corporate centre to CXT. This group had worked together in the holding company. They were regarded as a cosy entity and loyal to the Head of CXT. Some of the other remaining managers were considered parochial and uninterested in the relationship of their department in the context of the overall business. The newly mixed and extended management team did not get on well, which was one reason for a chain of reorganisations. In phase 3 following the first switch of management, scarce IT resources and an ICT misfit became more obvious. Moreover, financial control dominated the development decisions. The search for stable sources of revenue led to broaden source options. One of these options was to build and integrate e-services, but management did not concern themselves enough with the characteristics and implications involved in generating revenues from e-services. Established examples and pilots were not promoted and explored further, with the existing or potential customer base. The effort towards e-services can be considered at best half-hearted, which was also the customers' perception. Some services which the customer used independently of CXT were not even communicated (see ch. 5.4.3).

An ongoing problem was to identify a common development direction and communicate this to the rest of the company. The functionally oriented structure and sub-cultures prohibited the swift exchange of information and effective communication. The environment could be described as highly political, conflict-laden and coalition-based.

A critical issue was the isolation of the IT department from the rest of the company. The IT department had a high degree of autonomy, and the flow of information was at times one way - in their direction. One of the underlying reasons was the initial assumption that platform operations would suffice. The IT department was run with a focus on platform operation and optimising this task. Isolated decisions on resources and little understanding of management issues, required changes and the development of other units hindered progress in CXT.

The social relations of CXT in the years 2001 to 2002 were underdeveloped due to poor coordination and the difficulties experienced by the company in defining one development direction. Important sources of conflict were internal communication barriers and process inef-
5. Conextrade Case and Environment

Efficiencies. Some developments were duplicated or even counterproductive. Unit priorities were a hindering the success of a number of initiatives. The relationship to ICT was ambiguous, since the tool and product aspect dominated in the IT and sales department. Business development tended to view CXT's business from a service perspective designed to enable new business models. This different perception of the software, its potential and the service orientation contributed to misunderstandings within the company and confusion on the part of the customer.

The lack of deep understanding or knowledge of the software product functionalities and future developments of the software provider resulted in customers not being given the correct information on a number of occasions. For instance, sales communicated that there was no capability for offering certain functions, such as cost centre structures, which was the case at the time. These functions were offered six months later. This was not conducive to build a trusting relationship of the customers to the e-service provider. The lack of integration know-how exacerbated by a misfit of IT resources prevented customers from realising greater benefits from their solution. Integrated e-services were not communicated (e.g. inet-logistics), and customer requirements were not met (e.g. electronic booking of maintenance services).

There was a deficit in respect of encouraging organisational processes that foster communication, coordination and help to resolve inter-group conflict. Proposals for team building workshops and other initiatives were not supported by management. Hoarding and not sharing information was common among functional units.

Further, the units developed different views of the way the company was going. Business development and sales saw a shift towards more customised and integrated business models with customers. IT did not have the right competencies and constituted a considerable constraint on much-needed change towards more integrated customers. The solution of taking in partners who specialised in integration was not fruitful since sales did not actively sell these competencies. Failure to sufficiently understand customer problems and the favouring of a presentation-oriented rather than an interactive approach to the customer prevented closer collaboration with customers. The key motivation of IT was to operate the existing platform as opposed to business development which strived for the integration of new services. IT resources were generally scarce. Some projects were postponed due to the lack of IT resources. Making objective and inter-subjective understandable assessment was not possible as decisions seemed to be taken on gut feeling, on short-term priorities, or not made explicit.

5.3.6.2 Internal Cultural Perspective

The CXT environment was increasingly dominated by strong subcultures which were generally defined by the borders of business units. These subcultures existed in business development, IT, sales and engagement, and professional services. The management team itself was
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dominated by a closed group consisting of the CEO, Head of Business Development and the CFO in the phases 3 to 4. The head of IT was closer to this executive body but other units worked at a distance from this ‘triumphirate’. This description is an ‘aggregated’ generalised approach to groups which, of course, does not reflect the manifold aspects of reality. However, generalisation about human behaviour still provides some insights worth noting as to how and why various actions and events occurred.

The first example is the contrast between Business Development (BD) and IT. BD had an open and international background and a wealth of ideas for developing the ICS infrastructure. The goal was envisioning new e-service offerings and addressing new or existing target customer groups with these services. This entailed adaptation or integration into the existing IT platform. IT, on the other hand, based their initial approach on the idea of platform configuration, testing and optimising as being their main tasks. They were confronted with new and sometimes not fault-free software, which was not always well documented. IT’s main emphasis was on standardising and focusing on the existing business. Their intention was to offer an optimised platform to host e-market and ASP customers. The actual hosting was performed by a Swisscom unit. Although the business case provided for only 4 people in IT operations, the number had increased to 18 by end of the third quarter of 2000. Lacking the resources and competencies to expedite the development of new e-services, IT tended to block requests or neglected to deliver the information needed for sound business development. The internal computing network of IT was not accessible to other departments’ staff, and communication about the actual capabilities of the platform was scarce. IT was not interested in new releases or software updates, as this would have required more learning and more bug fixing. By contrast, BD generally saw the development potential of the e-market at risk if interoperability with other C1-based e-markets or the possibility of integrating e-services was not possible. Getting IT to commit to dedicated resources meant that the development of new services was often delayed.

BD got little to no information about the actual status of the platform or problems with the applications or customers. IT department management decided on its own that it would not collaborate with the software provider. They took it upon themselves to look for software to exchange bigger components of the e-market. The first phase of the service development was driven by IT alone. IT developed services by itself and did not communicate these developments to the BD team. This was one of the reasons why managing the IT resources for future development projects was nearly impossible for the leader of the service development council. Resources were almost always scarce, and the Head of IT was not willing to coordinate his priorities with BD. The relation between IT and BD was one of distrust, little knowledge of and sensitiveness to each other’s problems and activities. There was formal exchange but rarely real interest. Both units worked as if they did not need each other. The initial conflict
was due to the two heads of BD and IT adopting different approaches to work and pursuing different development directions. Replacing the BD manager did not change the situation much. All it did was to increase the power differential between BD and IT in favour of IT, as the new head of BD had less insight into IT operations compared with his predecessor.

A second example of cultural conflict arose between BD and Sales. Sales' perception was BD was not helping them to win customers because it was too focused on 'fancy' ideas. Sales did not accept that BD was working on the next development stage for integrating e-services. By the same token, even active offers of joint visits to customers were declined. Sales rarely attended services development meetings when new services were discussed. Communication was restricted to a round of time-pressured questions before proposals were clinched. BD was permitted to address customers which sales did not consider likely customers, such as international customer leads, other e-markets or customers with non-standard requests. These leads were handed over to BD employees, and there was little exchange during the request for proposal phase.

A key source of conflict was which services to offer and how. The sales department claimed its knowledge of the market and demanded isolated single solutions to meet customers' demands. Since sales had little interest in the future development of the software or existing potential of the solution they sometimes undersold the software functionalities. BD, by contrast, wanted standard solutions with elements of customisation to be able to address a wider customer base. Again, this conflicted with IT which just wanted standard solutions.

There was therefore a great lack of mutual understanding between the subcultures of CXT. Although these conflicts hindered progress, management of CXT rejected proposals from employees to have bottom-up team building or a strategy alignment workshop. It indicates that management was either not aware of cultural and political issues or was not willing to address these issues and manage them. The new directions were defined by internal meetings of management, with little input from other employees. Enhancing the understanding of technical possibilities or customer needs were not taken into consideration. The cultural heterogeneity influenced the perceptions and preferences of different units. Multiple meanings about the same actions attributed by different subcultures prevented efficient coordination and alignment within CXT. The power shift in 2001 towards IT and financial control restricted business development activities and, accordingly, their potential to contribute to success.

5.3.6.3 External Cultural Perspective

CXT's management was perceived as arrogant by the suppliers in development stage 3 to 4. Communication with customers and attention to their needs was at a low level. Instead, the dominant belief was that CXT needed to educate customers about e-business. On the cus-
customer side, this was perceived as arrogant and misplaced, as illustrated by the two quotes below:

'One can realise now that with the new management things [cooperative climate] have changed since then considerably. With the old CEO2 a relatively arrogant style dominated' (Key Account Manager, Brütsch-Rüegger, 15 August 2003).

'CEO2 has made an unacceptable offer - he made an offer - ex-post and on top of the services we already paid - suddenly a lot of emotions were involved - so we installed the software ourselves and it nearly put the project at risk. In the meantime the collaboration is good and the process works seamlessly. We test and certify and they (CXT) test and validate' (Project Manager, UBS, 4 August 2003).

The consequences of so many uncoordinated activities and projects impaired the efficiency of CXT, its standing with partners and customers, as well as the motivation of employees as a lot of energy was lost in internal battles.

The situation was made worse by management’s frequent changes to organisational structures without addressing the cultural issues between key departments involved in developing a running the e-market. The first management team did not address this issue and the second team needed much time to understand the business and these issues. After half a year had elapsed, they did not take the opportunity of resolving some of the cultural issues on the agenda which therefore persisted, unchanged for the most part, in new the organisational forms they had implemented.

5.3.7 Summary of Conextrade Description and Findings

The case provided a rich description of the environment in which CXT worked and the historical development of the e-market, as well as its first insights into inventing and offering e-services. The description included innovation and business, socio-political and process perspectives, as well as the e-services and their development. CXT substituted the Cl software with the B2B EAI platform rich in functionality. This platform enabled the successful integration of an external e-service, as illustrated by the example of inet-logistics. It enabled CXT to expand its potential for offering more customised services. Frictions rooted in strategy, cultural and communication and were identified as barriers to learning and change. The conclusions are drawn in the analysis chapters, together with the customers and other cases.

5.4 Conextrade Environment Data Collection

Five semi-structured interviews were conducted to analyse the performance of the services offered by CXT. There were two interviews with buyers (UBS and Huber+Suhner) and three interviews with suppliers (Seetal Schaller, Brütsch Rüegger and Logistikbetriebe). These interviews were made to analyse the offering, service quality and acceptance of the services offered by CXT to be able to assess the success.
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Figure 5-14: Overview of environment cases of CXT

The insights gained from the interviews are used in the analysis chapters to validate the e-service life cycle. Furthermore, they constitute a basis for the data on emerging issues and themes. It is a necessary supplement from a customer perspective on the CXT’s strategy, service offering, and behaviour.

5.4.1 Business Environment Context of the Customers

The chosen customers are situated in the German speaking part of Switzerland. The distance of their headquarters to CXT is less than 50 km away from the economic centre of Switzerland around Zurich (see Figure 5-15).

Switzerland had a gross domestic product of CHF 422 billion in 2001. The Swiss economic cluster encompassed a total of 317,000 companies with a workforce numbering some 3.7 million in 2001 (excluding the primary sector). 88% of these companies have less than 10 employees (Statistik, 2003). Their MRO goods spending, as estimated by a management consultancy company, was CHF 47 billion, of which CHF 30 billion were accounted for by companies with more than 200 employees. The top Swiss companies measured by market capitalisation are in the pharmaceutical, banking, insurance, engineering and food processing sectors. Some of them are world leaders. Switzerland has twice as many Top500 companies per capita as the US or European countries, such as the UK, France, and Germany (FT500, 2001).
5.4. Conextrade Environment Data Collection

The supplier landscape in Switzerland is dominated by SMEs, which have a minimum ICT infrastructure and formerly no need to standardise and digitalise their processes in relation to their customers. With the advent of e-commerce, the need for this has been on the rise, and some of the interviews show that the requests by key buying organisations was a major reason for moving towards an electronic product offering.

The readiness of Swiss companies to embrace e-business is relatively high. In 2001 e-business was used in 50% of companies with more than 10 employees as compared with 38% in Germany and 28% in Great Britain (Statistik, 2001). A look at e-commerce alone shows that 44% use e-procurement and only 16% use e-sales. In a two-year comparison between 2000 and 2002 the use of e-procurement has grown whereas sales of e-sales solutions have dropped (Statistik, 2001).

The following paragraphs will detail the context of the companies and the interview partners and their relation to CXT, as well as highlighting some key findings which will be elaborated in the analysis part of the thesis.

5.4.2 UBS as a Conextrade Buyer

The case study concentrates on a bank using CXT's catalogue and transaction services. UBS used originally a proprietary solution without an intermediary, which was subsequently replaced by CXT services. The insights are based on indirect contact with the customer challenges while working at CXT, with UBS as its the biggest customer. It was supplemented by an interview with the project manager in 2003. This section provides a brief overview of the context and history of the customer-supplier relationship of the e-market CXT, with UBS as a buyer and its suppliers mediated via CXT services.
UBS is a publicly listed company and one of the world’s biggest banks with a global presence. In 2003, it ranked in 3rd position in the banking industry measured by total assets. Its business areas are wealth management, asset management, investment banking and corporate and retail banking. It employed 69,000 people in 2002 and had an operating income of CHF 33.8 billion. UBS’s Swiss operations employed around 28,000 people who are the potential requisitioners for the e-procurement solution.

The interview was conducted with the project manager at UBS who was responsible for the operations of the key ERP system as well as the project manager for the e-procurement project ‘MyShop’ at UBS.

5.4.2.1 Project Goals at UBS

The objectives for the procurement process redesign were defined by the project manager as follows (see also Figure 5-16):

‘Reduce operative work and focus on the strategic work. One way to achieve this is to enable the organisation to decentralize operative purchasing (..) [The following three strategies were defined:]

1) Central guidelines and frame contracts for decentral operative purchasing
2) Achieve transparency and simplicity of processes
3) Choice of a useful platform to enable this.

That was the strategic orientation from the strategy workshop. The volume of indirect goods purchasing at UBS is nearly 100% as proportion of total goods purchasing, services are much greater (employees, trainings, IT services) and form the biggest amount in value, but transaction intensive are the cheap materials and office supplies’ (Project Manager, UBS 4 August 2003).

Figure 5-16: Move towards a strategic procurement unit via e-procurement at UBS

The project goals were to ‘achieve manageable and reduced process costs, transparency on the purchasing results, and within the central corporate purchasing function the process should be decentralised. This helps to increase the tactical and strategic procurement activi-
ties of the central procurement staff [and generates more value to UBS]. The typical purchaser hides from his strategic tasks by performing operative tasks (orders, invoices etc.).' (Project Manager, UBS, 4 August 2003).

5.4.2.2 Procurement and ICT Context of UBS

The broader context of the project was defined by the procurement organisation, its visions, and goals. The e-procurement project manager described it as following:

'There is a general procurement department for Switzerland within UBS, but not all categories are covered. Some were able to exclude themselves [due to political efforts]. These were IT, Information Centre and Human Resources. (...) The vision UBS procurement has is: (1) First, become the well-accepted number one procurement unit within UBS within the next 5 years. This means lost areas have to be won back, and (2) Second, it wants to be one of the top 5 procurement departments within Switzerland. Based on the vision strategic measures are defined. To realise the vision operative units have to be moved to strategic procurement' (Project Manager, UBS, 4 August 2003).

'The "MyShop" project with CXT was the second initiative of UBS in the field of e-procurement. First considerations started in 1999. The first e-procurement solution was established. It is still running and we are currently in the process of transforming it to MyShop. It was a superb solution with a limited amount of selected suppliers. At some stage we experienced the limits of the solution in terms of scalability and extensibility' (Project Manager, UBS 4 August 2003).

The second project had to overcome internal and external hurdles with CXT. The internal conflict stemmed from functional interests in not handing procurement over to the central procurement department. The conflicts with CXT were characterised by a mutual learning process of what each partner wanted and could deliver. During this process, the relationship developed from a sales-oriented to a partnership-oriented relationship, with open communication and mutual evolution of requirements and service offerings.

The ICS infrastructure is depicted in Figure 5-17. UBS uses CXT as additional hybrid e-service provider for catalogue and transaction services.
The catalogue consists of three sources. CXT-managed catalogues and UBS-managed catalogues. The third source, SAP EBP, the internal desktop purchasing solution, uses the OCI interface in addition to access supplier catalogues directly.

5.4.2.3 Business Process and Outsourcing Processes of UBS

According to the interviewee, the service offering of CXT evolved towards a mutual learning process. Initially, CXT wanted to sell a maximum range of services. The operative services in the pilot project were reduced to catalogue hosting. The e-procurement solution at UBS covered the selection, authorisation, ordering and monitoring processes. A further development together with CXT included the invoice processing process (see Figure 5-18). Alongside the legal barriers, the challenge here was that, similar to the ordering process, multiple ways were required to cope with different supplier capabilities and different processes. The invoices were processed in the ERP solution. The electronic support of the procurement process via the e-procurement solution enabled automated settlement. All order details were transferred and compared with the invoice details in the ERP solution.
5.4.2.4 Social Context and Findings at UBS

An issue was that discovered communication problems with CXT sales, which were gradually resolved. A partnership relationship gradually emerged. Internally not all departments were willing to accept a centralised solution. For UBS, SAP integration is crucial for achieving the goals.

5.4.3 An Engineering Company as a Conextrade Buyer

Huber+Suhner is a worldwide communications component supplier which had 2,865 employees in 2002. Huber+Suhner is headquartered in Switzerland. Net sales stood at CHF 590 million in 2002. The interview partner is head of corporate purchasing and logistics. The author, who has been commissioned to write a paper on the Huber+Suhner ASP solution (Klueber et al., 2001b), has been in contact with him since end of 2001.

5.4.3.1 Project Goals at Huber+Suhner

The general goal was process cost reduction with a bottom line impact. An additional goal was to gain experience in e-procurement on a practical level. How important this is highlighted by the following quote:

'Practical experience is more than Powerpoints (...). You can’t cut costs without releasing or re-assigning employee’ (Head of Corporate Purchasing and Logistics, Huber+Suhner, 20 June 2003).

This orientation focuses clearly on the simplicity of the solution and operational decisions aligned with business needs. Operational excellence has been seen as a key driver for customer and user satisfaction.
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5.4.3.2 ICT and E-service Content at Huber+Suhner

Huber+Suhner did not have an SAP ERP solution. The integration into their Baan ERP system was therefore an additional challenge for CXT, which was solved through a simple semi-automated file transfer. The connectivity to the marketplace required a bandwidth of 512kbit/s to ensure a sufficient performance.

The CXT services used were the ASP Buy offering, the catalogue management service for selected catalogues and the transaction management. However, the catalogue management was only a useful service for medium-sized suppliers. Customised and high variance products required a direct access to the supplier’s e-shop because standard classifications and catalogue structures were inferior to the search functionality of some of the suppliers. Furthermore, it was stated that the prices for the catalogue service of CXT were too high for small suppliers.

5.4.3.3 Procurement Context of Huber+Suhner

The decision to innovate the procurement for MRO goods was embedded into a larger strategy aimed at developing a stronger strategic focus in the procurement function, as illustrated by the following quote:

'MRO Procurement was part of an initiative to move to strategic procurement. It was a success since it worked well with an external partner. And internal people were more easily motivated. Other areas are still under development. For example auctions for high business impact were analysed but none of the purchasing segments had enough volume to make it seem successful' (Head of Corporate Purchasing and Logistics, Huber+Suhner, 20.06.2003).

The following matrix defined the solution landscape for improving the procurement landscape of Huber+Suhner. The e-procurement solution was positioned in the segment of high volume transaction and low business impact. Furthermore, pooling and bundling was implemented to reduce the number of contracts and increase the volume per contract. Prices for electronic auctions were still too high to be attractive to Huber+Suhner. For direct goods with high business impact and low transaction volume an industry solution would have helped but was not in place.

![Figure 5-19: E-procurement for MRO Goods as part of the procurement strategy](Source: Huber+Suhner)
5.4.3.4 Social Context and Processes at Huber+Suhner

The service evolution with CXT revealed a clear definition of Huber+Suhner's goals and less inclination to take on new opportunities or deviate from the decision taken. Internal relations were shaped by departmental objectives. The outcome was an alliance of finance and purchasing which were in favour of an ASP solution. The relationship with CXT staff was stable:

'Mainly constant relationship with key people. One sales representative and one technical person. Catalogue was not used for all MRO suppliers since some have e-shops with smart search functionality. The first attempt to implement one of the specialist suppliers was a failure' (Head of Corporate Purchasing and Logistics, Huber+Suhner, 20 June 2003).

The technical infrastructure was provided mainly by CXT. The previous history of ordering shaped the implementation process. Few internal capabilities were required.

The political and cultural hurdles were overcome, and the system and the service level were modelled to accommodate Huber+Suhner's needs. The use of an external service provider helped to overcome resource constraints on the IT side and reduced internal barriers to change.

5.4.3.5 Findings at Huber+Suhner

Although not everything worked seamlessly, it was within the tolerance range for a pilot customer. Huber+Suhner perceives using an ASP solution as an advantage. It avoids internal IT resource conflicts and delivers convincing results much faster than an internally deployed solution. The scope of products procurable was limited to 2% of purchasing volume of Huber+Suhner, or 20% of the MRO spend. A well thought through end-to-end process was a key element in optimising the process and realised the expected benefits as stated in the project goals. The results achieved are convincing and the customer was satisfied with the chosen solution.

5.4.4 Conextrade Supplier for Engineering Parts

5.4.4.1 Brütsch-Rüegger and its Relation to Conextrade

Brütsch-Rüegger was founded 1877 and became a leading trader in high quality tools in Switzerland (www.brw.ch). The products range from mounting, production, engineering tools, metrology, and facilities to standard parts. Its customers come from the metal processing industry, craftsmen, tool manufacturers, as well as industry and service organisations which need tools for their maintenance activities. The product range of traded goods currently includes more than 90,000 parts sourced by more than 700 suppliers. Brütsch-Rüegger employs about 130 employees in Switzerland. The company offers a high service quality and promises 99% delivery of all stored products as well as free advisory services. These are key differenti-
ators for competitive advantage in the market and contribute to the sound financial performance of the company.

Brütsch-Rüegger has been a supplier to CXT's e-market since 2000. Its first customer was Huber+Suhner, which joined CXT's platform in June 2000. The situation has constantly improved, as the following quote shows:

'Since 2000 I have been accompanying the whole subject. I am responsible for customers like Huber+Suhner, Bank A, NOK, Watchmaker A etc. The advantage of one 'plug' to many customers has been realised for us' (Key Account Manager, Brütsch-Rüegger, 15 August 2003).

5.4.4.2 Business and Innovation Lens on Brütsch-Rüegger

In discussions with Brütsch-Rüegger, CXT initially positioned itself as the key Swiss e-market with a universal solution and a superior business model compared to bilateral electronic relations.

'Conextrade said they were an e-market and what makes them attractive is that they were the only one in Switzerland. They would have a unique position and form a monopoly. Everything should go via their e-market. Everything else that might exist is sub-optimal' (CIO, Brütsch-Rüegger, 19 March 2004).

The vision of Brütsch-Rüegger was that it needed a high degree of flexibility to react to individual customer requirements. Technical capabilities were seen as crucial and were required in-house. Brütsch-Rüegger's business worldview was that they were embedded in a B2B ecosystem where multiple intermediaries and direct connections coexist. This contrasted with CXT's initial positioning as the only Swiss e-market for MRO goods.

'Based on the discussions with Conextrade in 2002 I was more and more convinced that there are major differences between the understanding CXT had and how I believe B2B rules can work. (...) It shows that my picture of a B2B ecosystem [of several e-markets and direct connections] is far closer to reality now. In this sense the strategic positioning for us is the following: We cannot rely on only one connection to one e-market to handle all our transactions. We need flexibility and the management of complexity to cope with multiple different connections. The connections result from the need to integrate with different e-markets as well as customers directly. If one is flexible this implies a certain complexity. Therefore we needed to install our own software and set-up own capabilities to cope with this complexity' (CIO, Brütsch-Rüegger, 19 March 2004).

5.4.4.3 Corporate and Project Goals at Brütsch-Rüegger

Brütsch-Rüegger follows a business-driven IT strategy intended to achieve a maximum degree of flexibility to cope with the complexity of the business environment.

'We are in the MRO parts business. Customer requirements and needs drive our business. This business is characterised by many orders and a low order value. That's why process optimisation and customer retention are the primary goals that drive a technical B2B integration for Brütsch-Rüegger' (CIO, Brütsch-Rüegger, 19 March 2004).
Increasing the customer base was a second objective behind the decision to become one of the first suppliers of the CXT e-market. Other objectives of the supplier Brütsch-Rüegger were to increase the electronic order entry rate, thereby reducing administrative work. This was expected to generate a higher revenue share with electronically integrated customers. Brütsch-Rüegger's intention was to strengthen the customer advisory function. They believed that this would increase the value added by employees and foster customer retention.

'We started with some customers with direct links based on EDI and XML. So we were able to gain experience. This brought us to commence the project with CXT. We saw a chance to reduce the effort in order processing. We did not want to reduce employees but we wanted to convert them into customer sales consulting employees. Fax, telephone and email orders need to be entered in the internal system. We wanted to relieve them from order entry and shift them towards consulting by increasing electronic orders' (Key Account Manager, Brütsch-Rüegger, 15 August 2003).

5.4.4.4 Business Process and Outsourcing at Brütsch-Rüegger

Brütsch-Rüegger had previous e-sales experience and started at an early stage to use ICT to improve the efficiency of the business relations with customers and suppliers.

Joining the CXT e-market was perceived as an investment and an instrument for learning more about e-markets as an option for B2B integration in the future. Brütsch-Rüegger was asked to participate by its existing customers. The relations with CXT were problematic at the start. In one of the first meetings, CXT positioned its e-market as pre-built and fixed solution. Many customer requirements could not be met.

Brütsch-Rüegger believed that active involvement in the customer sales process by suppliers was required to convince buyers and to realise the benefits of an e-market for suppliers. The activities of the CXT e-market itself were not considered sufficient, since CXT represented only the electronic platform but not the primary relationship.

5.4.4.5 ICT Infrastructure and E-service Content at Brütsch-Rüegger

For Brütsch-Rüegger, CXT was another electronic channel which complemented its own sales offering. Brütsch-Rüegger started its e-commerce activities in 1997 and had an electronic sales solution before it became a customer of CXT. In 2000, it began to operate with CXT and used the Supply Order solution (ASP Sell) and the CXT e-market. Brütsch-Rüegger needed to make two changes to this initial configuration. By the end of 2002, the company had moved to the direct transaction services in order to optimise process time and reduce costs. The second change was to use its own catalogue solution. The catalogue solution of CXT was sub optimal, as many of the products required a product-specific navigation and search functionality. Furthermore, users at Huber+Suhner were used to the Brütsch-Rüegger system. They used the Brütsch-Rüegger e-shop to identify the material numbers and entered them into the CXT
order form. Figure 5-20 shows the business network of Brütsch-Rüegger. The primary relation with the bottom three customers is omitted to simplify the presentation.

This customer behaviour necessitated using the round-trip solution which accessed the Brütsch-Rüegger shop and handed over the shopping basket to the CXT e-service solution via an Open Catalogue Interface (OCI). This became the preferred access to catalogue data, which only NOK and Watchmaker A did not use. A third solution for Bank A was to have the catalogue data exported to CXT e-service, enriched by other supplier data and exported to the own catalogue of a bank within its demilitarised zone. CXT had to learn that their software was not providing sufficient functionality for configurable products and that their pricing was too high for frequent and large updates.

Brütsch-Rüegger has a strong interest in evolving towards a deeper integration of the transactions of orders and invoices. Brütsch-Rüegger now mainly uses transaction processing, but also the round-trip and selected customer catalogue service functionality of CXT, which is clearly only one electronic way of connecting to customers.

"In the environment of Brütsch-Rüegger Conextrade is primarily a platform for settling transactions. In comparison to Ariba Supplier Network (ASN), we need to pay transaction costs. Other connection costs are comparable. But ASN offers further flexibility and possibilities for suppliers (e.g. supplier can define how he wants to settle transactions with his customer)" (CIO, Brütsch-Rüegger, 19 March 2004).
5.4. Conextrade Environment Data Collection

5.4.4.6 Socio-political Relationships

With the second change in management, the relationship with CXT improved. Brütsch-Rüegger experienced a more flexible and open partnership. The cultures of the two companies seemed to be less prone to clashing:

'CXT realised that we are a strong leader. Therefore we had the feeling that we were treated with preference. (...) If there was an issue we had immediately a response. It surprised me positively. We had a stronger and closer contact' (Key Account Manager, Brütsch-Rüegger, 15 August 2003).

The organisational changes at CXT did not have a major negative impact. The key contact persons were still the same and the changes in strategy did not have a major impact on the business model Brütsch-Rüegger pursued. However, in the early development stages 2-3, the sales representatives of CXT failed to communicate new developments of e-services (e.g. service level agreement management, payment and invoicing solutions) which were of interest to Brütsch-Rüegger. Brütsch-Rüegger did not have the feeling that CXT was initially asking for its requirements. This aspect of the relationship improved in 2003.

The project was internally driven by the CIO who changed mid-2002. With the new CIO, the e-business projects were pushed even more. On the business side it was supported by the board member responsible for sales. He followed the progress and actively participated in meetings. He was the pioneer who agreed to go in this direction. The purpose of using the e-market was to increase the quality of working life, and not to dominate or control.

Brütsch-Rüegger sees itself as one of the leading companies in Switzerland in e-commerce. It collaborates closely with its customers and suppliers. CXT co-evolved and ultimately offered more flexibility.

5.4.5 Conextrade Supplier for MRO parts

5.4.5.1 LB Logistikbetriebe and its Relationship with Conextrade

LB Logistikbetriebe AG was chosen since it was a CXT e-market supplier which had developed from a logistics provider towards becoming a customer-driven outsourced purchasing and logistics provider. In this context, LB Logistikbetriebe used the CXT e-market as platform for offering its services to its customers. LB Logistikbetriebe has been a customer of CXT since the beginning of 2002. The processes performed by LB Logistikbetriebe are procurement, export and import services, storage, packaging, and transportation with its own or via third party equipment.

LB Logistikbetriebe (www.lb-log.ch) has about 100 employees and a projected turnover of CHF 40 million, CHF 8 million of which is generated through office supplies. LB Logistikbetriebe has about 3,000 customers of which approximately 1,500 are separate legal entities with different invoicing addresses. LB Logistikbetriebe currently consolidates about 600 suppliers.
5. Conextra.de Case and Environment

5.4.5.2 Project Goals at LB Logistikbetriebe

The driver for becoming a customer of the CXT e-market was CXT’s customer NOK, with whom LB Logistikbetriebe had existing business relations. A key goal in becoming a customer of CXT was to keep NOK as a customer. The project goals for e-market integration were defined as:

'simplicity, reducing internal effort and increasing delivery quality. Avoid typos or reading errors. Example: Reduce typos [and the risk] of delivering a blue instead of a red pen' (Head of IT, LB Logistikbetriebe, 24.07.2003).

5.4.5.3 Context of LB Logistikbetriebe

'We originated from the internal warehouse operations of PBC. When it became ABB we became an independent unit. Afterwards there was a management buy-out, and now we are an independent company. A year ago we started procuring directly from China - these operations are beginning to take off. We procure what customers need. [This ranges] from highly specialized screws to metal sheets and raw materials, which they do not produce themselves. About 50%, or CHF 20 million, are C-parts, including screws and raw materials. The percentage is decreasing massively. The reason is that the pressure from customers is forcing us to reduce prices' (Head of IT, LB Logistikbetriebe, 24 July 2003).

5.4.5.4 ICT and e-service Content at LB Logistikbetriebe

LB Logistikbetriebe is a medium-sized company with 100 employees. It is able to react flexibly to customer demands. Its application landscape is dominated by an Intentia ERP System AMS 4.0 and a messaging capability provided by Microsoft .Net. The e-shops were developed by a small software engineering company called Kana. They also developed additional services, such as a business card printing solution. A future service will be a print consumables sourcing solution, which matches toner and ink cartridges to printer models.

To be able to interact with CXT e-market, LB Logistikbetriebe built an adaptor based on .Net technology to transact directly with the document management services of CXT. Catalogues were imported in the CUP 6.0 data format specified by CXT.
A fully electronic document exchange without human interaction is possible for invoicing and ordering. However, the Customer NOK did not yet require the changes to their invoicing. At LB Logistikbetriebe, switching from ftp to XML data transfer was achieved during the collaboration with CXT. The internal integration to the ERP system of LB Logistikbetriebe was done via an interface between Microsoft .NET which acted as a data converter and data storage, and an ftp call of the ERP system every 30 minutes.

To summarise, LB Logistikbetriebe offers 3 different forms of electronic interaction with customers: (1) via e-markets (e.g. CXT or Ariba), (2) via its own e-shop, and (3) via direct access to the .NET from the SAP systems of customers.

5.4.5.5 Sales and BPO E-service Context of LB Logistikbetriebe

The competitive positioning of LB Logistikbetriebe is characterised by an emergent strategy that defines its value proposition in relation to its competitors.

'We are slowly moving away from classical office and storage materials towards direct material, like supplying the complete range of instruments for Alstom Power plants in Baden, Switzerland (www.alstom.ch). They are stored in our warehouse and are ordered on demand. It requires a massive change on the employee job profile side. We do not have a classical procurement employee but we need an engineer who performs the projects. In the old days there were procurement people who focused on price and delivery time - today it is engineers who focus on the quality and the prices. With e-markets it is still the typical C-parts product spectrum. There we have integrated Conextrafe and we started a project to integrate Ariba, since one of our biggest customers ABB uses Ariba as purchasing platform' (Head of IT, LB Logistikbetriebe, 24 July 2003).
For LB Logistikbetriebe offering e-sales services was step taken due to customer requests and not a strategic initiative. They did not proactively go into the market with an electronic solution for office supplies, since competitors who specialised in office supplies had already established themselves. The interviewee described the emergent strategy as follows:

'It is both a general strategy and concrete customer demand [to move towards electronic sales processes]. We said we could not offer our services without an electronic shop any more. The office shop was the trigger. Then NOK - one of our office supplies customers - said we want to use the services of Conextrade. Can you still supply us, will you participate? We said, of course we will participate in the e-marketplace and went to the e-marketplace this way. Second, ABB asked us if we can [connect electronically]. We responded, in principle yes. So now we are in the Ariba integration project. Be we never discussed it internally to pro-actively go to an e-marketplace' (Head of IT, LB Logistikbetriebe, 24.07.2003).

Their differentiation from the existing wholesalers was that they can deliver more customised services and offer a product range that was collaboratively defined with the customer. Starting from office materials, they now offer electronic catalogues for semi-finished products, security materials. The planned evolution was to add tools, fixations and office furniture. A further advantage is that LB Logistikbetriebe could offer consolidated delivery at still competitive prices, which was not possible for specialised suppliers.

5.4.5.6 Social Process Changes of LB Logistikbetriebe

The induced changes to the culture and politics were not major, but some effects were indicated.

'The accounting and invoicing structure is not comprehensible. If you ask my boss he would say - CXT is only a cost factor! (with no value)' (Head of IT, LB Logistikbetriebe, 24 July 2003).

Relations with CXT were made more complicated by a business model which lacked transparency and prices which were perceived as too high. CXT charges the volume of data transmitted, which leads LB Logistikbetriebe to a workaround (where not the whole XML document is sent but only a copy of the order with some changes). This circumvents the pricing system of CXT and saves money for LB Logistikbetriebe. More positive was the feedback on the system and service stability, as well as the documentation on the xCBL document format.

The service evolution with CXT started with confusion arising from new terms, technologies and requests. Closer contact enabled an intermediate technical solution. As the full electronic integration worked, the solution was technically satisfying and the technical integration was efficient. The key issue, however, was the relation to the single customer NOK, who did not use the services as originally intended and suffered from adoption problems.

The culture of LB Logistikbetriebe underwent a change due to a reduction in the number of jobs. However, the acceptance of the system with employees was high, as the system automated many administrative tasks. The impact on the organisation was not obvious as the
number of transactions increased at a very slow pace which reduced the visibility of the success.

The project sponsor of the project was the CEO of LB Logistikbetriebe. He had close connections with NOK procurement.

'The driver at NOK convinced our management. Therefore we had an important business sponsor who always looks if our customer (NOK) is happy' (Head of IT, LB Logistikbetriebe, 24 July 2003).

However, the acceptance problems were assumed to be at the management level, as management was not entirely convinced of the value of the solution because many of the positive effects, such as reducing the amount of administrative work, did not become immediately visible. The measurable benefits, such as cost reduction, false deliveries and workload, were not visible because the level of utilisation was low. The general challenge as perceived by the interviewee was to maintain the acceptance of participating in e-markets or e-services even if the price-value ratio was not immediately favourable. The use of the system has not changed the employees' span of control.

5.4.5.7 Results of the Cooperation with Conextrade

'The number of false deliveries was reduced from 1,983 to 800 through a higher degree of electronic transactions' (Head of IT, LB Logistikbetriebe, 24 July 2003).

Therefore the perceived service quality was enhanced and amount of additional costs incurred by false deliveries was reduced. The benefits were a substantial easing in the amount of administrative workload and a lowering of the number of false deliveries is reducing reverse logistics processes and costs.

5.4.6 Conextrade Supplier for print products

The case study describes the history and situation of one supplier to the parent company of CXT, Swisscom AG. SeetalSchaller was chosen for reason of it being an early customer with a special request for the implementation of a solution for customised products.

5.4.6.1 SeetalSchaller and its relation to Conextrade

SeetalSchaller was approached by Swisscom with the proposal of becoming one of the first suppliers for the CXT e-market solution. SeetalSchaller is a major producer of envelopes and printed direct marketing products for the Swiss market. It employs more than 300 employees and produces more than 9 million envelopes a day. The business of SeetalSchaller is briefly described by the interviewee as follows:

'We have 40% of the Swiss envelope market. We have a concept that classifies customers into 4 groups. (1) Printers needs envelopes to print on, which are then resold, (2) Wholesalers, (3) Big retailers, such as consumer department stores, and (4) Direct sales to key customers: Biggest businesses with customers who consume several CHF 10,000 worth of products.'
5. Conextrade Case and Environment

Customers are telcos, insurances, banks or industries, who need a large amounts of envelopes. These are key accounts and direct customers. They order millions of identical envelopes. We produce them with a special machine and deliver. If a small customer needs 200-1000 envelopes, then we recommend a smaller printer who can print such small lot sizes economically' (Key Account Manager, SeetalSchaller, 12 September 2003).

5.4.6.2 Project Goals at SeetalSchaller

The key motivation of SeetalSchaller was to keep the customer Swisscom and respond to its request of transacting via the CXT e-market. The solution presented was only acceptable once an additional software feature for customised products had been implemented.

5.4.6.3 ICT and E-service Content at SeetalSchaller

CXT needed to develop a solution for customised product orders to meet the specific requirements of Swisscom (buyer) and the SeetalSchaller (supplier). The technical component provided by the software provider called Commerce One Smart Forms was required to be able to communicate individualised information to print on envelopes. This special service was depicted as an ASP-customised order in Figure 5-23. Technically it was an additional software component that enhanced the standard ordering and catalogue functionalities and which was accessed by SeetalSchaller via the ASP Sell solution.

![Figure 5-22: ICT architecture used for SeetalSchaller](image)

SeetalSchaller did not integrate the CXT e-market into its ERP system, since integration costs would have exceeded the perceived value, as other customers were not available to transact via CXT. SeetalSchaller usually integrates key customers via their PartnerNet – a solution
5.4. Conextrade Environment Data Collection

based on SAP software which integrates more easily with the SAP ERP system. Transportation orders and shipping documents are directly sent to the logistics provider from the ERP system.

5.4.6.4 Electronic Sales Context of SeetalSchaller

For SeetalSchaller, the CXT e-market is only one specific bilateral solution. The standard way to integrate with key customers is via individualised solutions based on the PartnerNet sales solution. The solution with CXT merely substitutes the traditional method of sending faxes, telephone calls or emails. Since there is no technical integration with the ERP system the benefits are marginal. The employees in the sales department do not save much time because they have to enter orders manually into the ERP system. The only real benefit is the elimination of typing mistakes and adjustment cycles.

5.4.6.5 Social Context and Processes of SeetalSchaller

For SeetalSchaller, the solution was requested by a key customer and therefore accepted.

'On a management level we have to think about it since we do not have any apparent savings with the solution' (Key Account Manager, SeetalSchaller, 12 September 2003).

The role of CXT was not clear in the beginning of the relationship. With the organisational change of CXT, work on building the relationship started again. As SeetalSchaller did not invest much into the relationship the internal political hurdles were not high. But management promoted the participation as well. SeetalSchaller started to transact a number of orders from Bankl via the CXT e-market and used the ASP invoicing functionality.

5.4.6.6 Findings at SeetalSchaller

Products and processes at SeetalSchaller were not standardised enough to be able to use the CXT e-market easily with additional customers. Furthermore, integration into the ERP system is currently not economically feasible. The company proceeds by using 1:1 connections with their key business partners.

Electronic services are more difficult to implement with standard software systems even though the service element here is designed to customise the product the way the customer wants it.

A further lesson is that SeetalSchaller expected CXT to produce a clear supplier strategy for expanding their business. This was not delivered since CXT saw itself only in the role of an agent. The approach to becoming a technical platform for the procurement department or a procurement company itself was not a strategic option pursued by CXT. The negative impact of a lack of critical mass on the development of a more intense business relationship is obvious in this case.
5. Conextrade Case and Environment

5.4.7 Summary of Buyers and Suppliers

The following section summarises and compares the data of the cases according to the categories of content, context and social processes (see Walsham, 1993).

<table>
<thead>
<tr>
<th>Category</th>
<th>UBS</th>
<th>Huber+Suhner</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Content</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product/Service</td>
<td>Banking Services</td>
<td>Communications component supplier</td>
</tr>
<tr>
<td>Products/Services procured</td>
<td>Office supplies</td>
<td>Tools, office supplies</td>
</tr>
<tr>
<td>Services of CXT used</td>
<td>• Catalogue Management</td>
<td>• ASP Hosting</td>
</tr>
<tr>
<td></td>
<td>• Transaction Exchange</td>
<td>• Catalogue Management</td>
</tr>
<tr>
<td></td>
<td>• Invoicing Solution</td>
<td>• Transaction Exchange</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• (Non-standard) Invoicing Solution</td>
</tr>
<tr>
<td>Integration with CXT</td>
<td>Machine-to-Machine via XML</td>
<td>From human-to-machine to machine-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>to-machine via ftp of a structured file</td>
</tr>
<tr>
<td>Catalogue Solution</td>
<td>Content in CXT's catalogue, direct access to supplier and own catalogue</td>
<td>Access to Brütsch-Rüegger catalogue and content in CXT catalogue</td>
</tr>
<tr>
<td><strong>Context</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal Social Relations</td>
<td>Ok – except for some categories with resistance to use the ‘MyShop' solution</td>
<td>An alliance between finance and procurement was required to convince IT. Now it works seamlessly.</td>
</tr>
<tr>
<td>External Social Relations</td>
<td>Problematic with customer, as utilisation is low; no solution for SME suppliers</td>
<td>Good relationship with CXT, learning with suppliers</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>Gap closed</td>
<td>No real-time integration but electronic connection via ftp realised</td>
</tr>
<tr>
<td>Know-how</td>
<td>Gap closed</td>
<td>Software know-how and process know-how of CXT improved</td>
</tr>
<tr>
<td><strong>Social Processes</strong></td>
<td>Culture</td>
<td>High acceptance of solution</td>
</tr>
<tr>
<td></td>
<td>Solution required convincing users of the previous system; some political issues</td>
<td>High acceptance of the solution was achievable only after resistance had been overcome</td>
</tr>
<tr>
<td>Politics</td>
<td>Accepted solution</td>
<td></td>
</tr>
</tbody>
</table>

*Figure 5-23: Buyer overview of CXT's customers*
5.4. Conextrade Environment Data Collection

The overview of suppliers according to the same categories is summarised below:

<table>
<thead>
<tr>
<th>Category</th>
<th>LB Logistikbetriebe</th>
<th>Brütsch/Rüegger</th>
<th>SeetalSchaller</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content</td>
<td>Product/</td>
<td>Services of CXT used</td>
<td></td>
</tr>
<tr>
<td></td>
<td>service sold</td>
<td>CXT used</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MRO aggregator from office to norm parts</td>
<td>Catalogue services</td>
<td>Catalogue services</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transaction services</td>
<td>ASP Customised Ordering</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Transaction Services</td>
</tr>
<tr>
<td>Integration with CXT</td>
<td>Content in CXT's catalogue</td>
<td>Direct access to B-R catalogue &amp; content in CXT's catalogue</td>
<td>Content in CXT's catalogue</td>
</tr>
<tr>
<td>Context</td>
<td>Internal social relations</td>
<td>Difficult for management</td>
<td>Ok – but value could be higher if more transactions.</td>
</tr>
<tr>
<td></td>
<td>External social relations</td>
<td>Problematic with customer, as utilisation is low</td>
<td>Business model did not suit; initially a difficult relationship</td>
</tr>
<tr>
<td></td>
<td>Infrastructure</td>
<td>Full integration achieved</td>
<td>Functionality of only ASP order management not sufficient - later with integration requirements met</td>
</tr>
<tr>
<td></td>
<td>Know-how</td>
<td>XML know-how transfer achieved</td>
<td>Initially little know-how at CXT, which developed to reach a good level</td>
</tr>
<tr>
<td></td>
<td>Process</td>
<td>Culture</td>
<td>Medium acceptance</td>
</tr>
<tr>
<td></td>
<td>Politics</td>
<td>Questionable benefit</td>
<td>Initial conflicts now resolved.</td>
</tr>
</tbody>
</table>

Figure 5-24: Supplier overview of CXT's customers
6 Explorative Complementary Case Studies

6.1 Motivation and Overview of Additional Cases

The complementary cases provide additional perspectives on the subjects under study. They can be divided into three categories. The first category is the case of Siemens Buyside Marketplace Click2Procure which is an e-market using a similar technology and with a similar background in the year 2003. It is a rival case to the situation at CXT and represents the situation about 20 months after the other interviews of this chapter. In the second category are the rival cases during the period of the AR study at CXT (2000-2001). These were conducted to gain insights into the business models, competitive environments and problems of other e-service providers at that time. The third category comprises buyers who chose not to use the CXT solution.

These studies are intended to provide insights into other contexts. The purpose is to triangulate similarities or differences between those and the CXT case. The interviews were all semi-structured using case study research methods (cf. Yin, 1994) (see chapter 3). It was important to establish a degree of trust between interviewer and interviewee so as to be able to ask them to speak freely about their personal view of the situation. The interview questions were predominantly open questions to avoid prejudicing or directing the answer. Exceptions were made when the question was not fully understood and examples needed to be given. Data was collected in the form of full transcripts for the interviews, verbatim notes, and written notes made shortly after the interview if recording was not allowed or if it was only possible to conduct telephone interviews.

The cases chosen represent a theoretical sampling. A difference of all the cases to CXT is their international focus. The case of Siemens is not regionally bound and extends to a worldwide presence with headquarters in Munich. The key countries for the Siemens e-market are Germany, USA, France, Spain, and UK. CXT was geographically bound due to local contracts by CommerceOne, which were then weakened by so called mega private exchanges, such as with Siemens in 2001. The other cases also have an international perspective, with SIG being the most regionally bound one.
6.2 Alternative Approach: Siemens Buyside Marketplace Click2Procure

Click2Procure, a solution built by the Siemens Buying Marketplace (SBM) unit, which started as internal project in October 2000 and went live as a Siemens-owned private e-market on the 1 April 2001. It is made up of a suite of applications designed to support the procurement processes for indirect, direct goods and services for Siemens worldwide. SBM is part of the central corporate procurement unit of Siemens AG.

Siemens was founded in 1847 in Munich and is the seventh largest company in Europe in terms of turnover. It is divided into 13 business units and operates in 190 countries. The purchasing volume is roughly EUR 50 billion. It purchasing operations are decentralized. Spend on MRO goods and services, including consulting accounts worth some EUR 7 billion, two thirds of which are spent in Europe.

Compared to CXT, the scope of the Siemens e-procurement solution was worldwide and initially focused only on Siemens' internal procurement volume for direct and indirect goods and services. Siemens offers a wide range of procurement services which supported large parts of the holistic procurement process (see Figure 6-1).

![Figure 6-1: Overview of Siemens Buyside marketplace business architecture](image)

Siemens used the same C1 software to start their service offering. Furthermore, compared with CXT, it added sourcing information, supplier relationship management, its own applications and procurement expertise.

The data sources were documentation about Siemens Click2Procure (cf. Aberdeen, 2002; Reitzig, 2002; Grass and Kaulen, 2002) as well as an interview with the Vice President Sie-
6. Explorative Complementary Case Studies

The questionnaire was targeted at the internal situation of an e-service provider from another economic area and with a predominantly internal focus (see Appendix B). The goals were to identify similar challenges and responses, since the business concept, the technical infrastructure and the funding by one of the largest national companies were comparable context conditions. A key difference was the international orientation of the Siemens approach.

6.2.1 Project Goals of SBM and Future Strategy

The scope of the project evolved from an internal solution to an external and international service in February 2003. Since SBM is part of the procurement department it has clear procurement objectives. The targeted savings were several EUR 100 million by 2003 with the help of e-business technologies, which included a sell-side solution from IBM, a supply chain management solution from i2, and an auctioning application from Portum. The targets and achieved results for the e-procurement solution consisted of 40% cost savings and process time savings of four weeks to 3 months. The objective was to reduce products and services costs by 15%. The savings from e-sourcing alone with the help of electronic auctions was EUR 280 million. The qualitative objectives were to achieve global supplier relationship transparency and to provide support for the whole procurement process.

6.2.2 Service Offering at Siemens

Siemens' strategy was to combine procurement technology and procurement services centrally in one unit. Siemens defined information, sourcing and ordering as the main process phases where SBM provides support for the 13 business units of Siemens.

The comprehensive service offering includes the following services targeted at suppliers and buyers at different Siemens business units. One specific service is the Siemens Supplier Self Registration Service. Existing or potential suppliers can register their names, product and service portfolio. Mid-2003, 3,000 core suppliers of the 260,000 suppliers were registered and 7,000 were to have been registered by the end of 2003. Figure 6-2 depicts the service spectrum and the names of the application solutions used to support the information, sourcing and ordering processes.
6.2 Alternative Approach: Siemens Buyside Marketplace Click2Procure

<table>
<thead>
<tr>
<th>Information</th>
<th>Sourcing</th>
<th>Ordering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Warehouse</td>
<td>RFQ</td>
<td>Desktop Purchasing System (DPS)</td>
</tr>
<tr>
<td>PIS SSI SA</td>
<td>Bidding Auction</td>
<td>E-NET „I“</td>
</tr>
<tr>
<td>click4suppliers</td>
<td>Contracting (by PCO)</td>
<td></td>
</tr>
</tbody>
</table>

- **Services**
  - Supplier Managemnt
    - Supplier Registration/SSI
    - Supplier Information and Qualifying
    - Communication Areas
    - Ratings/Supplier Assessment
    - Reports/Controlling
    - Supplier Development Tool
  - Preparation & Consulting
    - Material Field Analysis
    - Identification of Projects
    - Purchasers/Supplier Training
  - Realisation
    - E-RFQ, E-RFI, E-RFP
    - eAuction, eBidding
    - Advanced Negotiation Concept
  - Contract Management

- **Catalogue Management**
  - Catalogue Definition and Updating
  - Catalogue Hosting

- **Customer Integration**
  - Purchaser (ASP, OnRamp)
  - Supplier (Supply Order, SIP)

- **Document Routing**
  - Full ERP integration

- **Invoice Reconciliation**
  - (only ASP)

---

**Annotation:**
- ASP: Application Service Providing
- DPS: Desktop Purchasing System
- E-Net I: E-Net Excellence through Integration
- E-RFI: Electronic Request for Information
- E-RFO: Electronic Request for Quotation
- E-RFP: Electronic Request for Proposal
- PCO: Procurement Contracting Offices
- PIS: Purchasing Information System

---

**Figure 6-2: Adapted service portfolio of SBM click2procure**

A procurement-oriented service offered by SBM supports its customers in the strategic and operative procurement of goods and services. SBM offers procurement category experts in the area of non-core materials (e.g. office supplies or IT) or production materials (such as coatings, LCDs, OEM materials) for operative processes. Furthermore, the strategic purchasing process can be outsourced to BSM. This ranges from market analysis, the pooling of demand, the selection of preferred suppliers, corporate agreements on the controlling of contracts, and savings.

### 6.2.3 ICS Infrastructure at Siemens Buyside Marketplace

Siemens has about 260 SAP and other ERP installations which are connected via a B2B middleware to the e-procurement services of SBM.
6. Explorative Complementary Case Studies

If internal customers require an ASP e-procurement solution then SBM can use a software solution which can run in an ASP mode. The e-market services and supplier integration remain the same. The solutions cover applications for supporting MRO goods as well as direct production goods.

6.2.4 Social Relations and Processes

The internal organisation is defined by customer-oriented field operations, a service factory for service delivery, procurement services and a marketplace for external customers. In detail, field operation consists of sales, professional services, and marketing. The factory organisation comprises product management, development and operations, business services.

Siemens Buyside Marketplace established an organisation to avoid or reduce political hurdles. In contrast to many other approaches of software providers or IT-departments of multinationals, Siemens chose to put more emphasis on procurement know-how and procurement processes. SPLS is the global purchasing and logistics service provider which transformed its traditional business model to encompass e-business technologies (see Grass and Kaulen, 2002, 186). SBM is run as a cost centre internally. External projects are used to reduce fixed costs incurred for running the services (e.g. software licences or operating staff).

A complex organisation and processes evolved around the Global Purchasing Board (GPB) to coordinate the business needs with the service offerings and the costs incurred by the e-market. The BSM Steering Committee, made up of members from the 13 business units and BSM itself, plan the procurement strategy and decide upon the means to achieve the objectives set (see Figure 6-4). Utilisation of the services is a key performance indicator for both
the e-market as well as the heads of procurement of the units. BSM is a cost centre and the heads of purchasing at Siemens have to pay for its services. To stay competitive, demonstrate cost effectiveness, and to increase returns on investment in software and people, the third party business was started officially in 2003. The different councils responsible for implementing the procurement strategy are the purchasing council (PCO), the Procurement Service Center (PSC) for external and internal outsourcing, the Lead Buyers, and the Procurement Contracting Offices.

![Diagram of procurement strategy alignment]

The relationship with e-ready suppliers was intensified, and the savings on product and process cost came to several hundred million EUR.

### 6.2.5 Sales Approach of Siemens Buyside Marketplace

SBM does not participate in the price competition of struggling e-markets. Instead, they rely on their unique selling propositions of internationality, combined procurement and e-procurement know-how, content quality, investment security, and using the latest technology. In addition, the shared service approach enables relatively competitive prices to be calculated. The external target customer group are multi-billion EUR international enterprises which want to optimise their own e-procurement projects.

'The competition is working with dumping prices. E.g. Competitor Emaro and an automotive company worked with dumping prices and now Competitor Emaro is not existent anymore. Key goals are to bundle volume and to cut costs' (Vice President Siemens Buyside Marketplace, 4 July 2003).
6. Explorative Complementary Case Studies

The automotive company is now a customer of SBM and Emaro no longer offers these services anymore.

6.2.6 Business Model View and E-services at SBM

At SBM, business models are dominated by the external perspective and have the following properties and characteristics:

'It (the business model) has to have a valid relation of performance and benefit. This is a key problem. I need a certain output or performance, a certain benefit for the user, and I need to price according to its value. These three dimensions [output, benefit, and price] form a triangle, which I use to define a portfolio. This portfolio is connected to a marketing strategy. If I can connect these three I can develop a valid business model, which means I can be successful in the market compared to my competitors. Further it needs to be dynamically shaped and adapted to customer needs. We learned from customers that their preference changed, for example, from variable transaction based models, to fixed price models to ASP solutions. These changes require subsequent changes to the business model' (Vice President Siemens BuySide Marketplace, 4 July 2003).

SBM considers the potential for additional e-services in the form of WebServices for direct products to be relevant, if full integration can be achieved. In the future, SBM requires new innovative e-services to generate revenues. However, currently Siemens does not invest in internal development in this area. There is no formal assessment or development procedure to secure a high quality of developed services as well as to manage risk and resources. External market screening is done and many providers present their solutions. The status quo is described as:

'We have covered and examined everything. There is in our current situation not much value creation in additional e-services. It is not relevant as revenue generator. It is premature. The reality in e-procurement is that utilisation is still in its beginning and a long way from achieving first forecasts of e-procurement utilisation in Germany industry in terms of volume and degree of bundling from two years ago. Before doing the homework in existing activities, establishing additional e-services cannot be achieved. The critical mass is missing and the development towards additional e-services is much slower. Before I can realise bundling effects I need the electronic integration. Before we have not achieved a sound penetration in the organisations in the external market we do not need to think about fancy services which do something nicer, easier and better. We have had some approaches from EBS or others but they are too early. The critical mass is missing' (Vice President Siemens BuySide Marketplace, 4 July 2003).

This quote stresses that the change introduced by e-procurement requires market penetration and utilisation. SMB believes E-procurement needs to show benefits before additional services can be added. SBM sees the value of e-services in fully automated integration. The candidate process areas identified are logistics and payment processes.
6.3 Alternative E-procurement Cases of Non-customers

6.2.7 Findings at Siemens Click2Procure

Siemens chose to focus on internal customers first before addressing the external market. This strategy was successful since there was enough time to build the skills and to be able to understand what capabilities the software provided. SBS operates as cost centre. Its owners are strongly connected with the e-market and interact frequently and intensely.

Siemens Buyside Marketplace wins e-procurement volume via a distributed procurement network organisation which involves the business units of all units within Siemens. It is a convincing approach which focuses to maintain the key motivation, benefits and most importantly to keep focus and monitor the progress.

Other e-services are an issue but the focus currently lies on the utilisation of the existing platform and rollout for the standard MRO catalogue-buying, supplier consolidation and price reduction with electronic tendering. Furthermore, the increase of direct materials procurement via SBM and improved supplier relationship management to increase the transparency are at the heart of activities.

The situation is not much different in Germany compared with Switzerland. The political and integration barriers, as well as a low utilisation prevent success, as illustrated by the experience in the following quote:

'A typical external customer project: Tendering started with 300 catalogues, contract signed for 30, finally implemented 12, going-live with 3' (Vice President SBM, 4 July 2003).

6.3 Alternative E-procurement Cases of Non-customers

The following two cases represent companies which were aware of the CXT offering but decided to choose different solutions for their direct and indirect procurement activities.

6.3.1 Supply Chain Collaboration for Direct Goods at SIG Pack AG

SIG Combibloc is a subsidiary of SIG AG, an engineering and packaging company with a half-yearly turnover of CHF 1.007 billion and 7,200 employees in 2001. It chose to seize the potentials of business networking via electronic means in order to curb the negative consequences of the bullwhip effect (cf. Lee et al., 1997). They increased their e-service readiness and that of their partners by improving the information flow between the five parties involved. The B2B integration middleware chosen to improve the existing business network was a Microsoft’s BizTalk which was to provide a collaboration infrastructure e-service.

The goals were to reduce process and product costs, increase information quality, and reduce response and throughput time. It was important to SIG that there be little or no changes in their legacy systems (SAP R/3) and software license costs were low. The process substituted was a lengthy, manual one with many media mismatches and infrequent information exchange. The main technical goals were to attain a high scalability and exchangeability of the
6. Explorative Complementary Case Studies

software. To achieve the latter, the driving architecture design principle included a high autonomy of data, presentation and application logic of the collaboration infrastructure. Figure 6-5 depicts the implemented scenario of five parties.

The solution exchanges forecast information, orders, invoicing, and transportation documents. These six documents, including the corresponding response documents, build 26 connections within the business network of SIG; in addition, there is an SQL Server-based Web application which exchanges catalogue data with SAP R/3. One central BizTalk server, with workflows, coordinates the business network and connects to four ERP systems and to one proprietary system of the logistics provider. The collaboration infrastructure consists of an http(s) transport protocol. The documents are exchanged as BizTalk messages and converted to SAP IDOC, SAP BAPI and PRMS specific format. The security standard is high and SIG's proprietary ebis-Framework manages the trading partner registration. The message broker used is MSMQ, the object broker uses DCOM and SOAP. The key functionality of the infrastructure employed are mapping, messaging, and workflow (see Figure 6-6):
SIG was very satisfied with the reliability and handling of the BizTalk server. The time needed to set up a new installation was approximately one hour. With the knowledge in-house, SIG was now able to map new documents; the mapping of a new IDOC document or BAPI call took less than two hours. The benefits of the new solution are reduced time needed to exchange forecast documents from seven to twelve days down to one minute and ten seconds. Coca Cola was thereby able to reduce inventories by more than 47%. The plan was then to roll out the solution to 50 business partners in the near future. Key success factors were:

- Very few changes in legacy systems (SAP R/3)
- B2B and integration know-how available within SIG’s ICC-Systems development team
- Flexible workflow easily adaptable to suit changing customer demands
- Relatively inexpensive and reliable infrastructure compared to that necessitated by the products of pure B2B middleware vendors
- Achievement of a near real-time single signal of information throughout the supply chain to avoid bullwhip effects (cf. Lee, 1997)

To summarise the status quo, SIG optimised the flow of information using a B2B integration middleware designed to improve the flow of direct production goods within a multiple-party spanning supply chain or business network. There was possibly more potential for enhancement in utilising e-services. These ranged from an integration of information services for the identification of new suppliers, partners or customers based on UDDI, through to an integration of business processes in the secondary value chain (e.g. logistics, finance or insurance). Possible examples were inspection via SGSOnSITE (see ch. 6.4.1), landed cost calculations via tariffic (see ch. 6.4.2), real-time business intelligence solutions (e.g. based on inforay) or SLA management (see Appendix 1.3). At the end of 2001, using public e-markets like CXT for MRO could have been facilitated with the announced interoperability of the BizTalk software with the new release of CommerceOne MarketSite. However, CXT decided not to upgrade the MarketSite to be BizTalk compatible.

### 6.3.2 E-business Challenges for Freight Forwarders at Danzas

Danzas AG as a major third party logistics provider is both a user and a provider of e-services. The interview was conducted in mid-2001 with the Head of e-business at Danzas. Together with its owner, Deutsche Post AG, they formed a joint venture to build a fourth party logistics provider. Danzas regrouped in 2003 and now goes by the name of DHL as part of Deutsche Post. Danzas aims to become the leading logistics fulfilment provider for B2B e-markets (see Danzas, 2001, 5). Figure 6-7 summarises the e-business activity areas:
Danzas participates in different kinds of e-markets as a logistics fulfillment partner, and offers e-services directly to customers. It uses e-markets to procure logistics services via freight e-markets. An example is an e-market for air transportation (www.gf-x.com). It decided to participate with other European logistics providers to use inttra.com after allowing for a longer evaluation and waiting period until it evolved as a sufficiently mature e-market (see www.inttra.com). In the USA National Transportation Exchange (www.nte.com) is fully operative and successful, but road transportation is more complex in Europe (e.g. multiple borders, languages and country regulations). Therefore, Danzas and Deutsche Post have started to build and use their own services (www.portivas.de) to handle the complexity of European transports. Danzas believes that due to multiple bullwhip effects (Lee et al., 1997), it is not possible to handle the full complexity of road transportation via e-markets at the moment. These markets currently support freight capacity exchanges but not real-time disposition to reduce information frictions. Another unit at Deutsche Post is currently evaluating the procurement of indirect or MRO goods via e-markets. In Germany, Deutsche Post has its own e-market for MRO goods.

The main motivation for participating in industry-driven e-business activities in 2001 was to learn the market requirements and develop existing customer relationships by offering additional e-services. From Danzas' experience of discussions with more than 100 e-markets - both corporate and start-ups - the critical question is: Where does the procurement process directly connect with the logistics process? The business model of the best candidates for long-term successful logistics integration e-services is believed to require international logistics and/or solutions for reverse auctions in a one-to-few relation and delivery ex-works. If
these conditions apply and an e-market has or will have a critical mass of transactions, the
contribution to success by integrating e-logistics services is high enough to participate.

The main criteria used to evaluate the attractiveness of e-markets are the actors (buyers, sell-
ers, e-market makers, partners), the power relationships and processes. The least attractive
are pure MRO e-markets, which only handle free-on-board delivery. The delivery time for
some MRO categories like office supplies is not critical to business, and current suppliers can
achieve a relatively reliable delivery service through their own distribution system. Danzas
expects profitable e-business activities through private exchanges. The market makers of
these exchanges have an existing business network as well as the power to establish a new
electronic platform.

Running its own e-markets is not an option for Danzas since the company has back-end inte-
gration with several of the top-carriers and the value proposition for its existing customers
remains almost the same. Danzas expects the path from being a freight exchange, which im-
plements a simple black board, to becoming an e-service integrator to take a few years.

The major hurdles are legacy systems and infrastructures of the shippers that are in place to
enable the use of additional information offerings, thereby streamlining their supply chain.
The integration projects for an automated exchange of transportation documents currently
last about six months. In 2000, the start-up driven 'first-mover frenzy' in e-business de-
manded project times of a month but few or none of these were successful. The main inhibi-
tor was the need for change and the complexity involved in changing current business prac-
tices. Similar to the optimisation of procurement processes, several functional units have to
agree on promoting one solution and adapt their current tasks and processes.

The benefits of e-business activities are to retain customers via new means (e.g. e-markets).
The key is to extend services and depth of process integration. Quantitative positive effects
are currently not measurable. This is because benefits in information quality, flexibility and
responsiveness are difficult to compute against project costs in a short-term perspective.
There is currently no information available about detailed assessments. One effect expected
through an increase in automation is the achievement of increased flexibility to react faster to
customer demands and ad-hoc changes of orders. CXT was not considered due to own corpo-
rate initiative by the parent company Deutsche Post.

6.4 E-services Potential in Strategic Sourcing

6.4.1 Increasing Trust in Anonymous Trade via SGSonSITE E-services

The interview with Societe Generale de Surveillance (SGS) was conducted in mid-2001. SGS
employs 30,000 employees in a network of 1,200 offices, is present in 140 countries, and
generated a turnover of CHF 1.164 billion according to the first half-yearly statement in
SGS's core business is the verification and monitoring of services for companies in international trade as well as certification and services for governments and international institutions. In 1999, SGS launched an online solution called SGSonSite (www.sgsonsite.com). SGSonSITE started as a modular business process e-service that can be integrated into e-markets or directly accessed via the SGS website. This was the start of an XML-based service offering with the first four of the following services:

<table>
<thead>
<tr>
<th>Service Name</th>
<th>Service Description</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>SpecSheet</td>
<td>SpecSheet is product specification verification available to vendors. SGS reviews the existence, correctness and completeness of test reports, certificates and other documents provided by vendors against the standards/specifications mentioned on the e-market. (Fixed scope and upfront pricing structure.)</td>
<td>stopped</td>
</tr>
<tr>
<td>Visual Inspection</td>
<td>Is a visual identification service of the goods and their comparison against information received by SGS before starting the inspection: the product description provided in the inspection order or by the e-marketplaces, a product sample, if available commercial documents related to the transaction, quality documentation related to the product. (Fixed scope and up-front pricing structure.)</td>
<td>stopped</td>
</tr>
<tr>
<td>Sample/Sampling</td>
<td>SGS draws 'Type Samples' at the vendor's site, seals them in a secure way and organises the complete shipment process to the buyer. (Fixed scope and up-front pricing structure.)</td>
<td>stopped</td>
</tr>
<tr>
<td>SGS evaluate</td>
<td>Information e-service that provides performance metrics and characteristics of trading partners to complement ISO certifications. It displays a portfolio of independently verified information about a company at the company's website and a range of allied e-marketplaces. By clicking on the SGS eValu...</td>
<td>Live since 2000</td>
</tr>
<tr>
<td>Web-enabled SGS services</td>
<td>Industry specific order form, status tracking, and access results online. It covers 3rd party trust services for samples, inspection and testing, and verification of product specification.</td>
<td>Live since 2001</td>
</tr>
</tbody>
</table>

SGS only offered two of these services in 2001. The first one was SGS eValu...
### Business model Elements

<table>
<thead>
<tr>
<th>Business model</th>
<th>Element</th>
<th>Short description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business architecture</td>
<td>Actors: SGS network, SGSonSITE, buyers, suppliers, e-markets. SGSonSITE offers the ordering and monitoring of Web-enabled SGS services and the SGS eValuate program</td>
<td></td>
</tr>
<tr>
<td>Theory of the business</td>
<td>Reduce costs while increasing the customer reach and leveraging existing know-how and infrastructures</td>
<td></td>
</tr>
<tr>
<td>ICS architecture</td>
<td>Integration via link to SGSonSITE system to fill out order form and request status information. No single sign-on due to SGS security concerns with some of the e-markets. No back-end integration for the web-enabled e-service.</td>
<td></td>
</tr>
<tr>
<td>Benefits</td>
<td>Better information transparency, faster throughput times, system identifies correct unit within SGS, e-markets can complete their offerings and open new sources of revenue. It fosters anonymous trade by increasing trust through a trusted 3rd party (cf. trust in systems or organisations as described by Sydow and Loose, 1994).</td>
<td></td>
</tr>
<tr>
<td>Revenue model</td>
<td>Transaction based individual prices (per use) or subscription for SGS eValuate</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 6-9: Simplified business model for SGSonSITE services**

The e-market customers of SGSonSite services run vertical e-markets predominantly in the petro-chemical, minerals, oil, energy, and food and agricultural industries. Customers – especially the existing customers of SGS – were not satisfied with the fixed scope of the early online ordering solution since it did not provide the flexibility expected. SGS designed the solution to offer fixed scope and up-front pricing, which customers perceived as placing restrictions on their needs; they also missed human interaction element of discussing the scope of service offering (they usually wanted to add more to what was on offer) and price negotiations. These were the main reasons why the fixed scope, highly automated XML-based services (SpecSheet, Visual Inspection and Sample/Sampling), have been replaced by less automated but variable scoped web-enabled services where customers can freely choose the variety of services they require (with flexible scope) by submitting an RFQ/RFP order. The electronic ordering process is semi-automated and more flexible through open text fields. This step adds more flexibility and provides existing customers with the possibility of interacting and negotiating with SGS employees. The disadvantage is that the degree of automation and the back-end integration is limited. The service offers industry-specific customised ordering facilities, but the information can only be automatically processed via Web scraping or by manually entering it into a second system. It is an example of a typical hybrid e-service.

In addition, SGS learned that assessment of the e-markets is crucial. In hindsight, they participated in too many initiatives that failed (cf. Klueber et al., 2001a for an assessment approach of e-markets). SGS believed that the estimated 30 integrated e-markets which they planned to have as customers by the end of 2001 deliver considerable business.
6.4.2 Landed Cost Calculation E-service of Tariffic

Tariffic is an e-service provider for online landed cost calculations facilitating international trade. Tariffic’s tariffs are based on the Harmonised System (HS) code. The company has its base in San Francisco and employed approximately 100 employees in 2001. Their offering consists of the classification tool tactics™ that maps products to the HS code, and a calculation engine to define the tariffs and duties for international shipments (tariffeed™). The competitive advantage is that the service covers 150 countries, and helps shippers to avoid penalties and procurement professionals to optimise sourcing decisions. Their customer segments comprise large shippers (e.g. Fortune 500 heavy industrial equipment manufacturers with customers in 43 countries) and industry e-markets (e.g. customers in the mining industry who are active in more than 17 countries).

In August 2000, Forrester Research spoke with 40 logistics managers of American, European and Asian companies. The responses indicate a demand for landed cost services (see Figure 6-10):

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>54%</td>
<td>Respondents stated they either have no way of predicting total landed cost or have to do it manually.</td>
</tr>
<tr>
<td>52%</td>
<td>Do not know how accurate their information is for calculating landed cost.</td>
</tr>
<tr>
<td>Few</td>
<td>Companies can actually calculate total landed cost. They state that it is important to give customers an accurate quotation.</td>
</tr>
<tr>
<td>47%</td>
<td>Respondents use third parties to handle regulatory compliance issues.</td>
</tr>
<tr>
<td>53%</td>
<td>Do not know how frequently updates of compliance information occur, whether in-house or outsourced.</td>
</tr>
</tbody>
</table>

*CXT analysed several scenarios of using landed cost calculations and discussed those with www.tariffic.com — a preferred partner of C1. The three scenarios were:*

1. A landed cost calculation for reverse auctions, if the goods are auctioned ex-works
2. Support for strategic purchaser to compare prices ex-works
3. Providing a solution to improve the purchasing decision in multiple-supplier sourcing scenarios

Technically, there are two integration options: either integration of the e-service via a GUI and linking it to the two ASP solutions (hybrid e-service), or an XML-based data exchange with a direct link between the two application systems (full e-service). To offer this service, the user or syndicating party should be able to provide a single-sign-on functionality to increase the ease of use.

Apart from more transparent purchasing information on a worldwide basis, a major benefit for customers is the guaranteed compliance with international trade laws. One computer manufacturer had to pay a fine of several million US dollars for incorrectly declared shipments. A central motivation for using an accurate landed cost service lies therefore in its potential to avoid penalty fees.
6.5 Summary of Triangulation Case Research

The cases highlight that further e-services existed in 2001. The above cases are displayed in Figure 6-11 ordered in a matrix defined by buyer-process (x-axis) and the business value the e-service according to the e-service framework (y-axis).

For SGSonSite the proposed business concept structures their current business model in a concise form (see ch. 7.3 for more details). Promising standards and applications will be released or already have been at the end of 2001. In 2003, the situation improved. Companies that have already services to offer need to decide on how and when to migrate their offerings. Companies that have not yet tapped this field need to decide whether they should start building competencies to understand and leverage these new opportunities.

This chapter highlighted actual e-services in the area of direct (SIG case) and indirect (Siemens case) procurement support. Furthermore, two e-services to support international trade and trust (SGS case) provided examples of what is currently available and how these e-services integrate with their customers' or business networks business and ICS architecture.

The advancement of procurement via e-services was explored in two process areas connected to the selection and ordering processes that CXT already fulfilled. Firstly, logistics processes represent an area where e-services require both physical and electronic representation and current approaches of two providers (see ch. 5.4.6 inet-logistics and Danzas). Secondly, e-contracting and SLA Management to increase the efficiency and effectiveness of Business Networking are covered by Appendix 1.3.

On the BCI level, security issues are currently not top priority as many projects are still in a pilot phase. The experience at CXT shows that customers prioritise functionality higher, but this might change. On the Business Process level, rich collaboration e-services were not identifiable. MRO procurement requires a different set of e-service support than supply-chain e-services on this level, which corroborates the assessment of Siemens SBM. The information and knowledge level is hardly used due to unawareness of customers and the need to individually integrate, which incurs e-service provider specific costs. With more open standards this might improve considerably.
Part C: Interpretations and Conclusion

The following chapters comprise the analysis and present the findings. They position case data and theory into the context of findings.

Chapter 7 focuses on three concepts that were identified and elaborated on while working with CXT. They address early phases of the e-service development life cycle. They are the results of AR and case study-based concept development and describe reality-tested constructs designed to help understand e-service life-cycle processes. The concepts are seen from a socio-technical perspective as knowledge creation enablers and elements for fostering successful e-service development. Appendix K complements the concepts with a brief introduction to the method and one selected technique to structure the e-service invention process.

Chapter 8 starts with a review of the D&M'92 IS success model in the light of the data introduced in the chapters five and six. An adapted e-service success model is proposed to diagnose and improve e-services in future contexts.

Chapter 9 focuses on the issues that emerged from applying challenging or further commenting on the referenced literature with the data of the cases from a provider and customer perspective. The themes address customer orientation and learning, the management of utilisation, provider capabilities and politics. A first proposal for an e-service strategy process can be found in Appendix J.

Chapter 10 summarises the findings of the thesis and concludes with an outlook.

7 Key Concepts and Techniques for the Development of E-services

This chapter elaborates the elements and properties of concepts encountered in the first phases of an e-service life cycle until it is offered. It contributes to answering the research question as to which concepts are required to develop e-services. This construct building is a result of AR-based investigation of (sub)categories, properties and their potential values for developing e-services. The proposed concepts were identified within the CXT case by AR interaction with employees, partners, and customers (see Appendix G for details and triangulation cases to corroborate the findings). The result is a clearer definition of the words and meanings through elaborating context-bound sub-categories and properties. The aim is to be able to apply them to future challenges and new contexts. The benefit for business practice is that the concepts described should contribute to reducing project risks, improving project scoping, reducing service engineering time and improving the implementation and offering of an e-service by encouraging a better, shared understanding between participants.

The constructs identified are ordered according to the life cycle of e-services. The criteria for selecting concepts were (1) centrality to e-services, (2) novelty compared to existing business
7.1 Key issues of E-service Development at Conextrade

practice at CXT, thereby providing direct positive impact on the company, (3) possibility of testing the concepts in practice, (4) richness of the data available, and (5) missing specificity in the literature reviewed.

The initial elements of the concepts were taken from the case data and are enhanced by a reflective process using insights from thinkers in academia who explored similar phenomena in similar contexts. The concepts provide the first results of the thesis for taking action in supporting the successful life cycle management of e-services. The concept discussion addresses ways of identifying and specifying concepts, but does not contain procedural models or documents with results, which are discussed in Appendix K as core elements of techniques. Techniques support innovation in holistic procurement processes by proposing reality-tested theories-in-use (cf. Lyytinen and Robey, 1999).

The structure for presenting each concept is as follows: (1) The context and challenges of the concepts are described. It represents the challenges and requirements the concept was used in and how it developed during the research involvement and secondary cases. (2) A summary of the result of the concept elaboration according to the procedure described in chapter 3 is presented. Each section proposes relevant concept sub-categories, properties, dimensions, and values. (3) The sections conclude with lessons from applying the concept or implications for future application.

This chapter covers the first three of the five concepts identified:
- Specification, description and assessment of e-service inventions (see ch. 7.2)
- Development of business concepts for e-services designed to facilitate efficient and effective e-service innovation (see ch. 7.3)
- Definition of knowledge enablers for the e-service engineering process (see ch. 7.4)
- Definition of architectural principles for e-service aware ICT architectures
- Elaboration of e-service sales concept

The remaining concepts were identified as relevant but were not explored in detail since the researcher did not have detailed access to business practice at CXT or other cases to thoroughly develop the concepts.

7.1 Key issues of E-service Development at Conextrade

The process of e-service development and the challenges discovered when implementing e-services are briefly summarised to give an overview of the emerging issues the proposed sound concepts are intended to solve.

The concepts mostly apply to e-services that CXT was involved in developing during the period between 2000 and 2001. The period can be described as turbulent meeting the precondi-
tions of Eisenhardt and Brown (1999). They recommend several actions which were taking into account in the development of the proposed life cycle concepts.

<table>
<thead>
<tr>
<th>Preconditions</th>
<th>Applicability</th>
<th>Rules for taking action</th>
<th>Applied in CXT's development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Being part of turbulent markets</td>
<td>Yes</td>
<td>Do it fast</td>
<td>Initially (Phase 1-2), later less fast</td>
</tr>
<tr>
<td>Business and opportunities constantly falling out of alignment</td>
<td>Yes</td>
<td>Develop multiple options &amp; make roughly right choices</td>
<td>Partially (Phase 1-4), Transparency and communication of choices low</td>
</tr>
<tr>
<td>Emerging new technologies &amp; services</td>
<td>Yes</td>
<td>Run pilot to improve analysis and lower risk or create a shadow organisation (simulation)</td>
<td>Yes</td>
</tr>
<tr>
<td>Frequent testing of new business models &amp; rules is required</td>
<td>Initially Phase 1-4</td>
<td>Get the general manager right (overview &amp; vision)</td>
<td>Only partially achieved in phase 1-4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Script the details (Task lists &amp; check lists &amp; near term operative goals)</td>
<td>Too little knowledge management</td>
</tr>
</tbody>
</table>

Figure 7-1: Application of Eisenhardt and Brown's business portfolio rules

A prevalent issue in the data and business challenge was how to identify and qualify e-services. Many potential ideas existed in the electronic realm but the challenge was how to identify, assess, and communicate these ideas. The result is a concept for inventing e-services (see ch. 7.2).

The first variants of the service development methodology of CXT were transferred from several corporate units at Swisscom. Many modifications existed in the employees' minds, which increased the variety. Consequently, the employees did not speak a common language and thus put a different slant on their e-service proposals. The content of each step of the development methodology had not been unilaterally agreed upon and the employees did not share the implications and the valuation of the importance of certain documents. This was the cause of a great deal of misunderstanding about the content, purpose, and documents required in the development of new e-services. Central terms such as business models, business case, revenue model etc. were vague and definitions were not shared. Another issue were disagreements as to what e-services were and if they were needed. The lack of a common understanding and prioritisation caused numerous debates on the content and value of e-services or value-added services. The result was a detailed business concept which addresses the issues above (ch. 7.3).

The control of the project often stopped at the border of the unit. In effect, there was often no unit-spanning project manager to coordinate the whole service development project. For example, on projects initiated by IT, BD was not asked to participate or with a considerable delay. IT then led the project alone once the business case had been accepted. The low level of involvement of Sales and customers resulted in developments which were not aligned with explicit and implicit customer needs. Part of the reason was the lack of an incentive system.
and understanding of what e-services are and how they could be applied. The result was to develop a knowledge management concept that addressed the communication and knowledge transfer issues discovered at CXT. These issues are addressed as a knowledge management dimension of service engineering (ch. 7.4).

7.2 Invention Concept for E-services in Procurement

Innovation is a key element when transforming processes, organisations, or whole business networks in order to remain competitive. Drucker (1999, 119) posits that 'Every organisation (..) needs one core competence for the future: innovation. And every organisation needs a way to record and appraise its innovative performance'. This applies all the more to e-services with unlimited possibilities for inventions in the digital realm. Practical experience has shown that, in the past, there was little structure and knowledge about invention content and processes for e-services. The concept of e-service invention will be proposed to fill this gap. Not the often unplannable invention event but the invention result view is pursued. Its aim is to produce a concept functioning as a morphologic grid to help identify invention areas and elements to foster the invention event. The result forms the basis for assessing and implementing e-service-enabled innovation.

7.2.1 Context Description and Challenges of the Concept

For CXT, HiServ and Deutsche Telekom, the basic idea was to generate new revenue streams by offering innovative and yet saleable e-services. The questions to be answered were: Which areas promise new and profitable e-services? What are critical characteristics? How the ideas towards a purposeful direction and implementation should be structured? Several workshops were moderated to identify what innovative e-services are and how they could be classified. The insights gained from practical experience are combined with learning from literature on innovation in services and information systems (see ch. 3). The e-service invention is input to the strategy development and is the starting point of the e-service life cycle (see ch. 7.5).

7.2.2 Summary of Concept of E-service Invention

The concept of e-service innovation is defined by the (1) invention area and sub-categories and the (2) fit assessment for e-services which cover the environment and context where the invention idea would be implemented. The main invention objects for holistic e-procurement processes are summarised below (see ch. 2.3.1):

- Input innovation of new product or service innovations (e.g. new information services, information products)
- (Production) process innovation (e.g. using other partners, reconstructing the value network, using online mass customising capabilities of a supplier) by substituting existing processes from sourcing requirements to after-sales processes.
7. Key Concepts and Techniques for the Development of E-services

- Coordination innovation (e.g. using intermediaries or third parties)
- IS innovations (e.g. Desktop Purchasing Systems, e-markets, order management in an Application Service Provisioning mode)
- Discovery of new markets and sources (sell side & buy side) and invent new organisational structures and management methods (e.g. build your own e-market)

These categories and the intention of increasing the digitalisation of products, services and the coordination can lead to the invention of new business ideas. Their formation into an e-service invention concept is detailed in Appendix G.1.

The discussion coverers invention categories and specific innovation areas as well as examples where one can identify innovation potential for improving e-procurement. The area of innovation is defined by the sub-categories of nature, complexity, process category and role with several dimensions. It inspires new thoughts, details the initial ideas and supports the documentation of the concept invention process.

The fit assessment defines the fit with organisational (corporate strategy, existing customers, e-procurement process, power, and product or service characteristics) and integration needs (attractiveness, effort for provider and customer).

The concept of an e-service invention and its initial assessment is summarised in Figure 7-2. The goal is to generate and/or facilitate the completion of a first idea and provide descriptive elements to further shape the idea space and to assess an innovation idea. Several ideas for e-service invention are presented in Appendix G.1, which require assessments in specific practical contexts.

<table>
<thead>
<tr>
<th>Category</th>
<th>Sub-Category</th>
<th>Properties</th>
<th>Dimensions</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-Service Invention</td>
<td>E-service invention area</td>
<td>Nature</td>
<td>Output/Input</td>
<td>Service, tangible good or intangible good</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Type</td>
<td>full or hybrid e-service</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Delivery</td>
<td>physical, hybrid or digital</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Coordination</td>
<td>design or settlement oriented</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Process impact</td>
<td>automatic, informational, integrational..</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Complexity</td>
<td>Elements</td>
<td>simple or composite</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Interaction</td>
<td>static or dynamic</td>
<td></td>
</tr>
<tr>
<td></td>
<td>E-service process category</td>
<td>I&amp;K</td>
<td>e.g. tariff information, utilisation</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>BPO</td>
<td>e.g. ordering, invoicing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>BCI</td>
<td>e.g. document processing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Role</td>
<td>Type</td>
<td>Buyer, e-service provider, e-market, supplier</td>
<td></td>
</tr>
<tr>
<td>E-service fit assessment</td>
<td>Feature</td>
<td>Provider's processes</td>
<td>full, marginal, unrelated</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Customer's processes</td>
<td>full, marginal, unrelated</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Corporate strategy</td>
<td>similar - opposing</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Existing customers</td>
<td>similar - related - not related</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Power</td>
<td>even - uneven</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Product or service characteristic</td>
<td>high e-serviceness - low e-serviceness</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Role benefit</td>
<td>time, cost, flexibility, quality, future potential</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Integration need</td>
<td>Attractiveness</td>
<td>low - high</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Effort for provider</td>
<td>low - high</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Effort for customer</td>
<td>low - high</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Figure 7-2: E-service invention concept*
7.2.3 Lessons from Applying the Concept

The proposed concept aims to structure e-services and provides categories based on which an e-service can be assessed at an early stage of development. It forms the basis for a structured discussion within an organisation that decides on the further development of the e-service.

Several workshops were held at CXT for the purpose of identifying and classifying e-services according to the criteria process fit, benefits, and attractiveness of integration and the effort to integrate. These are practical criteria from the case for prioritising e-service invention ideas for e-service customers, e-service providers or syndicators likewise. They have been confirmed and enriched through analysing academic literature (see Appendix G.1).

CXT was struggling to identify viable e-services because BD had little information about customer's real needs. The sales people did not participate in internal workshops but were struggling with the acceptance of the existing services. The problem was compounded by BD or partners inventing many ideas all at the same time which led to a great deal of activity but no coherent direction. As the whole future service portfolio was vague and resources were scarce the inventions were pursued with varying effort.

In 2003 the situation changed. The challenge of assessing multiple invention ideas was not a central activity at e-Trade Solutions anymore. The pressure to identify more e-services was reduced by the new head. Similarly, at Siemens Buyside Marketplace developing new e-services was pursued opportunistically. They listened to proposals from the market but they did not develop any own services but focused on marketing existing services.

The cases indicate that a concept clarification and validation is useful and that the need for new services depends on the business goals and the business environment. Future e-services can be facilitated using the proposed concept and the corresponding technique (see Appendix K) as a basis. A prerequisite is that a company's strategy is flexible enough to accommodate free-form processes and time to experiment (see Von Krogh et al., 2000, 85). A limitation is that feedback from customers and external markets is not structurally embedded in the concept but is a salient further assessment dimension or part of consecutive processes. E-service invention is a salient input to the strategy and is influenced by the strategic direction. The proposed concept strives to increase the managebility of the identification of e-services. Its practical procedure is described in Appendix G.1.

7.3 Business Concepts for the Development of E-services

In the early phases a separation from conventional business strategy led Branche and Webb (2000, 13) to conclude 'e-Business remains an unchartered frontier with no tested models for guiding decision making'. The following section presents the business concept as a salient element for strategy implementation of e-services to overcome this situation. The business concept is seen as a means for assessing the viability of an e-service business innovation idea.
Further it is an instrument to align the e-service development and e-service portfolio with the corporate or business unit strategy. It strives to include the characteristics of e-services, the level of customisation and the change perspective of introducing a new service or a new form of delivery.

The business concept structures the first ideas of an invention (see ch. 7.1) and enriches it with information. As such, it serves as a facilitator for communicating and sharing the implicit ideas of the inventor(s) with a bigger group of experts and decision makers (cf. Von Krogh et al., 2000). The output should be detailed enough for a person or a group of persons with budget responsibility to decide on whether and when a detailed business case should be developed. The purpose of the business concept proposed is to assess one’s own, the partner’s and competitor’s business concepts in a concise yet complete way while minimising the required resources by providing a structured concept.

Both literature (see ch. 2) and case experience form the basis for proposing the key elements an e-service business concept should contain to enable profound decisions on the success potential and path further streamlined implementation actions. The proposed concept elements were used in an early version at CXT. A refined version aims to further focus discussions on critical components and provide an action-oriented approach by combining the elements.

7.3.1 Context and Challenges of Business Concepts for E-services

The business model was a central term at CXT and of the other cases. Despite its frequent use, the meaning of the term varied between departments of CXT and between companies. Finance, BD and Sales all used the term with a different meaning and in a different way. For the finance department, the term business model implied solely the financial model defined by the revenue drivers, revenues, required investment and costs. For BD, it documented an opportunity for offering a new single service. By contrast, the Sales department saw it mainly as the generalisation of all offered services. As such it stood as a synonym for being a virtual intermediary that offers an e-market. The term business model was equal to the n:1:m relationship model and its implied superiority towards n:m electronic business-to-business relationships (see Buxmann, 1996) (see ch. 2.5.4). The consequence was that the departments did not have the same (semantic) understanding of the term.

Examples of the diverse understanding of a business model of customers and competitors further stress the need for a clear understanding of the concept. Customers of CXT like Huber+Suhner defined a business model as ‘a way to make money’ (Head of Corporate Purchasing, H+S, 20 June 2003). Siemens described the essence of a business model as follows:

'It has to postulate a valid relationship between performance, benefit and price. This is a key problem. I need a certain output or performance, a certain benefit for the user, and I need to price all this according to its value. These three dimensions form a triangle which I use to define a portfolio.
7.3. Business Concepts for the Development of E-services

This portfolio is connected to a marketing strategy. If I can connect these three I can develop a valid business model, which means I can be successful in the market compared to my competitors. 
(Head of Siemens Click2Procure, (4 July 2003).

Although it was one of the essential terms and central tasks to be solved, it was difficult to find a common understanding at CXT and in the customer base. Key people avoided discussions about the existing business model or specific business model components. A proposal of a workshop to elaborate the business model in more detail was declined by management.

Due to the centrality of the business model, the internal confusion, and different external perspectives, a thorough analysis of the concept was necessary to help ease communication problems and facilitate the strategy formulation and service offering at CXT. One of the steps was to differentiate the term from an implemented business model. Analysis and discussion showed that other terms, such as business development planning or investment models, did not perfectly fit the context of new services with little or no experience in design, offering and customer retention potential, and a considerable time pressure to formulate and assess new service ideas.

The result was that customers were confused about their business partner CXT. The interview partners were able to list 4-5 different business models CXT pursued for the same type of output. Furthermore, due to the functional organisational structure (see ch. 5) the customer contact of key business development people was limited. Therefore their assessment of potential customer acceptance was based on previous experience or pure logical thinking. In reverse: with little information flow from Sales, new ideas of BD could not be tested since Sales refused to present the business concept before a service was fully developed and saleable.

The formulation of the concept was shaped by political hurdles of changing management styles and functional sub-cultures at CXT. The time pressure of evaluating many simultaneous ideas and the need to improve revenues during the e-commerce hype phase from 2000 until 2001 were other case-specific factors which shaped the concept formulation. An example from literature that stresses the importance of ex-ante business concept considerations is the business-to-consumer procurement Case of Napster Corp. (see Appendix G.5).

The influence from studying the literature and the CXT case succeeded projects with Triaton and Newtron, as well as Deutsche Telekom Multi-Media Systemhaus.

Generic business model types (cf. Tapscott et al., 2000) can be combined but provide no support as to what the possible combinations are and what criteria or processes are required to adapt or combine their proposals. For example, an e-market like CXT's, would be classified as aggregator with low value integration. However, the drawback is that their conclusions do not fit the specific situation, as other context conditions do not allow for a simple analysis of two dimensions. The offering of CXT fits many of their models and the conclusion therefore
becomes contradictory. By contrast, the component view attempts to encompass the relevant elements in a concise way without proposing norm strategies. The business concept developer is guided in defining the elements, properties and values of the concept. The options are too manifold, and a reduction to two or three issues would not suffice for the cases analysed. Moreover, the environment might change too swiftly to be able to define stable theories for competitive advantage in e-services. The guidance of the element view is weaker than the business model type approach but may be more applicable to new constellations. The chosen approach allows tracking changes of the theory of the business (cf. Drucker, 1994) as required by practice (see Siemens case of ch. 6.2).

A business concept is intended to describe the value creation logic and context conditions of an e-service of a company or business network in a concise way to allow for an assessment, a sharing of information and knowledge, and decision-making on its future implementation.

The approaches in literature (see ch. 4) were analysed in the context of the cases. This process identified the following six elements which are defined as constituting elements of a business concept plus the legal filter as shown in Figure 7-3.

![Business Concept Elements](image)

Figure 7-3: Business concept elements

A business model consists of the following elements: (1) business architecture (business actors, their roles, inter-organisational processes), (2) theory of the business (underlying assumptions and rules the business model is built on) (Drucker, 1994, 100), (3) ICS architecture, (4) benefits (qualified benefits for the participating actors), (5) sources of revenue, (cf. Timmers, 1999; Hamel, 2000; Klueber, 2000), (6) customer marketing concept, and (7) legal issues (cf. Alt and Zimmermann, 2001). The legal issues constrain or may drive the configuration, in contrast to the other elements, which are objects of design. The legal filter is an influencing factor but can rarely be directly influenced by a single company. The innovator can use these six elements to gauge the resource requirements. The business concept forms the basis for drawing up a business case, if it is approved by management and the required resources are assigned.
7.3. Business Concepts for the Development of E-services

The proposed concept integrates many views on a preliminary and little detailed level to provide a rich picture aimed at assessing the success potential and the strategy fit of the e-service that is evaluated by compiling a business concept.

7.3.2 Summary of a Comprehensive E-service Business Concept

Concept elements were identified in an iterative process to meet the needs of efficiency and practicability with the scientific interests of completeness (cf. Gummesson, 2000). In addition to identifying elements and properties, some generic values were assembled from literature and from case experience. These are proposed as aids for further e-service development projects, for triggering critical thinking and evaluating further possibilities.

<table>
<thead>
<tr>
<th>Category</th>
<th>Sub-Category</th>
<th>Properties</th>
<th>Dimensions</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Concept</td>
<td>Present a mental picture of the to be service as a service in the mind (Clark et al., 2000, 29)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Business Architecture</td>
<td>Actors</td>
<td>Type</td>
<td>Company, Customer, Suppliers, Partners, Competitors, Regulators</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Properties</td>
<td>Consent</td>
<td>Technical services, knowledge processes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Processes</td>
<td>Flow of Information</td>
<td>Sourcing, payment information</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I/O-Relations</td>
<td>Flow of Goods</td>
<td>Physical goods, information services</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flow of Funds</td>
<td></td>
<td>Per use, one time</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rules</td>
<td>Theory of the Business</td>
<td>e.g. become the universal platform for B2B transactions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Assumptions</td>
<td>About Competition</td>
<td>e.g. a dominant position by 200x</td>
<td></td>
</tr>
<tr>
<td></td>
<td>About Regulators</td>
<td></td>
<td>e.g. Electronic invoicing will be accepted by 2003</td>
<td></td>
</tr>
<tr>
<td></td>
<td>About Customers</td>
<td></td>
<td>e.g. customers want ASP solutions</td>
<td></td>
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<tr>
<td>Theory of the Business</td>
<td>Risks</td>
<td>Customers</td>
<td>e.g. low acceptance of ASP solution</td>
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<td></td>
<td>Implementation</td>
<td>Business Concept</td>
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<tr>
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<td>Financial</td>
<td>Business Concept</td>
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<td>Technical</td>
<td>Business Concept</td>
<td>e.g. Immature to proven technology</td>
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<td></td>
<td>Cooperation Need</td>
<td>Cooperation Form</td>
<td>Lose, Tight (e.g. joint venture)</td>
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<tr>
<td>Purpose</td>
<td>Intensity</td>
<td>Purpose</td>
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<td></td>
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<tr>
<td>ICT Architecture</td>
<td>Component</td>
<td>e.g. SAP EBP, CXT MarketSite,</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Relations</td>
<td>e.g. SAP EBP to CXT MarketSite</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Standards</td>
<td>e.g. XOB, EDF/FACT 86.4</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Documents</td>
<td>e.g. orders, order response, invoice</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Revenue Model</td>
<td>Sources of Revenue per Actor</td>
<td>e.g. Transaction fee from suppliers for orders</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benefits</td>
<td>Range</td>
<td>e.g. 2-5 CHF per transaction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sales Approach</td>
<td>Quantitative</td>
<td>e.g. Process cost reduction by 50%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Qualitative</td>
<td>e.g. User satisfaction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legal Conditions</td>
<td>Value Proposition</td>
<td>e.g. Streamline process and save costs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Customer Approach</td>
<td>Characteristics</td>
<td>Size, industry, functions etc.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Customer Profiles</td>
<td>Properties</td>
<td>e.g. No ownership of traded goods</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conditions</td>
<td>Security</td>
<td>e.g. SSL Security is sufficient</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 7-4: Summary of e-service business concept elements and properties

7.3.3 Lessons from Applying the Concept

The applicability and potential insights are presented through (1) the concise description of the e-services of SGS (see ch. 6), (2) the comparison of two e-procurement service providers (see Appendix 10), (3) the learnings of the application within CXT, and (4) discussing the implemented business model in the case of Brütsch-Rüegger below.

The learning on the social acceptance of an earlier version of the business concept within the context of CXT was: The proposed concept was accepted by BD as valuable. However, it failed to find acceptance with all employees. A few employees preferred to present new ser-
vice ideas 'their way'. It did not gain wider acceptance throughout the company because the
distribution of documents and a brief presentation in BD did not suffice. Basically, the guid-
line was too abstract and parts of the management were not committed to follow a strict ser-
vice development process. Furthermore, as the researcher left his successor modified it ac-
cording to his understanding. Some elements were eliminated since it was still perceived as
being too complex and its need was lower in that phase of CXT's development. Additional
modifications arising from the final writing of the thesis were not handed over to CXT.

A point of learning from Brütsch-Rüegger was that the supplier benefits from an active in-
volveiment in the customer sales process. Brütsch-Rüegger therefore promoted the CXT
e-market within its own customer base. The value of e-markets for Brütsch-Rüegger could
only be realised if more customers used this e-market and the technical integration encom-
passed the whole order-to-pay process. CXT's strategy and the implemented business models
of its e-services were based on the assumption that they would offer a unique and only n:1:m
relationship for buyers and suppliers in 2001. This assumption conflicted with Brütsch-
Rüegger's strategy of maximising their e-service readiness and flexibility in order to interact
better electronically with customers. Brütsch-Rüegger was convinced that it had to connect
and transact with multiple e-markets and also via direct connections instead of using CXT as
universal intermediary to connect with their customers. Brütsch-Rüegger believed that neither
one technical solution nor one intermediary alone can offer the variety and the flexibility of
communication which is required in heterogeneous inter-organisational business networks.

'The offer of Conextrade to use an exclusive tool to connect to their market was unacceptable due
to a total loss of flexibility and control. The pace of integration was also too slow. For content
management and integration of non-Conextrade customers we do not rely on Conextrade's services
anymore; we have it under our own control. We have our tool in operation [and can react flexibly
to our customer's requirements]' (CIO, Brütsch-Rüegger, 19 March 2004).

The business model of the universal business document exchange integration service of CXT
was not compatible with Brütsch-Rüegger's strategy. The case confirms the findings of
Jayatilaka et al. (2003) who propose that, if the knowledge risk, integration risk and intensity
of communication are high, the propensity to outsource is low. Secondly, this stresses the
need to validate and adapt one's business model if the customers cannot fully accept the as-
sumptions or solutions offered. The proposed concept should facilitate the monitoring and
adaptation of the theory of the business if communication about customer responses happens.

7.4 E-Service Knowledge Enabling Concept

The next logical step after the business concept has been formulated is to manage and perform
the service engineering process. It can encompass a phased project model with review meet-
ings before critical decisions. Several authors propose this as way of structuring and guiding
the service engineering or new service development process (see Koller et al., 2001, 73;
7.4. E-Service Knowledge Enabling Concept

Faehnrich, 1998, 5; Bruckner, 2000, 146; Johnston and Clark, 2001; Fitzsimmons and Fitzsimmons, 2001, 109; Cook, 2002). The analysis of the service engineering practice at CXT in the whole e-service life-cycle however identified a deficit in the exchange of information and knowledge (see ch. 5). The proposed concept of knowledge enablers builds on the work of von Krogh et al. (2000) and is applied to the context of e-services to avoid such deficits.

7.4.1 Context Description and Challenges of Service Engineering for E-Services

The major challenge in managing the e-service development for an e-market lies in its novelty and, consequently, the lack of knowledge about developing such a service. The person presenting the new service proposal is ideally the most knowledgeable person of the e-service provider in that field. A review board can only relate to past knowledge gained in other situations, and analogies might not always be appropriate.

First experiences with the 6-phase service development method called TollGate showed that it does not meet the requirements of a turbulent environment sufficiently. CXT used the TollGate procedure version of Swisscom’s B2C unit Bluewin to structure its service development projects. As mentioned in the case, several different versions existed and acceptance of the process was low. It appeared too stringent, cumbersome, and insufficiently focused. The TollGate process was generally considered too long. Some of the documentation requirements were prohibitively complex and extensive. Another deficit was not having any criteria to define what a new service needed to fulfil and criteria to assess costs and revenue potentials.

Using a modified TollGate process description as a basis, CXT established a service development council to structure the discussion and review of service proposals. The service development council was intended to share tacit and explicit knowledge in order to improve the success of the service development efforts, but too often open conversation and exchange of ideas were not possible. Operational problems occurred because the functional departments did not share or deliberately hid available information. Service development projects were often treated with a lower priority. Service development council members sometimes misused the procedure and documents required by the TollGate to stop service proposals in order to strengthen their coercive or functional position power in political processes. Reasons were formal gaps relating to the proposals for the TollGate stage under evaluation. The service development meetings were used by some participants as a forum for making general statements or expressing dissatisfaction which was unrelated to the service in focus and hindered the progress.
7. Key Concepts and Techniques for the Development of E-services

7.4.2 Summary of the Knowledge Enabler Concept for E-services

The challenges arising from the practicalities of the situation were to streamline the process, propose assessment criteria, identify ways of surfacing and sharing knowledge, and improve the structure and management of the review meetings held by the service development council. Except for the information and knowledge sharing and political issues the service development issues, such as procedure models, will not be covered in detail as the modified Toll-Gate process was in place and well documented adequate academic literature exists (cf. Fitzsimmons and Fitzsimmons, 2001; Goeke, 1998; Lehmann, 1995; Tomiyama, 2001; Faehnrich, 1998; Johnston and Clark, 2001) and literature with a practical background (cf. Koller et al., 2001; Morrow and Vijayananda, 2003).

A favourable framework that complements the TollGate process is 5x5 two dimensional grid of Krogh, Ichijo and Nonaka (2000), as introduced in ch. 2. The five knowledge creation steps and the five knowledge enablers form two dimensions. The framework supports the soundness of the basic structure of CXT's adapted TollGate, as the phase models are similar in structure and content. One can relate the adapted TollGate steps to knowledge creation steps.

<table>
<thead>
<tr>
<th>Phase</th>
<th>Knowledge creation step</th>
<th>CXT's adapted TollGate process</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Share tacit knowledge</td>
<td>Service Invention (see ch. 7.2)</td>
</tr>
<tr>
<td>2</td>
<td>Creating concept</td>
<td>TG0 Business Concept Design (see ch. 7.3)</td>
</tr>
<tr>
<td>3</td>
<td>Justify a concept</td>
<td>TG3 Investment Proposal (or Business Case)</td>
</tr>
<tr>
<td>4</td>
<td>Building a prototype</td>
<td>TG4 Service Definition &amp; Pilot Project</td>
</tr>
<tr>
<td>5</td>
<td>Cross-levelling knowledge</td>
<td>TG5 Roll-out of e-service</td>
</tr>
</tbody>
</table>

*Figure 7-5: Comparison of knowledge creation with the TollGate process*

Next to the confirmation of the e-service development steps which were derived from an engineering innovation context (see Figure 7-5), the benefit of the Von Krogh et al. (2000, 9) 5x5 grid is in its emphasis on the importance of the 'knowledge enablers' dimension. They can be considered as preconditions for a successful knowledge management process (Von Krogh et al., 2000, 8) and are here proposed for a successful e-service life cycle management respectively. This socio-political perspective was undermanaged at CXT and the knowledge management aspect was undervalued. The knowledge enablers as proposed by Von Krogh et al. influence the knowledge creation process, or e-service engineering steps, and will be applied to propose enhanced e-service knowledge sharing concepts.

The proposal aims to identify the main knowledge management elements for developing e-services weakly developed and used at CXT. The socio-technical aspect of sharing knowledge and information during the e-service life cycle are detailed as a basis for future e-service developments. Appendix G.4 details these aspects, including organisational and ICS design recommendations which build on existing literature.

Von Krogh et al. propose microcommunities for developing knowledge, which are equivalent to the project teams at CXT that were to cooperate in developing e-services. As von Krogh et
al. postulate, these teams should be inter-disciplinary, consisting of experts from service development, business integration, and operations. CXT lacked clearly formulated knowledge enablers to support the total service development process.

The knowledge enablers are listed in the following five categories. The concept is elaborated, as it would have facilitated the service engineering process had the author discovered this literature beforehand and had he been able to convince the management of CXT to establish or foster the following e-service knowledge enablers further. Figure 7-6 summarises an assessment of the applicability of the knowledge enabling context for e-service, achievement at CXT and examples from the CXT case.

<table>
<thead>
<tr>
<th>Knowledge enabling</th>
<th>Applicability and peculiarities</th>
<th>Achievement at CXT</th>
<th>Comment of situation at CXT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instill a vision</td>
<td>Required to motivate and direct employees</td>
<td>Weak</td>
<td>During development phases 1-2 the e-service vision was to offer additional e-services in the next major development phase. During phase 3-4 it changed frequently and became unclear. Different views existed at sub-culture level. Mainly technical changes were implemented.</td>
</tr>
<tr>
<td>Manage conversations</td>
<td>Arenas to discuss implications of new e-services</td>
<td>Medium</td>
<td>The service development council functioned as a platform for managing conversations but little participation and political activities prevented the creation of a productive environment. Too few other arenas for open conversations.</td>
</tr>
<tr>
<td>Mobilise Activists</td>
<td>Required to overcome barriers</td>
<td>Weak</td>
<td>Knowledge activists were often not motivated and initiatives were stopped without open communication which, coupled with frequent reorganisations, made for frustrated employees.</td>
</tr>
<tr>
<td>Create the right context</td>
<td>Organisational measures for innovation</td>
<td>Weak</td>
<td>The sub-cultures and functional orientation at CXT did not foster the free exchange and open discussion of new e-services.</td>
</tr>
<tr>
<td>Globalising local knowledge</td>
<td>Share insights with other units or organisations</td>
<td>Weak</td>
<td>Lack of document sharing and knowledge transfer between internal units, with partners, and customers. Intense information exchange only happened within units. The Globale Trading Web was not used to exchange knowledge.</td>
</tr>
</tbody>
</table>

Figure 7-6: Knowledge enabling at CXT

The concept for e-service knowledge enabling is summarised in Figure 7-7.
7. Key Concepts and Techniques for the Development of E-services

<table>
<thead>
<tr>
<th>Category</th>
<th>Sub-Category</th>
<th>Properties</th>
<th>Dimensions</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>e6 Engineering</td>
<td>Knowledge Enabling Context</td>
<td>E-service vision</td>
<td>Development direction</td>
<td>Unclear - Clear</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Imaginative element</td>
<td>Weak - Strong</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Restructuring element</td>
<td>Low - High</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Trust</td>
<td>Low - High</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Effective conversations</td>
<td>Conversation openness</td>
<td>Low - High</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Edit conversations</td>
<td>None - active editing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Caring atmosphere</td>
<td>Low - High</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Creativity</td>
<td>Low - High</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mobilise activists</td>
<td>Coordinate knowledge creation</td>
<td>None - operational - anticipative</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Create the right context</td>
<td>Align values</td>
<td>None - aligned</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Align organisational structure</td>
<td>None - aligned</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Align strategy</td>
<td>None - aligned</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Align ICT</td>
<td>None - aligned</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cross-leveling local knowledge &amp; globalise</td>
<td>Spread knowledge</td>
<td>None - actively pursued organisationwide</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Set incentives to use knowledge</td>
<td>None - organisation wide established</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Technical infrastructure</td>
<td>None - protocols - databases and interactive computer supported meetings</td>
<td></td>
</tr>
</tbody>
</table>

Figure 7-7: Overview of the concept of e-service knowledge enabling

7.4.3 Lessons from Applying the Concept

The concept of knowledge enabling for e-services has not yet been applied in business practice but the analysis of the original context indicates a high relevance for contexts like that of CXT. The transfer to the context of e-services has been made by logical deduction of similar contexts and motivations (cf. Von Krogh et al., 2000). Testing in e-service contexts is a subject for future research provided the researcher has sufficient control over its implementation and access to this data. Hyder et al. (2002, 33) corroborate this finding by stressing the importance of knowledge management for providers to improve their performance and competitiveness.

At SGS, the misalignment of the e-service offering with the customer's e-service readiness led to developed services being shelved, since human, change management and customer benefits were not addressed properly. Their e-services were not well received by customers and were redeveloped to a manual and personal contact business they had before or hybrid e-services (see ch. 6). Chances are that if the knowledge enabling and the knowledge creation processes had been in place, the development would have been postponed or stopped in an earlier phase.

7.5 Managing the Life Cycle of E-services

To make use of the insights gained from the concept development presented above, techniques were developed and applied at CXT. The techniques are part of method engineering following Gutzwiller (1994) as described in Appendix K. It includes the techniques and a preceding discussion of (1) the purpose, (2) the design principles and, (3) the application conditions of the techniques, which are part of a method for fostering the development of e-services in the example of the technique for e-service invention (T1).

The lack of an encompassing e-service development concept coupled with a lack of practical experience in a new field and great pressure to develop and market e-services can explain why
service development can become chaotic or random, or simply trial and error. This situation was found at CXT or early phases of other e-markets of the Global Trading Web from 2000 to 2001. It is the starting point for proposing method-based techniques for e-service development. Their main purpose is to facilitate e-service development by supporting the invention, service engineering, offering, and selling of e-services. Furthermore, the method supports the design efforts of e-service providers, intermediaries, buyers and suppliers. The method allows the documentation of possible techniques and result documents, which facilitates the life cycle management of e-services from a user or syndicator perspective. The proposal builds on experiences derived from practical cases, theories, trends and developments in the field. The approach taken here adds techniques that complement the Business Networking method (cf. Alt et al., 2000a) or other development methods for business process reengineering (cf. Brenner, 1995) or architecture planning (cf. Pohland, 2000) by adding specific aspects relevant to the development, management, and integration of e-services.

A simple form of the e-service life cycle consists of the six phases depicted in Figure 7-8. It is derived from the customer service life cycle of Ives and Learmonth (see Ives and Learmonth, 1984; Ives, 1999).

![Figure 7-8: e-service life cycle](image)

The life cycle of e-services can be enhanced due to the experience with practice by the following elements:

1. **E-service Portfolio Management (ESPM)** defines the alignment between a single e-service and the total scope and direction of the e-service provider, if the e-service provider offers multiple e-services.

2. **E-service Sales (ESS)** is the process that runs in parallel from the design phase to the retirement phase. It focuses on the communication strategy with customers, non-customers, partners and employees. It extends classical sales with relationship management functions to these other interest groups.

3. **E-service Monitoring (ESM)** starts with the pilot phase and runs through to retirement. It serves as component for the performance management of e-services enabling them to be able to adapt to changing internal or external conditions.
Together with the concepts defined above and standard service provider processes these processes form the detailed *e-service provider life cycle* (EPLC). The service invention, the business concept and the knowledge enabling concepts covered in the chapter above form a basis to define the content of the processes. It can be combined with the Piccoli’s customer-service life cycle (CSLC) (see Piccoli et al., 2001, 40) which is an adapted version of the CSLC of chapter 2. Together they form the *e-service life cycle process model* (ELPM).

The integrated perspective separates customer facing processes from dominantly development oriented tasks. The back-office operations and e-service development are integrated as back-office to reduce complexity of the representation. Figure 2-28 displays the integrated process view of an e-service provider and an e-service customer. It excludes administrative processes like infrastructure, personnel or management and partnering processes. The EPLC does not differentiate between automated and human task fulfilment. The level of automation depends on the context defined by (1) *e-service readiness*, (2) *e-service readiness* of customers, (3) degree of digitalisation of the service and (4) behaviour of competition. The process steps were developed and implemented in CXT except for the knowledge enabling (ch. 7.4) and the management of utilisation, which will be detailed in the section 9.3.

![Figure 7-9: E-service life cycle process model for of the provider and a pilot customer](image-url)
edge management process which were identified as relevant elements after the data had been analysed were not existent.

7.6 Summary

The concepts introduced into e-services and their life cycle with a focus on e-procurement related solutions. The life cycle of e-services starts with the invention of the e-service (ch. 7.2) and its specification in the business concept as part of the invention phase (ch. 7.3). The design, pilot and roll-out phases finalise the saleable product. The consecutive operations and developing phases are not at the centre of this thesis. The retirement phase may lead to a reuse of the existing service or a totally new invention with a complete phase-out of the service. The proposal of the concept of knowledge enablers adds a socio-political dimension to fostering the efficient development of e-services (ch. 7.4). It facilitates the e-service life cycle by improving the preconditions for potentially successful e-services. The concepts are also input to the techniques (see Appendix K) that aim to guide the processes of e-service development in the completed e-service life cycle as shown in the previous section (see ch. 7.5).
8 Findings on E-service Success from a Customer Perspective

The purpose of this chapter is to bring together some of the key themes that define the success of e-services in inter-organisational settings. It takes findings from a cross case analysis and compares them with recommendations sourced from academic literature, which were briefly summarised from an IS (see ch. 2.1.4.2), from a service (see ch. 2.2.2) and a first analytical approach from an e-services perspective (see ch. 4.3.). These reflections represent key findings for addressing e-services holistically from a customer perspective. The provider perspective is covered in chapter 9.

The themes identified in this and the following chapter are intended to facilitate managing the complexity of e-services in a dynamic environment. One driver for introducing e-services following the proposed design principles (see ch. 4) is to enable socio-technical systems to develop and transform faster and better. Social systems that have these capabilities can, according to Etzioni (1969), adapt to a greater number of environmental changes, can actively influence environmental change, and are able to achieve more of their value and objectives. The D&M'92 IS success model (see ch. 4) was one of the central elements in structuring the interviews with CXT's customers (see ch. 3 and ch. 5). Findings from other cases are explicitly stated and integrated where appropriate.

The application of the D&M'92 model into the context of the data will be discussed (see ch. 8.1). The following section provides some of the data elicited according to the D&M'92 model dimensions (see ch. 8.2). Further, extensions suggested by literature and supported by the data lead to the proposal of a respecification of the D&M'92 and the D&M'02-04 updated models for the e-service environment from a customer perspective (see ch. 8.3). This forms a proposal for improving the understanding, design, and measurement of existing and future e-services. The chapter includes a discussion of the new dimensions, their relationships, measures and remaining limitations. The last section summarises the insights, deduces requirements for the provider, provides an outlook on future applications of the e-service success model, and proposes the e-service success concept (see ch. 8.4).

8.1 Application of the D&M'92 IS Success Model to an E-services Context

The approach to combine individual measures of success surrogates which are aggregated in the dimensions of the D&M'92 model so as to create a comprehensive performance measurement scheme is corroborated by Grover et al. (1996, 178) as an appropriate approach. In this way a multitude of influencing factors can be integrated. The terms IS success (DeLone and McLean, 1992) and IS effectiveness (Grover et al., 1996) are used in the academic literature almost interchangeably. A confusion of the context of the data and its transferability to other contexts is avoided by explicating the context the initial D&M'92 model dimensions
8.2. Customer Assessment of E-service Success using the D&M'92 Model

were applied to (cf. Seddon, 1997; DeLone and McLean, 2002). Figure 8-1 extends Seddon’s categories (1999) by the type of e-service analysed (4), the business model (5), and the data source (6) to achieve a higher degree of understandability and accuracy in e-service contexts:

<table>
<thead>
<tr>
<th>Context categories</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Analysis perspective</td>
<td>Success is seen from an e-service customer perspective. Respective customers are buyers and suppliers using e-services. The analysis focuses on externally perceived e-service sales, delivery, and support processes.</td>
</tr>
<tr>
<td>(2) Number of actor roles</td>
<td>A multi-user perspective is required to cover the individual user and the organisational or management level of e-services in procurement.</td>
</tr>
<tr>
<td>(3) Voluntariness of use</td>
<td>The use of hybrid e-services by buyers or suppliers can be classified as mandatory-with-exceptions. Alternative channels for procuring goods still exist and not all goods and services can be supplied via e-procurement solutions. Therefore, additional channels for fulfilling the tasks are still an option but might require verbal or written justification after the transaction. Even in organisations where management commands the use of an e-service, the principal-agency problem of little ex-ante control permits hidden action (cf. Köpper 1995). Purchasing users may not be motivated to use the new channel due to fringe benefits (e.g. customer gifts) offered by the previous suppliers.</td>
</tr>
<tr>
<td>(4) Type of e-service</td>
<td>The e-services used are dominantly hybrid e-services with human interaction and decision making. Implications for full e-service are derived based on the emerging range of full e-services at CXT. The argumentation will explicitly state when different conditions of full or hybrid e-services have produced different results.</td>
</tr>
<tr>
<td>(5) Business model pursued</td>
<td>The business model that shaped e-procurement in the cases analysed was transaction-based which has implications for the importance of the use of the e-service (see ch. 9.3)</td>
</tr>
<tr>
<td>(6) Data source</td>
<td>Qualitative data using a process model explorative analysis to elaborate a suitable model</td>
</tr>
</tbody>
</table>

Figure 8-1: Classification of the context of the e-service success assessment

The dependent variable is e-services success defined as individual and/or organisational impact which builds on the IS success model elements of D&M'92 (see Goodhue and Thomson, 1995, 213). The term success is chosen instead of effectiveness (e.g. Grover et al., 1996) as the latter is limited on the outcome and may exclude efficiency aspects, if Drucker’s definition of effectiveness as ‘doing the right things’ is used. Efficiency and the socio-political elements have been too influential in the cases analysed to omit them. Smithson and Hirschheim’s (1998) use of efficiency in their evaluation framework for IT outsourcing services corroborates this argument.

8.2 Customer Assessment of E-service Success using the D&M'92 Model

This section discusses the data categorised according to the success dimensions of the D&M'92 model. The references to the success dimensions are in italics.

The insight that success and failure of IS are subjective was cautiously transferred to e-services (see ch. 4). It often implies that the judgement of whether an e-service is a success or a failure depends on the dynamic goals set by the actors involved. The success of e-services
8. Findings on E-service Success from a Customer Perspective

can be partly explained by the proposed model which contains information system success factors. The following section discusses responses to the dimensions of the D&M'92 model.

The ICT **system quality** at CXT was generally sufficient. Only a few system problems occurred: when the system went down twice in 2001. The communication of downtimes and how the problems were solved were satisfactory. With regard to the ASP solution the bandwidth was quickly identified as a major performance bottleneck.

'An issue has been Internet access bandwidth and consequently a user-friendly response time. It delayed the project since H+S first had to install and rent an IP access of at least 2 Mb/s for a convenient performance. In the meantime, up to 10 Mb/s is our access standard which provides excellent performance' (Head of Corporate Purchasing, H+S, 20 June 2003).

This comment reveals that access to the ASP solution can be a limiting factor and one which was unforeseen by the initial service development and project team of CXT. The perceived system quality of the ASP e-service depended on technical infrastructure services. During the first months, operational problems and interruptions were more frequent but the causes were identified and solved. Customers who went live in 2001 did not experience any notable problems. The **software quality** improved with system release updates so that functionality, usability and performance were no longer a cause for concern.

'The first release was of limited use. There were a great number of obstacles to use several functions in an efficient manner in practice, but Conextrafe adapted them quickly. By the time we went live, the release had been dramatically improved. At the moment the technology is working well. It is up and running smoothly. I can recommend this e-procurement solution' (H+S, Head of Corporate Purchasing, 20 June 2003).

A number of modifications were required on the part of CXT’s and the software provider’s side to meet customer needs. The customised order with SeethalSchaller in particular was more difficult to set up as a running service than initially thought. The cause was an insufficient understanding of both the software functionality and the process changes required in offering process support for the customised design of print materials which were not predetermined and fully cataloguable.

The relevant metrics that determine the system level success values are that the system is efficient to use, offers sufficient functionality, reliability and flexibility, can be easily integrated into the existing software environment and, last but not least, the ease with which it can be used for human supported e-services.

The **information quality** question uncovered several semantic problems of inter-organisational systems. Examples were address files or adaptations to the customer’s master data semantics. This addresses a whole spectrum of potential failure categories (see Figure 8-2).
8.2 Customer Assessment of E-service Success using the D&M’92 Model

<table>
<thead>
<tr>
<th>Quality Problem</th>
<th>Cause</th>
<th>Customer Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incorrect and incomplete addresses</td>
<td>Incompleteness of transaction data. No strong data typing and no address verification.</td>
<td>Addresses were incorrect in the beginning. We had failed or false deliveries. Our system did not accept the orders. No order number, no buyer identity but only a company name. This forced us to check orders manually before we handed it over to our ERP system until such point when it worked again. (B+R, Key Account Manager, 15/08/2003)</td>
</tr>
<tr>
<td>Order number and buyer identity missing</td>
<td>Problems with multiple value added tax rates for different categories of products and acceptance with authorities.</td>
<td>The software initially had to cope with different value added tax rates. Paynet facilitates for coping with the complexity of VAT. Paynet is a specialised almost functional e-market focusing on the invoicing to pay cycle. (B+R, CIO, 19/03/2004).</td>
</tr>
<tr>
<td>Value added tax</td>
<td>Deviations from ISO code for material measurements and types</td>
<td>Mapping of material types and material measurements was required for one customer.</td>
</tr>
<tr>
<td>Individual material categories</td>
<td>Frequent update with customised catalogue too expensive</td>
<td>Prices are not always accurate since there are often special offers. Catalogues are inflexible and too expensive to be as frequently updated as required by the price cycles in some of the MRO supply categories (H+S, Head of Corporate Purchasing, 20/06/2003)</td>
</tr>
<tr>
<td>Prices not up-to-date</td>
<td>Low catalogue data quality</td>
<td>Incomplete data, low picture quality and different formats provided by suppliers required considerable effort to increase the quality of the CXT e-catalogue.</td>
</tr>
<tr>
<td>Content correctness</td>
<td>Not possible to include content of some SMEs</td>
<td>The main reason is that suppliers were not as technically ready as UBS. (...) Most suppliers are SMEs. One reason is there is no standard for documents and catalogues. Therefore they do not have any investment guarantee. (Project Manager, UBS, 04/08/03)</td>
</tr>
</tbody>
</table>

Figure 8-2: Examples of information quality issues

The information quality met expectations for customers with an automated electronic link to the CXT e-market. Problems of initial customers (see Figure 8-2) were not experienced by customers who joined in 2001.

'Orders are received correctly no mistakes or inconsistency. Not since we have an electronic link to the CXT system. My expectations have been met since we have been using the integrated connection to the e-Markets' (Head of IT, LB Logistikbetriebe, 24 July 2003).

An issue raised by buyers was missing content (content incompleteness). This gap does not address the data field level but the spectrum of goods and services available. This perceived deficit can be the cause of (1) a functional deficit of the e-service provided by CXT (e.g. insufficient process support to procure services), (2) too little perceived economic benefit for the supplier or (3) a technical hurdle for the supplier that he does not have the required ICT capabilities (e-service readiness). The interviewees confirmed all three reasons.

The use of the e-services in procurement depends on the number of users being able to access the system and their actual usage of e-services. The latter finally defines the value for the
e-service provider and the e-service customer. Only few of CXT’s customers were satisfied with the level of use since the number of transactions remained relatively low. CXT was not able to convince the funding parent company Swisscom to intensively use its e-services. Other buyers were not fully satisfied with pace and depth of the roll-out of the solution. One reason given by interview partners was that suppliers were not able to see their own benefits and several suppliers resisted to become electronically integrated (see section 9.2.1).

‘User acceptance is currently very high. We started with our own shop 4 years ago. 90% of all [commodity] purchases go through our e-procurement solution. We have about 2000 transactions per day including stored materials from our own warehouse’ (…) ‘Suppliers are not as excited as UBS is - their added value has not been so obvious yet. The main reason is that suppliers were not as technically ready as UBS is. Suppliers have not used the integrated solution but only the ASP Sell solution (Project Manager, UBS, 04 August 2003).

On the company level the orders are too few. It all depends on the customer. Ways to overcome that are to extend the product range or the differentiation (e.g. business cards service). We need to offer added value. Another approach is that one can order all categories and receives one delivery. The order at CXT contains all materials. One order one invoice and one delivery is our goal. But acceptance and utilisation it is very slow. (LB Logistikbetriebe, Head of IT, 24 July 2003).

Suppliers had only a few customers (e.g. SeetalSchaller) and resisted to integration because the transaction numbers were low. All suppliers were expecting more use by the existing and future buyers. By contrast, Siemens achieved a higher level of utilisation on the buyer side and a higher number of suppliers. Due to the importance of utilisation for success this element will be analysed in more detail (see section 9.2). E-service readiness of suppliers is a relevant issue from the data since incomplete content prevents a high use of procurement e-services.

User satisfaction was high on the buyer’s side. On the supplier side operative users were initially dissatisfied with the ASP solution for order management since they could only download or print orders and enter them into their own systems. These hurdles of redundant data entry were solved by most suppliers via an integrated solution that exchanges data on the basis of XML document exchange. Comments from customers about user satisfaction were:

‘Constant - functionality was stable and foreseeable. For what it was it was sufficient. I did not hear complaints about usability’ (SeethalSchaller, Key Account Manager, 12 September 2003).

‘Employees with customer contact are very proud that we can offer this service’ (LB Logistikbetriebe, Head of IT, 24 July 2003).

The cases confirm that user satisfaction varies between buyers and suppliers. The level of expectation depends on past experience (see e-service success model). One buyer had some acceptance problems due to an earlier e-procurement solution which had more functionality than the first version of the CXT e-services. With the advent of further updates, these problems were overcome and users were more satisfied. The implications relating to learning and e-service development will be discussed in section 9.1 in more detail.
8.2. Customer Assessment of E-service Success using the D&M'92 Model

The individual impact as a criterion for improved task fulfilment or decision making was often described as positive by supervising managers, as shown in the examples below:

'[Individual impact was] not bad because they received the orders in a standard form. Therefore vague or unclear orders were reduced. In comparison to telephone and fax there was less room for interpretation. This has been a benefit' (Key Account Manager, SeetalSchaller, 12 September 2003).

'Internal acceptance is very high since people have nothing to do with operational ordering' (Head of IT; LB Logistikbetriebe, 24 July 2003).

Buyers were generally more positive. It has to be taken into account that the software as well as the services of CXT mainly targeted buyers. The individual impact underscores the importance of time, quality, flexibility, and knowledge advantages for the individual user. The e-services CXT offered focused on increasing quality and reducing the time for standard ordering processes on the buyer and supplier side.

Consequently, at the organisational level the impact on suppliers was limited and more disappointed statements were received:

'Not a big impact since it is only a small proportion of the total work load. Employees process fax or telephone orders but it is not perceived as a benefit of Conextrade's services that we have less work. The proportion of electronic orders via Conextrade is only 3-5%. The proportion has to rise it will rise with future customers' (Brütsch-Rüegger, Key Account Manager, 15 August 2003).

'At a management level we have to think about it [Conextrade's e-services] since we do not have any apparent savings with the solution. (...) As far as we are concerned I do not think that we are able to position ourselves better with the CXT e-market and that it helped us to progress and extend this channel and our business in total' (Head of IT; LB Logistikbetriebe, 24 July 2003).

On the buyer side the situation was more positive.

'Our expectations can be implemented - I am convinced - and are realistic but the time it takes to adopt suppliers is longer than I would prefer' (Project Manager, UBS, 4 August 2003).

Other deficits reported were the big effort involved in achieving integration and the insufficient monitoring of e-service performance. This suggests that utilisation is a key element in increasing the success potential of e-services (see ch. 9.2). Providing a platform may not be enough. An e-service provider must also help to enhance transactions and provide the information which suppliers and buyers need to increase the utilisation in their organisations. Other organisational properties, such as increased process flexibility, were achieved after CXT integrated the B2B middleware. It was only positively received on the customer side after the integration with Swisscom IT services when CXT had access to integration know-how and capabilities (see ch. 9.2). One of the reasons was that partnering was not actively pursued by CXT to close the integration competency gap in this area.
8.3 Respecification of the D&M'92 Model to Fit into the Context of E-services

The D&M'92 model was modified by the original authors (cf. DeLone and McLean, 2002; DeLone and McLean, 2003; DeLone and McLean, 2004 and others e.g. Seddon, 1997; Wilkin and Hewett, 1999). DeLone and McLean (1992) purposefully invited other researchers to modify their model according to the context it is applied to and the changing role of IS (cf. DeLone and McLean, 2002). Extensions of the D&M'92 model proposed here are based on the data and supported by arguments of various academic researchers.

The purpose of this section is to explore the field of e-services further through reflecting upon the D&M'92 model elements in the light of the empirical data and literature (see ch. 8.3.1). Based on additional empirical data (see ch. 8.3.2) an adapted version is proposed as e-service success model (see ch. 8.3.3). The closest applications of the D&M'92 to the context of e-services are theoretical (cf. DeLone and McLean, 2004) and empirical applications to e-commerce settings with a focus on B2C Web sites (see Liu and Arnett, 2000; Molla and Licker, 2001).

8.3.1 Reflections on Selected Dimensions and Relationships of the D&M'92 IS Success Model

The use dimension from a customer perspective was central in a mandatory-with-exceptions context of CXT's e-services when organisational directives on the customer side prescribed use. Despite that higher use was sometimes not achievable due to difficulties with unlearning, technology barriers, low satisfaction or the lack of sufficient electronic content and its quality to name a few reasons. Additionally use is relevant because it is closely connected with the transaction or use based revenue model that was part of CXT's business model. In contrast to MIS applications of the D&M'92 model a high use ratio indicates a successful change of previous processes and is a strong indicator of success for the customer and provider.

Seddon (1997) questions the clarity and purpose of the use dimension by providing three different interpretations: (1) He rejects use as behaviour not suited for a variance model on IS success. (2) He substitutes it for a past-oriented interpretation of Davis’ (1989) perceived usefulness as a proxy for the benefit accruing from use. (3) He declines to apply use as an event in a process model as not suitable for a variance analysis. Seddon further differentiates between mandatory and volitional use. In his data collection for the variance analysis, mandatory use of an accounting system formed the data basis (see Seddon and Kiew, 1994). Use was high since no alternative possibilities to fulfil the tasks existed. Seddon placed use as behavioural characteristic outside the success model. In contrast to use in the context of (M)IS systems where measures like hours spent are ambivalent, use measured in time spent to purchase or number of transactions provides information on the quality of the content and the
Seddon's substitution of *use* for perceived usefulness can be called into question in the CXT context (see 1997, 250), because the process interpretation is pursued. If the use of *hybrid e-services* is mandatory in business contexts, there will be workarounds using other applications or manual processes if the e-service does not fulfill the requirements of the users. Even for mandatory *full e-services*, the monitoring of the number of uses or other use metrics can help to measure the benefit the e-service provides to the customer. In contrast to Seddon (1997), it is argued here that even with mandatory use the degree of use is important and valuable to assess the total success. For example, an e-service that is automated may not be used 100% if users are not satisfied with the results and consequently find ways to circumvent the mandatory or automated solution and justify the exception ex-post. The measurement of *use* would indicate such incidents and provide information to improve the e-service to better the situation. *Use* can be viewed in these cases as an indicator that the system should be adapted to avoid using alternative sources. The substitution of *use* by the attitude 'intention to use' as suggested Seddon (1997) and mentioned as optional alternative by DeLone and McLean (2004; 2003) is declined from a process model application viewpoint. It is a key event that contributes to the success of an e-service and it will be applied in an informed way that takes into account the interpretative difficulties that DeLone and McLean (2002, 8) expressed by explicitly stating the context and meaning. The assessment of use was defined by the number of transactions and the time to complete transactions which are both related to the net benefit. Therefore, it can be maintained for the chosen context and data that *use* is applicable which is confirmed by several authors that apply a variance model testing (cf. Rai et al., 2002; Goodhue and Thomson, 1995; Igbaria et al., 1995). DeLone and McLean recommend *use* if the context fits (2002; 2003) and apply use in their literature derived examples of Barnes & Noble and an electronics distributor.

The relationship between *Use* and *User Satisfaction* has been discussed by several researchers. Rai et al. cover the unidirectional *User-Satisfaction-to-Use* relationship (see Rai et al., 2002, 54). Landrum and Prybutok (2004, 630) conceptualise a link from usefulness (as a surrogate for *use*) to *user satisfaction* or Mollar and Licker (2001, 136) from *use* to e-commerce *satisfaction*. Other authors such as DeLone and McLean (2003) propose the bilateral learning relation. At minimum, from a process model perspective, the positive or negative circle seems convincing and has been reported on for both interviewed buyers at CXT. They increased their utilisation by improving the *system quality, information quality*, and *user satisfaction*. Improving the e-service task-fit meant that the *user satisfaction* level and *use* improved (see SeetalSchaller case). This confirms the relation of technology-task fit to utilisation or *use* of the technology-to-performance chain (cf. Goodhue and Thomson, 1995, 217). On the supplier
8. Findings on E-service Success from a Customer Perspective

side, the negative circle can be identified for one supplier. Since the solution was only used for one key customer with redundant work the user satisfaction and net benefit was low. This had negative impact on the perceived system and service quality as the initial user expectations were high.

An insight from the data is that use depends on the context. If the business model, type and level of e-services, as well as the freedom of choice from mandatory to voluntary differ, appropriate measures may vary, too. Applied to the context of this thesis Figure 8-3 provides some examples of use measures for a mandatory-with-exception contexts.

<table>
<thead>
<tr>
<th>Hybrid e-service measures</th>
<th>Full e-service measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>I&amp;K e-service</td>
<td>Similar to information services (cf. Goodhue and Thomson, 1995)</td>
</tr>
<tr>
<td>BPO e-service</td>
<td>Number of transactions, time to complete transactions.</td>
</tr>
<tr>
<td>BCI e-service</td>
<td>Page hits per category, connection time.</td>
</tr>
</tbody>
</table>

Figure 8-3: Proposal of variations of use measures depending on the e-service type and level

The data confirmed that the relationship between use and user satisfaction can be conceded to be bilateral. Users who were satisfied with the system and information quality were more inclined to use the e-services (user satisfaction -> use). And vice versa: with increased use the benefits for the users and the personal efficiency rose which contributed to a higher user satisfaction (use -> user satisfaction). The quantitative verification of the bidirectional relation could be tested in future research in order to validate the relationship. This data suggests that the original D&M'92 model may be valid in the chosen context from a process model interpretation. It contradicts authors who chose only a unidirectional relationship between use or use surrogates and user satisfaction for reasons of simplified quantitative variance model testing (cf. Seddon, 1997; Rai et al., 2002).

8.3.2 Additional Case Data

The following data excerpts indicate a need to respecify the D&M'92 model to better encompass the nature of e-services. The answers to open questions about the expectations, awareness of e-services and the service quality document the understanding of these terms and the issues relating to these terms as perceived by the interviewed customers in the chosen CXT environment.

In general, the perceived service quality of the service support organisation was good in terms of operative availability, reliability, empathy, and general responsiveness (cf. Parasuraman et al., 1988). Empathy is defined by Watson et al. as ‘caring, individualized attention the service provider gives his customer’ (see 2001, 63). Deficits existed in structural or service content responsiveness to system changes, such as offering new software functionality, and empathy
with customer processes and needs (e.g. it took several months before the customised order for SeetalSchaller was offered) concerning the service content. The understanding of technical interfaces as well as the responsiveness to specific bilateral customer requirements was limited, as shown by the following quotes.

'(..) the understanding of procurement and process was initially limited. It may come as some surprise because the intention was to sell a standard product solution - we found that efficient procurement processes and interfaces were not well understood, differentiated and covered in the run-up to the project and the ensuing electronic set-up.' But finally the customer was satisfied. 'The e-procurement solution with CXT has been a well-received success in process re-engineering' (Head of Corporate Purchasing, H+S, 20 June 2003, 15 August 2003).

'There is a standardised interface for integrating transactions [at CXT]. If there is a customer who needs specific information (e.g. he wants information with a specific business value to him in a specific field), this would mean that CXT would need to change the standard, and it will be applicable for every other customer as well' (CIO, Brütsch-Rüegger, 19 March 2004).

The last quote highlights the fact that the customer believes that adaptation for one customer can become a change request for other customers if the e-service cannot cope with customer-specific documents. The provider has to define and communicate which requests need specific individual adaptations and which do not. If this is not done it could have negative impact on the perceived service quality. This insight underscores the need to address the level of customisation (see ch. 9.2.2) and learning (see ch. 9.1.2) from the customer and the ability to adapt to customer needs (see ch. 9.3 for further details). Furthermore, a deficit in procurement process know how can be derived from the answers to the perceived service quality questions (see ch. 9.2).

*User expectation* which buyers of CXT had was largely met. According to Parsuraman it is formed through word-of-mouth, personal needs and past experience (see Parasuraman et al., 1988). Limitations surfaced while using the e-service concerning the service content. CXT’s sales and marketing sometimes raised expectations to a level that exceeded actual functionality or capabilities. Consequently, there was disappointment because the functionality promised was not available or was inferior (e.g. catalogue search functionality). The offered procurement e-service was not applicable to goods with many variants and some types of services (e.g. repair services), or was only made available at a later date.

'Users used the Internet shop solution of Brütsch-Rüegger to access the part number and entered it into the (CXT) e-procurement solution. This added additional process steps. The solution was to integrate the Brütsch-Rüegger catalogue via Round-trip' (Head of Corporate Purchasing, H+S, 20 June 2003).

The above quote shows that customers circumvented the system because of functionality gaps which were initially not communicated and maybe misjudged. It was more difficult to meet expectations on the supplier side. Suppliers were partly unable to achieve their goals.
8. Findings on E-service Success from a Customer Perspective

'It [using CXT e-services] should be facilitating work for us or especially for IT. We have revised and changed that expectation [of an easy set-up]. The other expectation was that we would have less effort internally and we improve our delivery quality. This has been achieved. But the effort for the implementation should not be underestimated. You need a sufficient amount of stamina' (Head of IT, LB Logistikbetriebe, 24 July 2003).

Expectations of seamless technical and process integration were not always met in the beginning (see section 9.2.1.1). A related issue was the communication and learning processes required to meet customer’s expectations (see section 9.1). Both elements should be addressed by an e-service provider in order to be able to use this future-oriented indicator to improve the service offering further, thereby contributing to future economic success and viability.

The expectations of UBS in relation to e-service functionality and content (cf. Piccoli et al. 2004) at an organisational level were positive, with some need for adoption:

'To summarise: our expectations can be met and implemented, I am convinced. They are realistic but they are adopted at a much slower pace than what I would like to see' (Project Manager, UBS, 4 August 2003).

The reason for the disappointment was mainly due to slow adoption and education on the supplier side. The lack of technical standards, with buyers requesting different catalogue and process standards led to suppliers being confronted with a high degree of complexity. Buyers had to learn that they cannot force their supplier base to achieve an immediate high e-service readiness, thus generating benefits for themselves. This interlinks with the business model which was buyer-oriented and assumed that a one-sided approach would suffice. This disproves the assumption that large position and buying power differences alone are enough to enforce that suppliers provide the required content quality and use a full e-service as the most efficient form of interaction (see ch. 9.2.1 and 9.2.4). Similarly, SGS omitted to take account of the degree of process change they demanded from their customers (e.g. bargaining and customising) and the required level of e-service readiness. Not many customers used the full e-services developed. Consequently, two out of four services were stopped (see ch. 6.4.1).

User awareness was well received by the existing customers of the basic e-procurement solution of CXT. No major problems, knowledge deficits or inhibitions about using the service were reported. Sultan (2002) has analysed user awareness for online Internet services for business-to-consumer sites. He defined awareness as ‘knowledge about the existence and functionality of the e-service’. This dimension indicates the level of e-service knowledge about new or existing e-services. It can be measured by (1) the degree of knowledge about the e-service, (2) the capability of using it, (3) the degree of ease of access in terms of integration into other work processes and applications. User awareness measures the sales success of the e-service provider (e-service potential and actual e-service awareness). It is a critical measure if the tasks or processes are used as substitutes for traditional process as users may still use the known provider or task fulfilment process.
However, user awareness in respect of additional or planned e-services did not exist. This is true of pilot installations, such as the integration of the inet-logistics' integration solution or other e-services which were being developed (ch. 5.3.5.4). Siemens also had awareness problems in relation to additional e-services, as illustrated by the following quote:

'In our industry view e-services are relevant dominantly in the plant-engineering sector. Materials and processes narrow the application of an e-service based solution even more. We implemented e-services in three areas. We started with a few customers. It was new to them and incurred a relatively high amount of investment. We were therefore confronted by the challenge of having to create market awareness and achieving penetration' (Head of Siemens Click2Procure, 2003).

The SGS case showed similar problems of user awareness and acceptance since their service offering was not flexible enough and lacked personal experience. Users were not capable of using the fully automated XML-based services. Furthermore, the business model change from a request-for-quotation-based contracting phase to a fixed price model was not accepted. The solution adopted to help increase acceptance was to offer hybrid person-to-machine e-services with open text fields that require human interaction on SGS's side as well. The lesson for SGS was that customers were not ready to accept fully automated e-services in 2001. SGS quickly learned and adapted to the needs of their existing customer base.

The economic success was positive for the buyers who spent time calculating ROI. The satisfaction of buyers can be demonstrated by the following quote:

'The e-procurement solution with CXT has been a big [economic] success.' (Head of Corporate Purchasing, Huber+Suhner, 15 August 2003).

UBS experienced similar economic satisfaction level. Both buyers analysed the project benefits and the costs. This stands in contrast to the supplier side where none of the suppliers actively assessed the financial impact of the e-service. The suppliers did not make an economic evaluation since utilisation did not reach the desired level. The majority said the financial impact was negative but that they had other benefits (e.g. customer retention or employee satisfaction) which justified the use of the e-service. The economic success for suppliers was low due to a by and large low utilisation of existing buyers and too few buyers.

### 8.3.3 Model Respecification

The data analysed and partially presented above suggests that the original D&M'92 model should be extended to encompass two new dimensions, a reformulation of the service quality dimension, and a partial modification of the relationships. It should serve the purpose of explaining as well as proposing design and governance recommendations for future e-services. The new model takes into account and is corroborated by the respecification of D&M'92 model by DeLone and McLean as response to the critique of other authors (see ch. 4.3) using quantitative empirical data to validate and extend the original D&M'92 model (cf. DeLone and McLean, 2003, DeLone and McLean, 2004).
The resulting *e-service success model* incorporates previous research on information systems and services. It aims to be more comprehensive, better suited to emerging e-services, and still parsimonious compared with previous approaches to information systems (e.g. Seddon, 1997). The author believes a higher model complexity would make it lose its descriptive, explanatory and design value.

The new dimensions are *user awareness* and *economic impact*. The service quality dimension (cf. Kettinger and Lee, 1995; Wilkin and Hewett, 1999; Wilkin and Castleman, 2003; Molla and Licker, 2001) is broken down into *perceived service quality* and *user expectation*. The changes are in accordance with the suggestion of DeLone and McLean (2004, 43) who recommend a selection of success dimensions and measures according to the objectives and context of the empirical investigation.

### 8.3.3.1 Modification of the Service Quality Dimension

The inclusion of service quality aims for a more complete approach to measure the success of e-services that embraces the service nature of e-services. It was included in the CXT customer interviews based on the experience at CXT and on the literature analysis of the service lens (see ch. 2). The original reasons to include it were a theoretically assumed (cf. Pitt et al., 1995; Zeithaml et al., 2000) and empirically perceived increased service element in external e-services. The original D&M'92 model focuses purely on technical questions relating to (M)IS (see Wilkin and Hewett, 1999, 667). Pitt et al. (1995) first complemented the D&M'92 model by adding service quality which was well received by other authors (cf. Seddon, 1997, Wilkin and Hewett, 1999). They empirically measured the service quality of IS organisations with the SERVQUAL instrument (see Parasuraman, 1988). Liu and Arnett emphasise the relevance of service quality (2000). They use the service quality criteria of SERVQUAL (cf. Parasuraman et al., 1985), namely quick responsiveness, assurance, reliability, empathy, and exchanged tangibles by follow-up service (Liu and Arnett, 2000, 27). Other measures adopted from Molla and Licker (2001) are online-support, customised site intelligence and order tracking for e-commerce contexts. Having analysed library information systems, Landrum and Prybutok (2004) identify service quality as a highly important factor. They also used a combination of the D&M'92 and SERVQUAL models.

Another line of research from the marketing field addresses the service quality of Web sites. Zeithaml et al. (2002b) adapted the SERVQUAL instrument to Web sites (see Zeithaml et al., 2000; Zeithaml et al., 2002a). E-SQ is defined as 'the extent to which a Web site facilitates efficient and effective shopping, purchasing, and delivery of products and services (cf. Zeithaml et al., 2000). They identify a fulfilment, communication, design and information gap focusing solely on person-to-application communication via Web sites. It can be cautiously applied to *hybrid e-services*. A definition of service quality in relation to full e-services has
8.3. Respecification of the D&M '92 Model to Fit into the Context of E-services

not yet been identifiable in literature and is partially contained in the information quality and system quality dimensions.

Additional examples are WEBQUAL for improving the design of web sites (see Lociacono et al., 2000), EX-SERVQUAL to measure Extranet service quality (cf. Cody and Hope, 1999), and .comQ to measure service quality at electronic retailer Web sites (see Wolfinbarger and Gilly, 2002). Watson et al. (2001, 73) identified practical recommendations from a longitudinal SERVQUAL study on IS that omits the tangibles dimension: (1) enhance communication with clients, (2) improve processes, (3) training and (4) adapt the reward system to improve service quality. They go on to stress that the measurement of service quality should be integrated into the service delivery process (see Watson et al. 2001, 74). This issue will be explored further in section 9.3.

However, the application of the SERVQUAL model of Parasuraman et al. (1988) to the IS field is not undisputed in academia because of the questionable statistical value of the difference scores used and the general applicability of the 22-item score (cf. Hentschel, 1994, 409). Van Dyke et al. (1999, 2, 11) argue that the difference score instrument suffers from unstable dimensionality, poor predictive and convergent validity, inadequate reliability, and ambiguity of the expectations construct. On the other hand, Jiang et al. (2002) present a statistically sound confirming study. In the more recent versions, DeLone and McLean (2002; 2004) suggest adding service quality but omit to propose a specification of the operationalisation of measurements and leave the measuring object of (1) service quality of individual IS or (2) of organisations open to the context.

The application of the SERVQUAL concept to IT services (cf. Pitt et al., 1995) focuses on the quality of the service organisation. Hochstein et al. (2004) criticise from a customer perspective that the service quality of individual IT services is not measured by such a measure but of increasing relevance in the context of outsourced IT services (e-services). They propose a service-oriented IT SERVQUAL to close this gap.

A further gap of the IT SERVQUAL is that it misses to encompass the fit of the service itself or what Haywood-Farmer and Stuard (1988, cited in Hentschel, 411) added as quality of the core service. It focuses on the 'how' and lacks the output oriented 'what' (cf. Meyer and Mattmueller, 1987) that is not covered in the system and service quality dimensions. Since the e-service-fit is important to assess its success it is included here. The open interviews indicated a misfit of the customer requirements or expectations and the offered e-services. The extension of the dimension fosters a holistic assessment of the service itself and its service organisation. With both sources of information not only the 'how' a service is delivered (e.g. SERVQUAL) but also the fit on an individual service basis are taken into account for the service elements that are not covered in the information quality and service quality dimensions. Meyer and Mattmueller (1987, 363) call it the output quality ('what') which should become a
8. Findings on E-service Success from a Customer Perspective

subcategory of the service quality. A quantitative assessment would need some focused research to include this emergent topic.

Van Dyke et al. (1999, 11) recommend that practitioners applying the IS-SERVQUAL model (Kettinger and Lee, 1995) should use the perceived performance-only scores (cf. Cronin and Tylor, 1992) to be statistically sound. Therefore a separation of the expectation and perceived performance / perceived SQ might be useful to avoid the ambiguity caused by the gap score. In contrast to student based data, such as that used by Kettinger and Lee (1995), Van Dyke used business information systems users of an external provider rather than an internal function which resembles the context of e-services pursued in this thesis (cf. Van Dyke et al., 1999). The reliability with Cronbach’s alpha (1951) of the perceived perception scores was consistently higher than the expectation scores of the service. Van Dyke et al. concluded that perceived perception is a better predictor of both overall satisfaction and overall service quality when compared with the gap scoring method. Both studies that of Kettinger and Lee (1995) and Van Dyke et al. (1999), excluded the tangibles dimension and used reliability, responsiveness, assurance and empathy only. The application of the tangibles measures might need to be reintegrated for hybrid BPO or BCI e-services which rely on direct customer or customer object contact. Judging from the published literature Hentschel (1994) argues that a single scale compared to a difference scale avoids interpretation problems and the tendency of exceeded, inflation expectations (cf. Dichtl, 1986). The latter is caused by the assumed ideal service expectation of SERVQUAL which always leads to high expectation levels (Hentschel, 1994). The application of SERVQUAL should be done with caution and therefore two single scale measures of perceived service performance and user expectation are proposed.

If the data collection and sample size allow for a variance testing, the choice of using a gap analysis by combining the relevant parts of the two dimensions or using them separately is dependent on the research goals and the settings. The data above indicates that separate analysis and single scales might lead to statistically more significant results and avoid interpretation difficulties of the SERVQUAL measure (cf. Hentschel, 1994).

8.3.3.2 Perceived Service Performance Dimension

For the purpose of clarity, service quality is defined here as ‘a global judgement or attitude relation to an assessment of the level of superiority or excellence of service provided by the IS department [or in this context the e-service provider], support personnel’ and ‘fit of the service output’ (adapted from Wilkin and Castleman, 2003). To reflect the success of e-services, perceived service performance includes active sales support, service delivery, after sales and human exception handling in the service context. The latter service component is also required for full e-services (see Figure 8-4). The fit of the service output is contributing to the service quality in extension to the SERVQUAL measurement dimensions.
8.3. Respecification of the D&M’92 Model to Fit into the Context of E-services

<table>
<thead>
<tr>
<th>Full e-service</th>
<th>Hybrid e-service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales, human exception handling, after sales service and automated routines</td>
<td>Sales support, service delivery (operations), after sales service, and human exception handling</td>
</tr>
</tbody>
</table>

Figure 8.4: Service performance quality components specified according to the e-service type

The greatest relevance of traditional literature on service quality can be expected when analysing hybrid e-services with human interaction. Several customers on buyer and supplier side requested a greater level of customisation of the e-services and more empathy in responding to their specific needs which corroborates the service quality perspective as an independent variable for e-service success. Cronin and Taylor (see 1992) propose an empirically grounded marketing research that relies on perceived service performance only scores and delivers more reliable results than SERVQUAL in quantitative variance model analysis.

8.3.3.3 User Expectation Dimension

Rust and Kannan argue that customer or user expectation is an important element of the transformation to e-services. They identify a self enforcing mechanism with increasing expectation and increasing use (cf. Rust and Kannan, 2002, 9). In a similar vein Van Dyke et al. (1999, 11) maintain that ‘a better understanding of expectations is required to increase the understanding of the service quality construct’ after criticising the application of service expectation to the IS field. User Expectation has been defined by Zeithaml et al. (1993) as ‘a range of values from ideal to intolerable’ (cited in Johnston and Clark, 2001, 83) which assumes ideal performance. Here it is defined as the task-fit and the ex-ante level of tolerance towards an e-service delivery by customers. User expectation is defining the level of service process quality and service output match shaped by previous influence before use. It is shaped by external word of mouth, past experience, the users’ expected quality, delivery standards, price, available alternatives (competition) and marketing efforts. The understanding and management of user expectation is seen as a key challenge for service operations (see Johnston and Clark, 2001, 83). It is a future oriented criteria defining what should happen.

Measures can be failure rate, level of friendliness, available alternatives, word-of-mouth knowledge, marketing impact, sales experience, price, compensating transactions and the degree of past perfect service delivery. The last measure is closely linked to service level agreement terms of an e-service contract if and when customers define clear measures (see ch. 5.4 and Appendix I.3). If customers have used an e-service before, their previous experience influences their expectations.

Service literature discussed several similar constructs. Zeithaml et al. (2002b, 363) defined the perceived ease of use (EOU) as ‘the degree to which the prospective user expects the target system to be free of effort’. Furthermore, the perceived usefulness (U) defines the prospective user’s subjective probability of using a specific application system to increase his or her job
8. Findings on E-service Success from a Customer Perspective

performance (see Davis et al., 1989, 985). Both constructs can be surrogates for measuring expectation.

The expectation dimension is positioned as separate dimension and not positioned as part of service quality for three reasons. First, there is profound critique of the IS-SERVQUAL model due to the interpretation and validity concerns of difference measures (cf. Van Dyke et al., 1999; Babakus and Boller, 1992; Balloun and Klein, 1997; Hentschel, 1994). Second, the two separate dimensions that substitute the service quality dimension adopted by DeLone and McLean (2003; 2004), can still be validated using variance analyses if the data is statistically significant to allow for a variance analysis for both measures (cf. Van Dyke et al., 1999). The separation can enable both a qualitative variance and process logic using the same model. Third, Seddon (1997, 245) corroborates the influence of ‘expectations about the net benefits of future IS use’ on use in his respecification of the D&M’92 model as a behavioural element.

The explicit questions on user expectations delivered information about the service support as well as on the content of the service delivered. The study data shows that valuable information about the user’s main motivations, task-fit and expected level of service quality can be derived. This may serve as important input for future e-service adaptation to increase the future success of the e-services in focus. Quantitative measurements can be deduced from existing literature and the experience gained in this research (see Appendix H).

8.3.3.4 User Awareness Dimension

The user awareness questions were added to test the communication quality of CXT with its customers. Since CXT’s business model was to offer multiple e-services the sale of further services was critical for the organisation. It is a future-oriented dimension that measures the current strategic alignment of the service provider with existing customers in a bilateral relationship.

The awareness of existing e-services is a prerequisite for active use of an available e-service. The awareness of future services is the first step towards adopting a new e-service and consequently contributes to the success of the provider and the customer. There was little research found which covers this element for identifying the success of the communication with customers. One exception is the study by Sultan (2002). He conducted a study to measure the awareness of Internet service providers towards private customers over the period from 1995 to 1999. This can be mapped to the BCI e-service level.

In the absence of a large research background in the chosen field, the working definition for user awareness in the context of e-services is the knowledge of the existence, capabilities and permission to use the functionality of a current or the knowledge of an announced future e-service of a specific provider. The knowledge encompasses the content, benefits and application area of the e-service in focus. The future user awareness is targeted to management or
project leaders and the present user awareness to current users of an e-service. Metrics that can be proposed for future measurement are (1) knowledge of e-service content, (2) knowledge of e-service benefits, (3) knowledge of e-service application, (4) degree of ease of access, and (5) capability to use (see Appendix H).

8.3.3.5 Net Benefit and Component Dimensions

The net benefit is perceived as an aggregated measure of the dependent variable of e-service success (cf. DeLone and McLean, 2004). In contrast to Seddon (1997) or the model depicted in DeLone and McLean (2004), a differentiation of the D&M’92 model between individual impact and organisational impact is maintained, and extended to include explicitly economic success as a separate dimension. Yuthas and Young (1998, 112) identified that ‘the model relationships between use, satisfaction and net benefits are not as strong so as to substitute them for one another’ which confirms that they should be measured individually.

It is assumed that the process logic applies without excluding a causal relationship. The reasoning behind this is that, for inter-organisational settings, the differentiation between individual, organisational and economic success or benefits is relevant to assessing the values of the contributing dimensions to the net benefit. The data shows that at an individual user level the e-service can be perceived as successful but at a management and economic dimension this perception is not shared (e.g. case of Logistikbetriebe).

The proposal complements Seddon’s analysis that individuals assess success differently (see Seddon, 1997, 248). He therefore posits that the perspective of a single role is required. It is agreed that any kind of variance analysis requires comparable data, but the limitation to a single role for each assessment requires a number of data gatherings and analysis efforts. Instead, the individual impact, the organisational impact and the economic impact allow for the simultaneous integration of three types of users. It corresponds to the individual, group and organisational better-offness of the Seddon et al. (1999, 7) context matrix. The proposed model thereby integrates the views of operative user, the project manager or person responsible, and the financial impact on the whole unit or organisation on the top management level. In this way the net benefit is the sum of the impacts measured separately. The information on each of the perspectives which contributes to the net benefit is gathered without mixing different roles and losing important information on success or failure. If possible interviews with each user group should be arranged. By evaluating the net benefit component dimensions the identification and correction of success inhibitors is facilitated and information loss through averaging effects is avoided. The differentiation can be relevant to define appropriate practical actions designed to raise acceptance or utilisation levels. For example, if individuals and the whole organisation value the qualitative elements of the e-service, but the economic impact dimension fails to satisfy, the provider may only need to change his revenue model or detailed busi-
ness terms to convince the top management that promoting a roll-out will lead to financial benefits.

In contrast to IS success external e-services are more easily economically measurable, and *economic impact* is of different nature than *non-economic organisational or individual* impact dimensions. It is an ex-post measure and more easily quantifiable than the other two. It can be defined by traditional measures like ROI, net present value (NPV) (see ch. 7.3) or e-commerce specific ones like ROI on Web site investments (cf. Piccoli et al., 2004). Pure economic measures often include cash values or tangible benefits and costs but largely ignore project or event risk, non-financial and intangible implications (see Irani and Love, 2002, 78). The need for comparison and assessment of different investments in project appraisal and budgeting processes requires standardised financial comparisons. Irani and Love (2002, 78) emphasise that project costs and project risks are often neglected but they should be included in order to assess the overall economic impact of an e-service. The total life cycle e-service costs, revenues and risks should be measured to avoid incomplete assessments (see Appendix H).

The *non-economic organisational* impact dimension complements the individual and economic impact by adding time, flexibility, quality, customer retention, learning and the strategy alignment measures of the e-service (see Appendix H).

The cases indicate that customers of CXT implicitly used elements of a *net benefit* success instrument. The buyers invested more effort than suppliers in calculating the economic success key performance indicators like ROI and cost savings. They were aware of individual and organisational impacts (e.g. freeing procurement professionals from the operative ordering tasks of MRO goods). In contrast, suppliers were not explicitly using formal measures to justify the use of e-services. Learning and customer retention dominated in their answers to the *non-economic organisational impact* dimension.

CXT itself did not explicitly measure and assess the bilateral relationship with its customers. It was assumed that standard financial control mechanisms and reports can be applied and suffice. A bilateral evaluation would have provided a fine grained management of the customer relationship if the e-service provider had run e-services on a permanent basis. Topics such as the e-service or customer-specific accounting and the management of funds can be an element to be embedded into the e-service success management.

8.3.4 Relationships between Dimensions

Besides the above elaborated extension of dimensions Figure 8-5 depicts one new relationship and the other relationships between the model dimensions which will be discussed below (the numbers depict each relation and will be used within the text with circles:
8.3. Respecification of the D&M’92 Model to Fit into the Context of E-services

The new relationship is the feedback from user satisfaction to user expectation, as shown in the UBS case. The existence of an accepted e-procurement solution had a negative impact (e.g. initial resistance) on the roll-out of the new e-service. Users initially reported functional deficits after using CXT’s e-service compared to the substituted internal solution. With improvements of the e-service offering a positive feedback circle was established. The impact of user expectation on user satisfaction can be confirmed by Dabholkar et al. (2001, 141). The feedback loop can be corroborated by Johnston and Clark (2001, 97) who claim that there is a strong relation between user expectation and user satisfaction.

High user expectation values might lower the user satisfaction of service actual delivery and redefine the user expectation for future service use. This feedback loop therefore has indirect impact on the use of e-services. The resulting learning cycle can have a positive or negative effect on the use of the service and consequently on customer satisfaction. It may be important for an e-service provider to understand this interrelatedness and act upon desired or undesired customer behaviour, if he is aware of the changes of user satisfaction and use (see ch. 9.3). However, some authors argue that a functional relationship cannot be assumed in all contexts. Johnston and Clark (2001) pick up the argument of Groenroos by postulating that meeting user expectations and achieving high customer satisfaction does not necessarily guarantee future use. Post purchase intentions need to be considered, which need to be integrated in the individual impact and a feedback relation to user satisfaction. E-services may have some lock-in effects but parts of their strength may depend on external factors like competition, switching costs, contractual arrangements, and the net benefit from e-services.

In accordance with literature service quality (perceived service performance and user expectation) is conceptualised as a global attitude that is based on multiple service experiences (see Hentschel, 1994, 404) whereas user satisfaction is of transactional nature. Willkin and Hewett
8. Findings on E-service Success from a Customer Perspective

(1999) have used this assumption to integrate both and to their respecification of the D&M'92 model. This implies that user satisfaction is more volatile and directly dependent on the experience during the use of an e-service.

The new dimension user awareness contributed to use and user satisfaction. The data could only confirm a positive impact of user awareness on use and user satisfaction for existing services. No impact or negative impact can be stated for future e-services CXT offered which customers' decision makers were not aware of or were sourcing from other providers, without knowing that CXT could have offered the e-service (e.g. inet-logistics solution).

The use and user satisfaction relation forms a second positive or negative feedback mechanism (see ch. 8.3.1). The data confirms this relationship in that interviewees reported sufficient satisfaction and use of the system. LB Logistikbetriebe confirmed the link from use to user satisfaction where employees were proud to be using an innovative e-service. UBS confirmed the increased user satisfaction from direct use after modifications of the e-services which increased the future use. This relation form the second positive or negative learning cycle.

DeLone and McLean added another feedback loop from the net benefit to use and user satisfaction. This relationship which visualises a learning process with positive or negative outcome, thus measuring development over time, will be retained (cf. DeLone and McLean, 2003, DeLone and McLean, 2004). Positive net benefit reinforces use and user satisfaction. Negative net benefit will trigger a vicious circle (cf. DeLone and McLean, 2002, 8). Confirmation of both effects can be identified in the cases. Some suppliers were less enthusiastic about how e-services could benefit them and did not actively promote this solution in their customer base. On the buyer side, the proven net benefit led to organisational measures and e-service improvements aimed at increasing utilisation. At Siemens Click2Procure formalised utilisation information (reports) is a central topic that is discussed with the buying organisations in regular meetings to increase the net benefits. The lack of catalogue content for some of the MRO categories provided negative feedback reducing the use of e-services. Since small suppliers lacked the e-service readiness to offer their product spectrum electronically and lack of an economically viable integration with CXT prevented a higher use. Croom and Johnston (2003, 539) confirm in their study on e-services in procurement that a high user satisfaction on the buyer side is central to the success of e-procurement deployment and is a significant determinant of the total cost-benefit ratio.

The process model relation of the e-service success model is maintained. The terminology of DeLone and McLean (2003, 16) of IS creation, use and consequences is adapted to the context of this thesis. E-services phases are (1) acquisition, (2) use, (3) monitoring and assessment (consequences). The structuring of the elements from left to right follows the semiotic
8.3 Respecification of the D&M'92 Model to Fit into the Context of E-services

logic from syntax to pragmatics: The e-service system requires syntactically correct *systems quality* and semantically correct *information quality*. The extended pragmatic level is defined by the categories *perceived service quality, user awareness, user expectation, e-service use, user satisfaction, individual impact, non-economic organisational impact, and economic impact*. The arrows of the model indicate their interdependencies and mutual causal influences (e.g. e-service use has a positive or negative impact on user satisfaction). The *net benefit* is constituted by averaging out the *individual impact, organisational impact and economic impact*.

The cyclical learning loops increase the application of the model and its explanatory and predictive power to guide practical actions. In contrast to linear process models the e-service success model can explain development paths and learning after intervention from customer or provider side. It can explain trajectories of success or failure facilitate the intervention in longitudinal studies such as the one presented with CXT. From a customer perspective dysfunctions or self-enforcing effects can be identified and supported or enervated. The model has been elaborated by analysing the empirical responses of customers within the CXT case. Preliminary confirmation has been achieved by applying it to the similar context of Siemens Click2Procure and selected rival cases (e.g. SGS). Further insights can be derived from the analysis of the provider side (see ch. 9).

The differentiation between the attitude denoted by the *intention to use* and the behavioural *use* of the D&M'02 (p. 8) model is not maintained in order to simplify the model as it is not considered critical of the context of use-base e-services. Further a use-based business model of CXT and Siemens Click2Procure suggest that *use* is best suited in this context.

A stronger variance model is needed to understand the relationship between the various dimensions of *e-service success model*. This can be a task for further studies. The requirements are that the setting is transferable, and that there are a statistically sufficient numbers of comparable users of a specific type of e-service. This is most likely to limit the potential areas to large organisations which use the same e-service.

The following table summarises the confirming theory sources of the *e-service success model* as discussed above (see Figure 8-6).

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<tbody>
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<td>System Quality</td>
<td>System Quality</td>
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<td>System Quality</td>
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<tr>
<td>Information Quality</td>
<td>Information Quality</td>
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<td></td>
<td>Information Quality</td>
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<tr>
<td>Perceived Service Quality</td>
<td></td>
<td>Service Quality</td>
<td>Service Output</td>
<td></td>
<td>Service Quality</td>
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<tr>
<td>User Expectation</td>
<td>User Expectation (implicit)</td>
<td>User Expectation (implicit)</td>
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<td>User Expectation (implicit)</td>
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</table>
8. Findings on E-service Success from a Customer Perspective

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<tbody>
<tr>
<td>User Awareness</td>
<td>Use</td>
<td>User Awareness</td>
<td>(Intention to) Use</td>
<td>User Satisfac</td>
<td>rection</td>
</tr>
<tr>
<td>Use</td>
<td>Use</td>
<td>Satisfaction</td>
<td></td>
<td>User Satisfac</td>
<td>tion</td>
</tr>
<tr>
<td>Individual Impact</td>
<td>Individual Impact</td>
<td></td>
<td>Net Benefit</td>
<td></td>
<td></td>
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<tr>
<td>Organisational Impact</td>
<td>Organisational Impact</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Economic Impact</td>
<td></td>
<td>Revenue</td>
<td>Growth, Profit</td>
<td></td>
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</table>

**Figure 8-6: Composition of the E-service Success Model**

Along with explanatory value, the encompassing design of the model should have predictive value if the dimensions are used to assess the success potential of a future e-service. Furthermore, the model can have design value if the factors influencing success are taken into account in the design of an e-service with a view to increasing the success potential. Finally, the model could serve its main purpose which is to assess the success of e-services or form the basis for e-service monitoring. The model is a basis for this research, and more research is required to detail the model and adapt it to specific situations. A proposed selection of the existing measures could be a starting point of a detailed analysis (see Appendix H).

A partial answer to the critique of Svenson (2001,358) can be given (see ch. 2.2). He argues that a deficit found in service quality models (e.g. SERVQUAL) is that they do not measure the bi-directionality of service quality in a service encounter. The proposed approach includes bi-directional relations. It starts with the customer and includes the dynamic interaction with the service provider by integrating the use, user expectation and impact dimensions of e-services. The dynamic interaction is not directly reflected in the model, but the results allow tentative conclusions on the bilateral nature of the success of e-services. Furthermore, the feedback link between user satisfaction and user expectation indirectly integrates the e-service provider. The provider can actively influence the expectation level and user satisfaction to secure a positive circle for the customer and the provider.

To summarise, the initial model was adapted to reflect the changes (1) indicated by the data, (2) required by different context the model was applied to, and (3) resulting from progress in the academic discussion reflecting empirical tests (e.g. Seddon and Kiew, 1994) and applications to the e-commerce environment (e.g. Molla and Licker, 2001).

### 8.3.5 Metrics for Measuring Success

By analysing transaction processing systems (TPS), information reporting systems (IRS), and decision support systems (DSS) Jiang and Klein (1999) found that different impact measures
are appropriate for different types of systems. This supports the conclusion that a selection of the proposed measurements is applicable to a specific type of e-services but other measures are required for other e-service levels, types, tasks, contexts and industries. This context and task specificity needs to be aligned with the customer's goals and strategic orientation to enable the most appropriate measures to be selected. Existing validations of the D&M'92 model have often selected only one measurement per dimension (cf. Rai et al., 2002; Seddon, 1997). A selection of possible measures for IS and e-commerce systems is provided in Appendix H.

The measures for Web sites or e-services show that different authors assign the measures to different dimensions. For example, the degree of personalisation is mentioned by Zeithaml et al. (2002b) in relation to e-service quality but DeLone and McLean (2004) classify it as information quality. This suggests that a selection of measures is required before a detailed assessment of the dimensions can be commenced. The quantitative variance testing of D&M'04 model applied to e-commerce or e-service success model proposed here has not been performed yet.

8.3.6 Remaining Constraints and Limitations

Although the model strives to provide a more encompassing picture of e-service success it is intentionally incomplete. It covers neither the business model of all customers nor the alignment with the general strategy, issues which are addressed in Appendix J. Further independent success variables, such as brand awareness, substitution by other technology (cf. Lenz et al., 2001), can be aggregated in the expectation dimension. Success components, such as strategic flexibility or general competitive positioning, are not in the focus of the proposed success model which was applied to analyse success from the viewpoint of individual customers. Other authors have addressed these issues (cf. Lenz et al., 2001; Brignall and Ballantine, 1996). Strategic elements and the flexibility needed to respond to customer needs in time are complementary and are addressed in the customer orientation and strategy sections (see 9.1 and Appendix J). Competition and the financing of the e-service provider were purposely left out since they are not directly relevant to understanding bilateral customer relationships with existing customers.

Organisational and political antecedents of the customer relationship were included in the questionnaire but are not explicitly covered in the success model. These factors should be taken into account when defining measures for assessing relationship specific success in order to guarantee an alignment with the customer's goals and strategic orientation. These additional context factors need to be excluded if the variance model interpretation is statistically validated.
A limitation is that non-customers are not included. They represent a different source of information for the service provider and necessitate different means (e.g. conjoint measurement or simple interviews (see Hensel-Börner and Sattler 2000)).

Several studies applying a variance theory interpretation of the D&M'92 model were methodologically not unquestionable (e.g. Seddon and Kiew, 1994). The deficit calls for a better specification of the data source, the IS or e-service analysed, and the application of the findings. Differentiating between (1) mandatory, partial voluntary, and voluntary use (cf. Seddon, 1997; Goodhue and Thomson, 1995) or (2) between internal and external use, and (3) single or multiple applications is recommended when specifying the context and assessing applicability of findings to other contexts. This has yet been done only in a rudimentary fashion in the existing study.

The main reason is probably the lack of available data to assess the success of a single application in a statistically significant population and the IS or e-service success in terms of statistical confidence. None of the analysed variance model studies could explain a variance of their dependent variables with more than 75% (using R²) (see Goodhue and Thomson's (1995, 228) who present task-technology-fit and utilisation on individual impact with an R² = 0.16; Seddon and Kiew (1994) found information quality to user satisfaction R² = 0.46 and R² = 0.74 for user satisfaction as dependent variable). This result is not surprising since success in information systems or e-services is probably too multi-dimensional to identify a limited number of surrogates that show a strong causality with a high level of confidence for the dependent variable (see Markus and Robey (1988) and ch. 3.3.4.2).

8.4 Conclusion and Learnings of Applying the E-service Success Model

The multi-dimensional D&M'92 model was initially applied to assess the success of e-services from a customer's viewpoint of using the existing e-service offering of CXT until mid-2003. It was chosen to form a starting point for the success assessment, without an initial bias towards only one success component to encourage open customer interviews.

If appropriate, insights from triangulation cases were added to underpin the argument. The proposed e-service success model serves three purposes: (1) to assess the perceived success of the services offered by its customers, (2) to enable the deduction of relevant issues for the management of e-service providers such as CXT, and (3) to derive the implications involved in improving the life-cycle management of future e-services. In addition, the process view of the model itself was tested and enhanced.

8.4.1 Summary of Case Insights of Applying the E-service Success Model

The D&M'92 model was extended to match e-services based on empirical data of CXT and its customers. The model aims to collect the opinions about an e-service provider and its e-
service offering from 2000 to 2003. The goal was to keep the complexity of the model at a manageable level.

An overview of the assessment of the separate dimensions of CXT is shown in Figure 8-7. The values represent averaged assessments among interviewees over the years from 2000 to 2003. The respondents were asked to focus on the time during the AR study of CXT (2000-2002). The time after the AR involvement under the new management was treated separately (2003). The verbal statements are classified and aggregated using a simple scoring model and are displayed according to the following scale: ⨿ Indicates perfect fulfilment. ⨸ Indicates positive results with minor deficits. ⨶ Indicates medium achievement. ⨷ Indicates insufficient achievements. ⨸ Indicates no achievement at all.

<table>
<thead>
<tr>
<th>E-Service Success Dimension</th>
<th>Achievement Value as perceived by Buyers</th>
<th>Achievement Value as perceived by Suppliers</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Quality</td>
<td>⨷</td>
<td>⨷</td>
</tr>
<tr>
<td>Information Quality</td>
<td>⨷</td>
<td>⨷</td>
</tr>
<tr>
<td>Perceived Service Performance</td>
<td>⨷</td>
<td>⨷</td>
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<tr>
<td>User Awareness</td>
<td>⨷</td>
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<tr>
<td>User Expectation</td>
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<tr>
<td>Use</td>
<td>⨷</td>
<td>⨷</td>
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<tr>
<td>User Satisfaction</td>
<td>⨷</td>
<td>⨷</td>
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<tr>
<td>Individual Impact</td>
<td>⨷</td>
<td>⨷</td>
</tr>
<tr>
<td>Organisational Impact</td>
<td>⨷</td>
<td>⨷</td>
</tr>
<tr>
<td>Economic Success</td>
<td>⨷</td>
<td>⨷</td>
</tr>
<tr>
<td>Unweighted Sum</td>
<td>0.7</td>
<td>0.4</td>
</tr>
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</table>

Figure 8-7: E-service success model application at CXT during 2000-2003

Figure 8-7 indicates in an aggregated overview of interviewee’s statements categorised in two groups. Buyers attributed more value to the CXT e-services than suppliers. For example, a supplier did not invest in technical integration because the perceived benefit was too low. The table reveals that the business model of CXT initially provided much less value to suppliers. Some suppliers only participated because one of their key accounts wanting to transact via CXT. The simplified quantification using a scoring model on the e-service success dimensions helped to identify this deficit. The tendency is that buyers achieved more than two thirds whereas suppliers were only achieving little more than one third of the potential success.

The success achievement of CXT and its customers was suboptimal. Some of the reasons can be deduced using the e-service success model. (1) The buyer focused business model provided considerably less benefit to the suppliers. The lack of content of suppliers (only medium satisfaction on information quality) and too few buyers prevented both parties from reaping more...
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benefits. (2) The insufficient communication on potential e-services stopped CXT from developing acceptable and required e-services or to sell conceptualised e-services to customers.

The identified hurdles for achieving higher levels of success are (1) customer orientation and learning aimed at improving the bilateral relationship and increase net benefits, (2) the management of utilisation of hybrid e-services, (3) the required e-service capabilities, and (4) actively address power and trust issues. These issues will be analysed in chapter 9 and suggestions for future e-service developments in respect of application and validation in similar contexts assuming that context characteristics are similar to the situation discovered at CXT or the triangulation cases will be provided.

8.4.2 Discussion of the Contribution of the E-service Success Model

This stream of research lacks empirical grounding by the original authors, only partial variance model based validation by other authors, and the moderate fit with the context of e-services. Since the original authors themselves recommend the application of their model to new contexts the reasons for the well-informed and justified modification are presented below:

(1) DeLone and McLean have never validated their own model using primary data. The 2004 publication was the first to provide exemplary data but is based on secondary data sources only. The empirical tests provided by numerous authors were only partial, often lack clear specifications of the context and the data basis, and depend on university user data samples (e.g. Seddon and Kiew, 1994, Rai et al., 2002) or library services (see Landrum, 2004). In contrast the AR study of CXT enabled to understand e-services more fully. A modified initial questionnaire and open interviews posed on CXT's customers resulted in rich data on the drivers to success for e-services. The reasons that justify a respecification are: (1) focus on external customers, (2) higher relevance of service quality, (3) higher need to be financially successful compared to internal (M)IS functions combined, and (4) a better objective financial assessment of successes from the use based revenue model.

(2) Further the emergent and explorative research design required a qualitative data basis with a strong focus on attitudes, meanings, motivations and values which were idiosyncratic and context-bound. The goal was to adapt the initial D&M'92 model to the situation of the study and the cases to derive context specific meaningful findings and develop an appropriate assessment model. The use of qualitative data, a longitudinal study that includes learnings and adaptations of the e-services, and the process model application differs from other applications.

(3) The D&M models misses identified e-service specific characteristics such as the service content fit (see ch. 8.3.3.2) and the relevant dimensions of user expectation and user awareness.
8.4. Conclusion and Learnings of Applying the E-service Success Model

(4) Although it is favourable for analysing e-services that DeLone and McLean have added service quality multiple authors have criticised a suggestion to use the SERVQUAL measurement (cf. Van Dyke et al., 1999, Cronin and Tylor, 1992). Cronin and al. (1992) have proved that perceived performance leads to better statistical results it has been argued that the separation is better suited for qualitative data analysis (see ch. 8.3.1.1). A restriction on support-oriented IT service quality (see DeLone and McLean, 2004, 34) does not suffice (see ch. 8.3.1.1.) as e-services can include business oriented human services (e.g. hybrid strategic procurement e-services of Click2Procure).

(5) The lack of context specificity of their analysis of existing applications can be seen as a major weakness. In the context of interpretative qualitative research much of the value and transferability of the findings is lost if the socio-political context and the data about the IS analysed is not provided. The betterment of the context description for qualitative interpretations of data has been proposed earlier (see ch. 8.1).

(6) Finally, the process model view has not been empirically tested as a whole. Selective attempts of validating the relationships were done using variance models. The presented research applied the process interpretation of the e-service success model. However, the approach did not apply a quantitative variance testing approach for the following reasons:

(a) The goal was to develop a suitable success model based on rich interview data and not to perform a statistical valid test a proven model in the context of e-services based on a large number of questionnaires.

(b) A process model interpretation of the model was more appropriate and allowed to use richer qualitative data analysis methods

(c) The intention-to-use dimension was declined since use was easily measurable. DeLone and McLean have also used use in their application of the e-commerce success measures to secondary e-commerce case data (see 2004, 41).

(d) Measures were not explicitly applied due to the emergent nature of the research. Exact quantification was not strived for since it would have been premature to measure dimensions which are questioned in the context of e-services. The result of the analysis provides sufficient back-ground to prepare a quantitative analysis, if sufficient data is available. The context specific selection of the e-service success measures requires taking into account the (1) type of e-service (I&K, BPO, BCI), (2) the sourcing context defining the use in the continuum of voluntariness (see Moore and Benbasat 1992) (3) the role (customer/provider), (4) the revenue model (use based or licence), and (5) the context (power, objectives, strategies) (see ch. 8.1).

The new model elements are economic impact, user awareness and the reformulation of service quality as user expectation. The additional feedback element between user satisfaction
and *user expectation* adds to the cyclical character of the model that allows for long-term analysis in the life cycle of e-services. The cycles form a basis for learning effects and thereby increase success indirectly.

The undertaken process interpretation of the *e-service success model* is intended to provide a better descriptive and diagnostics tool for the e-service user. In addition it reveals a number of design implications for the e-service provider (see ch. 9). The *e-service success model* proposes a wider understanding to encompass e-services. It covers the relevant aggregations relating to the individual customer, namely the individual user, the project manager or functional head, and the company level. Success is not only defined as effectiveness but also measured by efficiency in the economic dimension and gathers the business and socio-political context data. The purpose is to assess success from different constituting elements to deliver a comprehensive picture. The interview data was limited to the view of the person responsible for the e-services relationship who was asked to give his opinion on the other levels.

From an academic point of view, the proposed model adds to the body of knowledge by encompassing the bidirectional relationships of e-services customers and providers during the e-service encounter. It aims to depict a richer relationship that allows for long-term mutual learnings as opposed to most of the existing models which focus solely on customer-oriented unilateral views (see Svensson, 2001, 358). This is achieved by including the future oriented elements of *user expectation* and *user awareness* and a new cyclical relation. The future oriented dimensions simultaneously allow reducing the uncertainty of the provider. Thereby the *e-service success model* avoids the lack of present and future oriented data for IT-based services as diagnosed by Smithson and Hirschheim (see 1998) that leads to lagged reactions. The proposed model includes the human, economic and social side of e-services aiming to provide an encompassing yet a parsimonious framework.

The e-service success model itself is still in an early development stage of substantive theory as the proposed elements were not analysed on a sub-category level such as other well-researched models (e.g. SERVQAL of (Parasuraman et al., 1988)) nor was a quantitative validation started. The assessment of the model itself reveals that the validity of the relationships between the dimensions can only achieve a process theory level (see Markus and Robey, 1988) substantiated by data from the cases. The data does not disconfirm the causal relations analysed using quantitative variance analysis (e.g. DeLone and McLean, 2003; Seddon and Kiew, 1994; Rai et al., 2002).

The above mentioned modifications and their application to the data gathered in a cyclical AR-based process lead to the following insights:

The process model of e-services is complex and under researched. The number of influencing factors may not be complete but a high coverage can be assumed. This assertion can be
8.4. Conclusion and Learnings of Applying the E-service Success Model

stressed by the fact that the data gathered not only measures the dimension level and total success but also provides reasoning why the values are on a low level. This information can be used on an e-service customer and provider side respectively to influence the situation in order to increase the success dimensions and the net benefit.

The practical application in customer interviews showed that the model facilitates the structuring of the questions and fosters the open discussion with the interviewees. What emerges is a rich picture of the success of an e-service that reveals many context specific contingencies. The success of CXT was limited by a low level of satisfaction with the amount of supplier content available (information quality), utilisation of the e-service (use) and economic impact dimensions on the supplier side. The challenge of satisfying both user groups with e-services, mainly targeted towards buyers, can be considered as flawed (see ch. 8.4.1).

8.4.3 Future Applications and Extensions

The purpose of eliciting customer perceptions is to improve the success potential. The uses may not only be descriptive and explanatory but also diagnosis and design oriented for practice as other researchers have identified for their success models (cf. Goodhue and Thomson, 1995).

The validation of the causal nature of the proposed e-service success model requires a large sample of comparable e-services and service providers and a thorough selection of dimensions, relations, and measures. The quantitative validation of the three feedback-loops may complicate the analysis compared to earlier approaches (cf. Seddon, 1997).

The model has been applied for hybrid e-services that require human interaction. For full e-services it can be assumed that user satisfaction is of less importance and could be substituted or enhanced by Goodhue and Thomson's (1995) task-technology fit. They report a significant link from of task-technology fit to individual performance (see 1995, 228). They found in their study that the task technology fit (TTF) becomes important in cases of mandatory use to measure and explain additional variance since the user satisfaction and use may be less important if the e-service is used without human interaction and decision. The TTF concept could be used to identify metrics that allow measuring the contribution to the net benefit and its sub-dimensions (Goodhue and Thomson, 1995, 216). Some research is required to assign the overlapping measurement dimensions of the TTF and the e-service success model. For example before both models can be integrated into a harmonised model data quality, reliability, training and timeliness are measured in both models. The data available suggests that this approach could be pursued but it does not suffice develop an enhanced model.
8. Findings on E-service Success from a Customer Perspective

<table>
<thead>
<tr>
<th>Level</th>
<th>Automated use</th>
<th>Mandatory with exceptions</th>
<th>Mandatory</th>
<th>Voluntary</th>
</tr>
</thead>
<tbody>
<tr>
<td>I&amp;K</td>
<td>(Landrum and Prybutok, 2004)</td>
<td>(Seddon and Kiew, 1994); (Seddon, 1997); (Goodhue and Thomson, 1995)</td>
<td>(Seddon and Kiew, 1994); (Seddon, 1997); (Goodhue and Thomson, 1995)</td>
<td>(Rai et al., 2002)</td>
</tr>
<tr>
<td>BPO</td>
<td>(Goodhue and Thomson, 1995)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Figure 8-8: Allocation of variance theory D&M'92 model validation according to the voluntariness*

A provider can use the model to aid the invention, development and operating of e-services through identifying and measuring the success contributors of his existing or potential customers.

### 8.4.4 Summary of the Concept of E-service Success

After discussing the measurement approach for e-service success the concept of e-service success can be proposed. The initial concept is enhanced by the findings of the other cases (e.g. rival case of Siemens). The concept of success is multi-dimensional and the choice of the context defines the appropriate measures to be taken (see Grover et al., 1996, 178). In the explored context of external e-services measurable quantitative elements can be identified to measure the economic success (e.g. project and e-service ROI). The critique of Smithson and Hirshheim (1998) that the D&M'92 model suffers from a measurement problem can be refuted for this dimension, if a use-based business model is pursued. It has been argued that the pre-control and measuring of the influencing dimensions is important for the e-service customer and the provider to gain a better picture of this multi-facetted concept of e-services to facilitate efficient e-service management. The socio-political dimension as proposed by Smithson and Hirsheim has been added in the interviews and data gathering but is not an explicit element of the *e-service success model*. It is contained in the concept as context factors to contain the complexity of the model.

The elaborated concept of e-service success is summarised in Figure 8-9. The categories context, scope, role and sourcing define the context of the empirical setting of the data. This explicit statement of the context should foster the clarification of the findings and its analytical generalisation as improvement to previous research. The *e-service success model* and its dimensions are then applied to gather and analyse the data and deduce situation specific actions to be able to improve the bilateral success of existing and future e-services.
8.4. Conclusion and Learnings of Applying the E-service Success Model

<table>
<thead>
<tr>
<th>Category</th>
<th>Sub-Category</th>
<th>Properties</th>
<th>Dimensions</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-Service Success</td>
<td>Context</td>
<td>Goals</td>
<td>Project (Ownership phase)</td>
<td>Quantitative - Qualitative</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Strategy</td>
<td>E-Service (Use phase)</td>
<td>Quantitative - Qualitative</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Infrastructure</td>
<td>E-Service Strategy</td>
<td>Existing - First pilot project</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>E-service readiness gap</td>
<td>High - Low</td>
</tr>
<tr>
<td></td>
<td>Politics</td>
<td></td>
<td>Management commitment</td>
<td>High - Low</td>
</tr>
<tr>
<td></td>
<td>History</td>
<td></td>
<td>Provider Relationship</td>
<td>Open - Closed</td>
</tr>
<tr>
<td></td>
<td>Organisational</td>
<td></td>
<td>Experience level</td>
<td>Past e-service experience - New e-service</td>
</tr>
<tr>
<td></td>
<td>Task</td>
<td></td>
<td>Focus</td>
<td>Inter - Intra</td>
</tr>
<tr>
<td></td>
<td>Technology</td>
<td></td>
<td>E-service level</td>
<td>I&amp;K - BPO - BCI</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>E-service type</td>
<td>Full - Hybrid</td>
</tr>
<tr>
<td>Purpose</td>
<td>Customer</td>
<td></td>
<td>User</td>
<td>e.g. purchasing staff</td>
</tr>
<tr>
<td></td>
<td>Provider</td>
<td></td>
<td>Employee</td>
<td>e.g. customer service</td>
</tr>
<tr>
<td></td>
<td>External</td>
<td></td>
<td>Organisation</td>
<td>e.g. country organisation</td>
</tr>
<tr>
<td>Characteristics</td>
<td>Sourcing</td>
<td></td>
<td>Discretion</td>
<td>Mandatory-Voluntary</td>
</tr>
<tr>
<td></td>
<td>Revenue Model</td>
<td></td>
<td>Sources of Revenue</td>
<td>Mandatory, (Partial) Voluntary, Automated</td>
</tr>
</tbody>
</table>

The application of the model to serve academic purposes can be in two ways:

1. The process logic can be applied to single cases to assess the success and the fit of the model. This has been done in this work to elaborate relevant insights in acceptance and success of e-services and elaborating the e-service success model.

2. If the sample data allows for a variance model testing then a statistical evaluation of the applicability can be done.

From a business perspective two potential purposes and objectives are thinkable:

1. A user of an e-service can assess his net benefits and deduce measures if the success achievement is not meeting the goals.

2. A provider can use it to raise his success potential by improving communication, service offering, capabilities, and the measurement of e-service performance (see ch. 9).

The proposed model can satisfy academic and business requirements simultaneously. However, its application will differ if it should either achieve business or academic objectives.
9 Emergent Themes on E-service Success for E-service Providers

The final analysis chapter consists of emergent themes and insights into conditions contributing to increase the success potential of an e-service provider. The assessment of the provider focuses on its capabilities of offering an attractive e-service. Other success elements, such as the measures making up part of the success model, business model, and organisation are discussed elsewhere in the respective sections (see ch. 7).

The chapter builds on the findings of the customer interviews based on the e-service success model (see ch. 8) and elaborates the implications for the provider's side. These emergent findings are structured into the ensuing sections: (1) Customer orientation and learning, (2) E-service capabilities and politics, (3) Management of utilisation. Further insights on e-service strategies (see Appendix J) and the method based development of e-services are detailed in Appendix K. The themes identified are intended to facilitate managing the complexity of e-services in a dynamic environment, thereby increasing the success potential. The selection was targeted on these issues that were of high relevance, have not yet been intensely discussed in literature or are assumed to require an adaptation in the context of e-services.

9.1 Customer Approach and Learning Barriers

9.1.1 Case Data on the Chosen Customer Approach of E-service Providers

During the analysis of the interviews of the customers of CXT the following themes emerged as barriers to success. The situation was aggravated by internal communication problems within CXT. The e-services conceptualised or piloted such as logistics integration or SLA-Management were attractive; all interviewees showed interest in at least one of the conceptualised e-services – the problem was that they were not informed about these services. For example, Brütsch-Rüegger had little information about e-service developments.

[Interviewer]: 'Was there an offer towards monitoring and reporting? No, the only files that we received were reports of successfully processed orders - just a summary on a monthly basis - nothing more'. [Interviewer]: 'It was one of the potential e-services of CXT to offers SLA monitoring services. Were you informed about that? (...) This was not communicated. There was great interest but nobody offered such a service' (Key Account Manager, Brütsch-Rüegger, 15 August 2003).

The quote shows that potentially available e-service functionality was not communicated which confirms the assumed communication gap identified by Zeithaml et al. (2002b) in the context of B2C Web sites. Along with the communication barriers within CXT, the low level of transactions and promises which were in some instances not implemented, prevented an open discussion with suppliers. This might have been aggravated by a lack of business model clarity. The confusion of customers and suppliers as to what the business model was and why a potential customer should use CXT's services is shown by the following quote:
'The CXT offering was initially sold as a product. There is a fix solution you can buy. (...) The first presentation to new potential customers was focused on technical details: xCBL, https, and so on. There were CEOs of companies who had no idea what they were talking about. On the business benefit side only one slide was presented' (Key Account Manager, Brütsch-Rüegger, 15 August 2003).

Another communication and conception deficit implicit in the quote is the undervaluing of the service character of output. Instead of positioning services as BPO services, the product character was emphasised. Similarly, the focus on the technical questions was not aligned with the customers' motivation. These were early flaws of the approach to customers.

Service contract elements were also not pursued thoroughly. Customers of CXT had varying perceptions of the service level agreements they had made. Service levels were not defined in a coherent way and suppliers were rarely aware of their SLAs. SLAs were reduced to information systems metrics such as downtime. Business relevant elements like time to process orders or guaranteed delivery were not defined in the SLAs.

The sales process was perceived as CXT centric. The needs of Brütsch-Rüegger were only addressed with much delay. Too much technology focus and product-oriented sales not coordinated with customer needs did not lead to the high acceptance levels which create great customer satisfaction. The SGS case highlights a similar example by offering a more ICT-intensive solution and a process change customer did not want to accept.

9.1.2 Assessment of the Customer Approach

CXT was initially not able to fully deliver one of the key success factors of Trapscot et al. (2000, 90) who postulate that ‘one should design a value proposition that let customers conduct business ‘their way’. Customer process, not your process, should guide you. Understand how customers purchase and use the goods that you sell, and optimise your value proposition around those preferences and behaviours’. One possible explanation is that the technological inflexibility and business model mismatch combined with the initial lack of knowledge about customer needs, and difficulties in adapting to articulated customer needs led to operations becoming company centric. CXT started to sell software and its services via a product-oriented sales approach. The situation was initially aggravated by the fact that CXT was a new intermediary without an existing customer base.

'The initial solution portfolio offered by CXT consisted of an American based software package, project management and catalogue services. ASP and consulting services to support implementation was the value proposition for attracting leading medium sized companies. At an early stage, CXT had to improve the IT-solution to meet the comprehensive European process needs. Due to a slow market penetration they highlighted suddenly the transaction aspect [pay per use] of e-markets as value proposition. However, implementing efficient e-procurement processes was a tricky task and required an intensive interaction with CXT. Bringing on board suppliers, training users, defining efficient processes, improving software and managing the project beside many
9.1 Customer Approach and Learning Barriers

"other strategic initiatives meant a stretch for all involved in the project at H+S and CXT" (Head of Corporate Purchasing, H+S, 20 June 2003).

If the goal is to learn from the customer or co-opt customer competence a more intense exchange with customers is required (see Prahalad and Ramaswamy, 2000). To adapt the value proposition and the IT-driven solution CXT had to change its approach in the direction of an intense exchange with customers to learn about their needs after an initially more product-sales oriented approach. The data suggests that this process change took several years.

Open discussion, deeper involvement and active listening to customer's needs can foster the achievement of high levels of trust (cf. Petrovic et al., 2003). One initiative was to learn through interviews conducted via call centres and marketing consultants about customer's needs. Another source were academic studies supported by CXT. The key deficit was that only non-customers were asked with a standard questionnaire about complex new services by interviewees who were not prepared to discuss and explain the questions. Potential leads were often not pursued due to other priorities. The three studies delivered little insights about customer needs on a sufficiently detailed level.

Instead a more intense involvement of existing customers could have helped to understand customer needs. A proven marketing technique that could have been used is conjoint measurement to identify the properties of new services and the willingness to pay for specific features but would have required intensive interviews for yet not available e-services (see Lakmann 1995, 189; Hensel-Börner and Sattler 2000).

The service orientation of CXT can be assessed using the challenges in the service operation process of Johnston and Clark (2001) (see Figure 9-1).

<table>
<thead>
<tr>
<th>Challenges in Service Operation</th>
<th>Performance of CXT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowing the customer</td>
<td>Not achieved (only partially and gradually achieved on buyer's side)</td>
</tr>
<tr>
<td>Knowing what the organisation is selling/providing</td>
<td>Unclear between departments</td>
</tr>
<tr>
<td>Managing outcome and experience</td>
<td>Partially achieved (buyer's side)</td>
</tr>
<tr>
<td>Managing the customer</td>
<td>Too little open communication and vaguely addressing the needs of all customer groups.</td>
</tr>
<tr>
<td>Service is real-time</td>
<td>Service was initially perceived and articulated as product that is sold in a discrete manner.</td>
</tr>
<tr>
<td>Co-ordination</td>
<td>Weak (internally, with partners and customers)</td>
</tr>
<tr>
<td>Knowing the relationship between operation decisions &amp; business success</td>
<td>Not transparent</td>
</tr>
<tr>
<td>Knowing, implementing and influencing strategy</td>
<td>Non existent (internally and externally a number of interviewees did not understand the strategy)</td>
</tr>
<tr>
<td>Improving the operation</td>
<td>Partially achieved by substituting the Commerce software to gain more flexibility.</td>
</tr>
</tbody>
</table>

Figure 9-1: Service operation challenges

When comparing the performance of CXT with the operational challenges it becomes clear that CXT focused on back-office operations (cf. Johnston and Clark, 2001). Interactions with
customers were not seen as a partnership nor were customers viewed as co-producers. Featherman and Pavlou postulate for consumer oriented e-services that e-service adoption decisions are typical more complex [than one-time e-commerce], as they initiate a long-term relationship between the consumer and service provider (2003, 452). In B2B projects the experience shows that it is even more complex. E-procurement projects require the commitment of several functional roles within an organisation. Alongside the procurement function, ICT as well as finance are involved and need to promote a solution in order to successfully establish an e-service. In analogy to the MRP infusion findings of Cooper and Zmund the control of political manoeuvrings to cope with the bureaucratic self-interest may be similarly important and has been experienced in the e-service practice (see ch. 2.4.4.1).

The organisational and e-service delivery implications can be supported by applying Apte and Mason (1995, 1258) extension of Chase's (1981) customer contact need theory. The degree of symbolic contact becomes a differentiator for service delivery. Combined with physical presence need the conclusion is twofold: (1) Full e-services require no human physical presence, little or no customer contact but customer object contact. If the customer has the required e-service readiness and the e-service can be delivered in a modular form the offering can be disaggregated. Front-office activities are only required in exceptions and at the beginning and end of the CSLC. (2) Hybrid e-services require intense front-office activities if high customer contact is required (e.g. calling a procurement expert). If the physical presence need is low these services can be disaggregated and performed anywhere worldwide (e.g. off-shoring (cf. Karmarkar, 2004)).

The conclusion is that hybrid e-services require a personal customer approach that is supported via knowledge and customer relationship management tools and by the whole organisation. This approach needs to address the whole process and consequently the actors who are part of the outsourced value chain. The customer service life cycle perspective of chapter 7 can be a useful model for analysing current or future practices. The measurement of the user awareness can be one approach to institutionalise the success of the communication with customers (see ch. 8.3.3.3).

Although fully automated, full e-services may still require personal sales to reduce the socio-political barriers (e.g. fostering trust) during the service encounter, during the service operations and service development or retirement. This tendency may be alleviated if dynamically automated e-services emerge that have a trusted functionality from trusted third party providers. Currently the financial and operational risks, a lack of mature standards and e-service readiness may still prevent a widespread acceptance by customers in practice.
9.1 Customer Approach and Learning Barriers

9.1.3 Provider Learning Inhibitors

Part of the difficulties in winning and keeping customers stem from the functional organisation chart of CXT and the frequent changes (see ch. 5.3.3.2). A formal organisation chart does not depict the real functioning of an organisation (see Malik, 1992, 96) but only formal authority, position power and reporting chains. It cannot explain the behaviour of organisations. An organisation chart neither shows customers nor products and services nor the resources needed to create the output (see Harmon, 2003, 93). The typical organisation chart leads to silo thinking which aims to increase the efficiency with a single unit. Instead Harmon (2003, 94) argues that systems and process thinking should be applied. Figure 9-2 highlights the information dysfunctionalities discovered at CXT at the end of 2001. The communication chart includes customers and partners (in rectangles). It depicts the communication between the departments which correspond with the subcultures (in ovals) that were prevalent.

Business Development had a number of communication barriers to overcome. Customer information was not communicated sufficiently. The current status of the IT software and capabilities remained obscure. It was difficult to obtain commitment and resources from IT for new service development projects. Moreover, IT decided in an early stage not to collaborate with the software provider any more and stopped attending meetings and training sessions. They then merely contracted external resources from CommerceOne if resources were lacking. Professional service had little exchange with sales or the software provider.

Communication barriers represent dysfunctionalities which, analysed using the Viable Systems Model of Beer, imply that the company cannot fulfil its internal and external coordination functions. Several vital communication channels required by the VSM for fast and unfiltered information transfer, such as system 2, 3 and 4, were only partially active. This diagno-
sis implies that organisation was systematically incapable of learning from and adapting to the requirements of the environment. The communication barriers prevented the flow of information and consequently hindered learning. Unilateral communication can have a similar effect. The results were an uncoordinated market approach, mixed market messages and difficulties in finding customers for an inconsistent offering, which can be partially explained by systemic communication dysfunctionalities. This internal impression and AR-based analysis result was corroborated by the case study-based feedback from customers.

Further, CXT showed the symptoms similar to those of the negative learning cycle of Lytyinen and Robey (1999) (see ch. 3). CXT had limited organisational intelligence due to a perceived external information overload (cf. March and Simon, 1958). Partners, customers and competitors frequently changed their requirements and offerings. In such situations, cybernetics theory proposes that the internal variety and the intensity and means of communication (cf. Ashby, 1964; Beer, 1997; Schwaninger, 2000b) should be enhanced. In contrast, the internal communication deficits were strengthened by the functional organisational design and sub-cultures, which fostered isolation and the hiding of information. Since most of the staff was transferred from another organisation the formative context maintained (cf. Ciborra and Lanzara, 1994).

Furthermore, learning disincentives existed in the service development council. There were participants who did not see it as means for exchanging information and shaping the future but for protecting their own ‘domains’. A frequent routine for preventing change was to block progress by not allocating required resources or postponing for reasons of formal mistakes or incomplete documentation.

The lack of interest of IT in business development issues meant that theories in use were often not exchanged with business development and that there was virtually no common language. The frequent response of IT was to say that there were no resources available or that current priorities could not be changed. BD, on the other hand, questioned IT’s competency and decisions.

Learning achieved in different departments was rarely shared. The functional design prevented organisational learning about technology capabilities, customer requirements and/or new developments for e-services.

The failure to learn produced general myths such as ‘CommerceOne software is faulty and not usable’. Another example was ‘business development does not help my sales process’. The service development council was not attended and not all departments believed in the value of new services. Consequently, meetings did not help as they should: to share experience and align the organisation.
9.1 Customer Approach and Learning Barriers

Considering the similarity of symptoms and consequences described by Lyytinen and Robey (1999) who described means to overcome obstacles that lead to learning failures in information system development (ISD) processes. Their findings can be cautiously extended and applied to e-services since the development processes of e-services share the characteristics of immateriality and the ICT elements of e-services with ISD processes (see ch. 2.4.6). Characteristics, such as real-time responsiveness to customer needs and customisation of the results or simultaneous consumption, require a special emphasis.

CXT was caught in a vicious circle of learning failures due to the limits of organisational intelligence, disincentives to learn, inappropriate organisational designs, and poor performance which became the accepted standard. Myths were that ‘customers do not understand the advanced topics’ or ‘suppliers are not important, they will follow if we have buyers on board’. However, these assumptions caused buyers to become dissatisfied with the CXT’s capability of attracting new suppliers, as the following quote shows:

‘Expectations were not achieved on the supplier side. The ASP Ordering Solutions was not accepted by suppliers. They tried to put burden of integration on the buyers in form of higher product prices since they had not so much value. Suppliers are not as excited as UBS is - their added value has not been so obvious yet. The main reason is that suppliers were not as technically ready as UBS. Suppliers have not used the integrated solution but only the ASP solution [front-end to receive orders and send confirmations with high manual effort]. Most suppliers are SMEs’ (Project Manager, UBS, 4 August 2003).

There was little willingness to adapt methodologies for business and technical service development. This was reinforced by the vicious circle of the learning failure model (see ch. 2.5.1.5). Figure 9-3 shows a suitable model that can help to avoid the vicious circle of learning failures (see Lyytinen and Robey, 1999, 96), and used to improve the situation at CXT or similar ventures.

Figure 9-3: Organisational learning model development applied to CXT

The circle represents positive learning that fosters the creation of valid theories in use which help to achieve a smart ISD or e-service organisation. When applying and enhancing the recommendations of Lyytinen and Robey (1999) for encompassing e-services, a more effective and customer-oriented organisation which avoids some of the failures to communicate, learn
and, ultimately, to adapt can be the result. Consequently, the prerequisites can be set in place for more flexibility and customer-orientation to be able to offer beneficial e-services to the existing or future customer base.

The logically deduced but not implemented recommendations are shown in the table below:

<table>
<thead>
<tr>
<th>Gateways to Learning</th>
<th>Potential application to CXT</th>
<th>Expected positive result</th>
</tr>
</thead>
</table>
| Establish knowledge management throughout the organisation to increase organisational intelligence | - Establish an accepted customer relationship management system  
- Refine internal processes and documentation of service development  
- Add knowledge repositories that include business model and business concept categories including documentation of assumptions, theories of the business and their continuous assessment and re-evaluation (reality check). These would reveal the theories in use for e-services or new software developments (Conklin and Begeman, 1988)  
- Establish routines to review existing knowledge and decide in line with the strategy which knowledge gaps need to be closed  
- Define the information policy and set conditions for knowledge creation (see ch. 7.4) | Provide information and knowledge for adapting to changes within service provider and in its environment |
| Set incentives for learning | - Document customer interaction  
- Increase communication within CXT  
- Set incentives for acknowledging errors and admitting faults  
- Set incentives for selling e-services and ideas | Service provider is not blind to his surroundings and can react faster to positive and negative service development outcomes and changes in the environment |
| Organisational redesign | - Form a customer-oriented organisation  
- E-service development should be established with direct contact to the service customers in virtual teams  
- Build e-service teams without the boundaries among the tasks  
- Set new value oriented performance targets  
- Add integration specialists, ERP and add procurement capabilities (see ch. 9.2)  
- Monitor and adapt methodology, technologies, skills, and knowledge when targets are not achieved  
- Allow for external competencies or e-services to be socially and technically integrated | Enable freer communication and improve competencies. Set incentives and adapt internal processes towards becoming more service-oriented. |
| Reforming IS education | - Educate IT staff towards integrating e-services  
- Case-based learning and defending  
- Software engineering skills and tools  
- Add ERP capabilities or use existing ERP capabilities of partners | Competencies match customer requirements for customised services |
| Use ICT infrastructure potential | - Define software tools and databases  
- Use customer sales and knowledge management tools | Use of creativity tools and knowledge management concepts and tools to improve processes |

*Figure 9-4: Recommendations for becoming more flexible and service-oriented*
9.1 Customer Approach and Learning Barriers

Some of the means identified have been taken into account in this thesis. It is critical to take actions and revise the theories in use which are not only limited to the IS world but require questioning of the business model and customer approach pursued.

The meta-learning from the CXT case is that experience with customers should be valued. Processes and incentives should be designed to promote learning. Infrastructures fostering learning, such as document databases, methodologies and status reports, should be a help in decisions to be made on e-services. Some of the knowledge that would have facilitated adapting to customer needs more rapidly was available but neither accessible nor communicated within CXT. Instead, myths about customers, software, business unit subcultures, communication barriers etc. all hindered learning and prohibited fast reaction to changes. If these measures had been taken the responsiveness and ability to adapt to a changing environment and customer needs would have been better.

In conclusion, enabling open communication, free flow of information, and establishing a learning cycle should help to cope effectively with change. Measures to assess the level of achievement are (1) established knowledge management, (2) put in place incentives to learn, (3) institutionalised pondering about organisational redesign, (4) education plans for employees, and (5) a sufficient ICT infrastructure facilitating the flow of information.

9.1.4 Conclusions and Learnings

The findings of the CXT case indicate that electronic delivery of services does not imply that personal customer orientation and contact are not required. If customers require company specific customisations the e-service provider should be in a position to understand and respond accordingly, thereby satisfying and retaining their customers. In cases where customer requirements contradict the business model the provider either has to decline the request or redesign the offering (e.g. via modular service design and self-customising). Depending on the type of e-service different organisational and delivery forms can be designed to choose an adequate customer approach.

Communication with customers and within the company itself has been analysed using the cybernetic principles of the VSM. The result was the identification of dysfunctionalities. Knowledge management and learning were not sufficiently developed and the existing sources were not used because of cultural separation of the units (see ch. 7.4). The case revealed a need for designing and managing communication and learning when offering an e-service with business impact on a non-standardised business process level. The ISD learning failure posited by Lyytinen and Robey (1999) provides useful insights on how communication problems can lead to learning failures and how they can be overcome. Their proposals were modified in order to test their applicability and transferability to the context of e-services. The gathering, organisation, refinement, analysis and dissemination of knowledge in
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turbulent environments is stressed as relevant for high quality IT-based service provision by other authors (cf. Hyder et al., 2002).

The building up of close business relations with a customer requires an intensive exchange of information so as to learn from the customer. The design of better organisational and communication infrastructures and processes has been addressed. The fit of the competencies and capabilities to further improve the success potential are presented in the next section.

9.2 E-service Capabilities for Providers and Politics

The above elaborated misunderstandings, communication and learning barriers etc. suggests that specific capabilities and behaviours are required from providers to increase the success potential (cf. Oliveira et al., 2002; Hyder et al., 2002). The constituting electronic integration (ch 9.2.1.), the customer relationship and customisation (ch. 9.2.2.), procurement process know-how (ch. 9.2.3.), and the political assessment and behaviours to achieve change towards services are discussed below (ch. 9.2.4).

9.2.1 E-Service Integration Requirements and E-service Readiness

E-services are touted to be an alternative solution or a further development step as compared with EAI solutions for business integration (cf. Linthicum, 2004). Integration can be a goal to strive for and a limiting factor at the same time if costs, technological capabilities or time constraints prevent the goal from being achieved.

The importance of addressing the need to offer integration services was initially not well understood at CXT. Subsequent learning from customers and rival cases helped to highlight this issue which is also part of the E-service choice model. Due to its importance, insights and conclusions on technical integration from the cases will be described in the following section.

The need for integration depends on the type of e-service and its purpose. Full e-services require back-end integration into the ICT infrastructure of customers or other e-services. By contrast, hybrid e-services may only require browser access to the e-service provider’s website. The analysed data shows that integration should not be limited to technical integration of ICT elements but requires a wider view which includes business and social perspectives.

The importance of technical integration for e-services can be stressed by the following quote from SeetalSchaller who uses a Screen-to-Machine integration (hybrid e-service). Seetal-Schaller accesses the e-market and downloads incoming orders in an asynchronous way. A factor limiting successful e-service experience was a lack of integration.

‘Our problem is that we cannot directly process those [incoming orders] in SAP. The investments would have been greater than the (expected) benefits. (...) The integration on the basis of an electronic document is not relevant for our volume of transactions. If we were an office retailer (e.g. Buero Waser) with thousands of items in the catalogue and everybody can order then the situation would be different. (...) At the moment, we can cope with the redundant work [of manual data cop-
ies and double entries]. The benefits of less administration and easier processes are non-existent [without integration]. The only benefit we see is customer retention. This is the only one’ (Key Account Manager, SeetalSchaller, 12 September 2003).

One reason was that a Screen-to-Machine e-service did not offer enough benefits if two systems are integrated via a human interface. All suppliers initially accepted the Supply Order e-service (ASP Sell) but requested modifications. Brütsch-Rüegger and LB Logistikbetriebe had established direct XML data transfer by 2001 and SeetalSchaller requested the customised order so as to digitalise the specific customisations of their products but declined integration due to the low level of utilisation (see ch. 9.3). Together with internal documents and discussions it can be deduced, that the topic of socio-political, business, and technical integration was not discussed adequately at CXT. Accordingly, the customer need for a deeper technical and business integration was not sufficiently valued.

The SIG case showed that control and trust in the provider’s capabilities limit willingness to use e-services, especially if direct value creation and direct materials are in the scope of the inter-organisational project. SIG considered it important to protect competitive advantages and reduce the security and financial risks. SIG decided to control the information flow and provide the integration know-how by itself. CXT was at that time unable to provide the required functionality. The integration requirements and internal know-how transfer from SIG to CXT would have exceeded the benefits for establishing a connection to one customer and one logistics provider. There were many technical challenges when CXT started. The capabilities and chosen software products gradually enabled CXT to cope with integration challenges such as master data mismatches (e.g. units of measure) and varying transaction data standards on the semantic layer. On the pragmatic layer only the predefined scenarios were initially possible. With the use of a messaging and integration platform CXT gained more flexibility on all three levels in line with customer requests. CXT’s services were positioned to enable transactions for multiple trading partners of MRO goods and before the implementation of the B2B EAI platform not to deliver customised supply chain solutions for 1:1 relationships.

Finally, the case of Covisint, supported by data from literature, indirect experience via CommerceOne, and the business press stresses the need for integration. The Covisint consortium formed by Ford, DaimlerChrysler and GM set out to provide 12 business process outsourcing e-services based on Oracle and CommerceOne software. The initial idea was to become the procurement e-market for the automotive industry. However, a number of incorrect assumptions, business model failures, and political issues between the partners and with suppliers caused the automotive companies to withdraw funding. As a separate company under new management and ownership, Covisint focused in 2003 on offering messaging and integration platform e-services based on XML technologies (cf. Ericson, 2003) to customers of the
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automotive industry. The initial business model was simplified, from offering solutions on all three layers of the *e-service framework* to providing BCI e-services only. The learning was that first the basic infrastructure services need to be available to enable a secure, reliable, and cost-efficient exchange of semantically interpretable data. Once this has been achieved – a process which may take several months to a few years - advanced composite e-services on the BPO level will be possible. The analysis of Covisint stresses the need for integration and, at the same time, the difficulties involved in providing and selling a myriad of standard solutions, even with sufficient financial resources. Pure position power alone does not suffice if the business model, *e-service readiness* and the capabilities are insufficient. The standardisation behind firewalls and acceptance of suppliers was more difficult to achieve required more than offering a high degree of interoperability and shared inter-organisational applications between companies. To summarise: this case supports the *e-service framework* design and its hierarchical assumption that the BCI layer needs to be established before full e-services on the BPO and I&K layer can be offered and used successfully. With highly automated e-services the level of integration is high and requires a stable and politically accepted infrastructure if one intermediary is to handle the processes.

9.2.1.1 The Challenges of Technical Integration in Defining the Requisite Integration

ICT systems integration relates to linking different computer-based information systems and databases more closely together. Systems integration is often required to achieve business integration (see Markus, 2000, 10). A frequently used categorisation to delineate system integration is the coupling dimension (cf. Themistocleous, 2002, 27; ch. 4.2.1 and Appendix L.3). Authors such as Linthicum (2001) have already identified multiple technical integration problems.

One key challenge is the heterogeneity. The heterogeneity of the technical systems can be defined by the number of applications, protocol and document standards, computing platforms, and programming languages which need to be addressed to achieve technical integration. Existing EAI tools and functionality can help to hide and manage the heterogeneity of different operating and application systems. Design standards such as Web services help integration with external partners.

If partners rely on the same standards and have similar objectives and capabilities the efficiency of integration may be high. If the standards are incompatible then the effort required to integrate the partner may outweigh potential benefits. The requisite integration is an integration solution that is technical feasible and has a favourable cost-benefit-ratio for all involved parties.

All interviewed suppliers saw the benefit of achieving technical integration if using or providing a *full e-service*. With low-cost back-end integration sufficient benefits could be real-
ised for suppliers, if the starting basis is existing customers and not new ones (see Seetal-Schaller case). The theme of integration cannot be analysed separately but is influenced by a number of factors which are part of the input required to define the integration need and possible solutions. Technical factors influencing the efficiency of integration cited in the interviews and from the experience at CXT were the support of catalogue, master data, protocol, transaction data (e.g. order formats) or design standards for the user interface.

An example from the early phases of CXT was that suppliers did not use catalogue standards internally. CXT had to convert the information from new suppliers into the UN/SPSC classification and into the CommerceOne CUP catalogue format. Suppliers were increasingly able to support different catalogue standards by using their own catalogue management tools. Master data and transaction data standards were crucial to achieving efficient technical integration. CXT had to learn that internal know-how specific to the customer was required to set up seamless operations. Examples of this learning process were the need of mapping and to add customer-specific data (e.g. to ISO units of measurement) if the receiving application required certain data not provided by the sender. The CommerceOne-specific XML derivate xCBL served as a good basis for achieving extensibility, flexibility and a high degree of automation. However, some of the semantic and pragmatic challenges such as process variances cannot be solved purely by XML document standards.

For BPO e-services the integration mechanism can range from file transfer to near real-time integration. Huber+Suhner chose a simple file transfer of orders to be able to match orders with invoices in a semi-automated way. Swisscom chose a messaging service-based EAI solution which automatically exchanged documents between the e-procurement application and the ERP system. This solution enabled the documents 'purchase order' and 'goods received' to be exchanged in a close to real-time mechanism via an application programming interface and a message broker. Suppliers had to offer multiple catalogue formats for their e-procurement buyers or had to take on additional cost if CXT had to prepare the supplier's catalogue format. Finally, multiple heterogeneous systems and XML, as well as different EDI messages, had to be integrated by CXT.

In conclusion: the decision of the requisite integration and appropriate architectural changes are important activities in the context of e-services (see Appendix L.4 for an integration decision framework). Full e-services may imply more costs on the customer side and more functional roles needing to be addressed. There is a trade-off between an easy-to-use hybrid e-service with human interaction and the full automation of using a full e-service. Integration becomes a core competence of a provider that offers full e-services. However, the offering must suit the context and should be aligned with ICT and business objectives.
9.2.1.2 Challenges posed by Business Integration

On the business level the process dimension proved to be complicated when the software standard processes did not meet customer requirements. CXT’s initial software basis was not flexible enough to be able to implement process variants. A number of differing customer perceptions and the actual capabilities of CXT led to a series of misunderstandings which hindered success.

The cases have shown that buyers readily accept ASP solutions if they can avoid upfront investment and if a minimum integration is provided. The ROI can be high if the integration is a simple flat file transfer in a format defined by the customer. The reasons for avoiding a more complete technical integration are less of a technical nature but more often due to business decisions, as the following statement highlights:

‘With UBS the invoicing solution is used but not integrated. We use our standard invoicing process and then do it for the e-market. This is redundant work for us. But this is also a question of the volume. If it is only a question of 100 or 200 invoices it is not worth investing in integration.’ (Key Account Manager, SeetalSchaller, 12 September 2003).

This statement strengthens the claim for sound business analysis as to whether a full e-service suits the output and business model of the potential customer. If this is not the case, either e-service provider or suppliers will have to adapt in order to sustain a viable business relationship. Alternatively, they can pursue a sub-optimal process if the goal is customer retention as SeetalSchaller did.

E-market customers only want technical integration if it is economically viable. SeetalSchaller refrained from a technical integration since the volume of transactions did not constitute the critical mass, as shown by the following quote:

‘Therefore it is limited to this single customer. We need to assess if it is worth integrating the CXT solution into our ERP-System. We do not have hundreds of customers with the same structure and the same offering. First and foremost, it is not our strategy to do this for smaller customers. If there were hundreds of big customers with this requirement it would be much more economically justifiable to invest in a technical integration of the CXT e-market with our ERP system’ (Key Account Manager, SeetalSchaller, 12 September 2003).

If the goal is to use ICT and e-services in particular to improve business performance in inter-organisational settings, the business and the information system have to be aligned and need to work together smoothly. From CXT’s standpoint, the issue of integration was predominantly raised and solved on the buyer side. However, interviews showed that suppliers also demanded integration. Only SeetalSchaller did not invest in the required project and infrastructure as they did not see the business benefit of investing for the sake of just one customer.
Suppliers who have neither the ICT infrastructure and capabilities nor the need for integration because they have too few transactions restrict the success of a transaction-based business model. Neither CXT nor their business partners succeeded in gaining their commitment to participate in the e-market which constitutes a threat and source of dissatisfaction:

'A good start has been made, we are on a good track, but suppliers have to be developed - the collaborative idea has to be accepted and has to settle within the supplier base. The focus shifted. It is not only on internal processes but now the focus is on suppliers and CXT to optimise the whole system. That philosophy will be required and promoted from the first project phase to the implementation. It is very important that the supplier is involved from A to Z and that he supports the processes' (Project Manager, UBS, 4 August 2003).

The data disproves the belief of CXT that the supplier will follow if buyers commit to use their e-market. The data shows that buying and position power alone do not suffice to convince suppliers to invest into integration.

BCI e-services might not be saleable if possessing a high e-service readiness and integration capabilities is seen as competitive advantage by potential customers. At Brütsch-Rüegger possessing integration competency and a high flexibility to adapt to customer specific processes and content requirements was seen as core competency which is not to be outsourced:

'We are integrated in such an ecosystem [with e-markets and one-to-one connections with key buyers]. For our future we need to cope with this complexity. (...) We want to have flexible processes. We now have achieved a greater flexibility than other wholesalers' (CIO, Brütsch-Rüegger, 19 March 2004).

The quotes above highlight that technical integration has strong business implications, that support the competitive positioning and stress the need for business and ICT strategy alignment (cf. Henderson and Venkatraman, 1989) and further stakeholders must at least be managed (cf. Earl, 1989, 17). The literature findings appear to be transferable to inter-organisational e-service settings. Neither a focus on business nor on information systems alone is sufficient. The balancing of both is required since business goal, strategy, and process alignment are not automatically achieved by proposing a technical solution.

The definition of business goals and project prioritisation influences the participation and use of e-procurement service. The economic benefit calculation and the political clarity of roles and objectives may foster seamless integration and ultimately the success of e-services. If the economic situation does not justify investment in full e-services an offering of a hybrid e-service might be required. This has implications for the business and resource planning of e-service providers if they start to win customers. Offering a hybrid e-service with low initial costs might be required until a full integration is economically viable. Similarly, this holds true when analysing the risk element of change. Hybrid e-services can be considered as sub-optimal but less risky compared to changing existing ICT infrastructures and processes. Risk
averse customers might prefer this option. It has to be balanced with the costs of autonomy and control which may rise (cf. Kling, 1987).

9.2.1.3 The Challenges of Social Integration

Issues such as trust, communication problems in the sales process, loss of power, corporate politics and conflicting values can hinder the social integration of an e-service. This may be the result of an underlying resistance in the sales or implementation or use phases of e-services. Without addressing the cause of resistance achieving success in e-services may be difficult.

The service offering of CXT was not complete. It did not appear trustworthy and functionally complete to meet the requirements of all suppliers considering it as an option for outsourcing catalogue management and integration:

'We need to integrate others. We need flexibility and we need the flexibility in-house. We cannot rely on an exclusive solution for transaction processing and integration, which they (CXT) tried to sell to us a separate piece [of software] and then say this is the solution' (CIO, Bräisch-Rüegger, 19 March 2004).

Resistance to accept e-services, adoption on customer and on employee side are issues discussed by Kling (1987, Kling and Iacono, 1989, Kling and Scacchi, 1982) or Markus (1983). The cultural and political aspects as well as trust and openness turned out to be relevant decision factors if and how suppliers adopt e-services in procurement. Providers of e-services need to address the acceptance issues and design their customer approach and service delivery accordingly if they want to reduce the risk of losing customers commitment to e-service innovation.

9.2.1.4 Learnings on the Integration of e-services

With a potentially widespread adoption of Web service standards, full e-services can become an additional B2B integration alternative (as mentioned in ch. 2.1.5.3). The level of standardisation can range from low for custom developed integration solutions via de-facto standards to high standardisation in the case of full Web service standard compliance on all semiotic levels.

During the core data collection at CXT phase until 2002 the standardisation of data and business processes was low and the acceptance of emerging XML standards was not high. Suppliers feared customer-specific costs if other customers were not prepared to use the same communication and data standards. Apart from this, CXT had already proven in 2001 with inet-logistics that it was technically possible to set up a pilot of a full e-service. The prerequisite was an appropriate ICT infrastructure and technical integration capabilities (e-service readiness), which was achieved by an easy-to-set-up and stable solution using B2B EAI software (see ch. 5).
The lesson is that e-service providers must satisfy the needs of technically advanced customers and motivate less advanced ones. Suppliers are willing to invest in technical integration if they can expect a high utilisation and volume on the buyer side. Alternatively, suppliers can be motivated to accept a more automated integration if the buyers are already among the top customers or if there are enough of them to be significant. If these conditions apply it reduces the uncertainty for the supplier as to whether the investment will pay off in the future.

E-service providers need to make integration as easy as possible and should reduce integration requirements where possible, thereby reducing the requisite networkability of customers. The e-service provider should therefore put considerable effort into preparing its own e-service readiness and offer services for handling its customer's heterogeneity or target a business segment where customers already have a high e-service readiness. If all e-service providers can offer a high networkability this would lower the switching costs for customers but would at the same time promote a higher utilisation. CXT increased its e-service readiness gradually:

'Interfaces exist in a wide range to enable an easy roll-out. Processes, procedures and methods are clear. So it will be with minimal effort on customer's and on our side. This is something critical that I have learned in the last two years. The key is to be able to make a roll-out as efficient and fast as possible' (Head of eTrade Solutions, 16 February 2004).

When considering e-services the business and socio-political dimensions seem to be even more important. The cases highlight that focusing on the technical integration perspective alone is insufficient if business or socio-political hurdles prevent a successful and mutually beneficial integration.

The data provides reasons why the announced and projected advantages of e-commerce and e-procurement were not achievable. The complexity of semantic integration was probably underestimated. Furthermore, only a few processes such as MRO procurement can be moderately standardised across industries using the same software basis. However it becomes questionable, if the e-service provider is not capable of modifying his software basis as it has been the case with CXT in its start with C1 software. This is one explanation why horizontal e-market providers rarely managed to offer a sustainable platform for vertical industries with specific processes and content requirements (see Covisint case). Next to the above discussed issues the service quality and system quality issues were stressed by customers. The e-service success model can be used to corroborate these findings (see ch. 8).

An alignment of the business model with the resource, the offering and sales processes is required. The new and changing environment at that time prevented from the application of traditional knowledge on e-services. Academia, consultants and business press proclaimed that new rules apply (cf. Kelly, 1998; Hamel, 2000; Eisenhardt and Brown, 1999).
In summary: The benefits of e-services only justify a system change if they are not purely politically motivated, if the new solution is coordinated better, provides better information, and consumes fewer resources, consequently costing less and is socio-political viable.

9.2.2 Customisation and Personalisation of E-services

On buyer and supplier side a higher level of customising was requested (see UBS, Seetalschaller, H+S). CXT initially had little possibilities to respond to these requests as it perceived itself initially as hosting standard software. Therefore, the rights and capabilities to adapt and enhance the software were missing. The business model was initially targeted at selling the existing functionality. Initially customers were deterred with the 'arrogance' by which the existing services were sold (see ch. 5).

The slight move towards a more responsive organisation and personalisation is in line with Rust and Kannan who see these competencies as critical factors for e-services (see Rust and Kannan, 2002, 10). Kakamar proclaims that complex processes require customisation (see Karmarkar, 2004, 103). If this tendency is correct BPO e-services tend to require customisation, if they should be able to outsource core business processes.

9.2.3 Procurement Process Know-how for Improving the Value Proposition

The need for and acceptance of partial to full outsourcing of procurement processes can be demonstrated in market studies by procurement associations (cf. BME, BMÖ and Accenture 2003). In a similar vein Apte and Manson (1995, 1259) classified a high disaggregation potential for information-intensive services such as the tasks of purchasing managers, purchasing agents and wholesale and retail buyers. Moreover, suppliers offer extended process outsourcing services. Strategic and operative sourcing for MRO and direct goods and services is a development direction at LB Logistikbetriebe. The company covers sourcing, ordering and warehousing outsourcing, not only in Europe but also in Asia:

'We are moving slowly away from classical office and storage materials towards [direct materials procurement] processes like supplying the complete range of instruments for Alstom power plants. They are stored in our warehouse and are ordered on demand. It requires a massive change of the employee's job profile. We do not have classical procurement employees; we need an engineer who undertakes the projects. In former days there were procurement people who focused on price and delivery time - today it is engineers who focus on quality and prices. With e-markets it is still the typical C-parts product spectrum. With Alstom there is a project for ordering higher value and more complicated goods electronically. There are some internal decisions to be made at Alstom. The order volume is SFr 150,000 to 200,000 for an electronic order. There are legal issues which have to be solved. Internally we have a limit in our EDK system of SFr 10,000. Above that level goods cannot be ordered electronically' (CIO, LB Logistikbetriebe, 24 July 2003).

The cases emphasise that one path to success is to use procurement or even engineering know-how and offer process outsourcing capabilities including strategic procurement in the
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form of hybrid e-services. The future development of Logistikbetriebe is towards offering direct production material procurement processes to its customers. Its customers benefit from an outsourced process which is more than the pure electronic platform. Siemens Click2Procure offers these services to internal and external customers.

When transferring the ASP findings of Jayatilaka et al. (2003) (see ch. 2.4.7) to e-services it can be argued that the attractiveness and utilisation of an e-service offering rises if the perceived process domain knowledge and ICT know-how are relatively high on the provider side and if there is a scarcity of resources and capabilities on the customer side. Furthermore, if the knowledge risk, the amount of firm specific knowledge, the need for deep integration, costs, asset specificity, as well as concentration and interconnectedness are low, the use of an e-service is favourable according to their model. This section analyses the applicability of the above-mentioned relations in the context of the cases studied at the BPO and I&K e-service level.

The following analysis differentiates between the procurement categories of MRO goods and direct production goods (see ch. 2.4.2.3). For customers of the Siemens SBM the knowledge risk for MRO sourcing services is not high. The firm specificity is low and asset-specific knowledge is widely available for standard MRO goods. It can be argued that category specialists achieve better results without necessitating intensive know-how transfer since the customer requires the same type of products as the provider. In addition, the process variance for sourcing of MRO goods is relatively low and does not require adoption and intensive communication once company specific process requirements such as authorisation workflows, data exchange and mapping procedures are defined.

As Siemens is one of the largest buyers in Europe Siemens SBM has a comparative advantage in its e-procurement know-how. The concentration of buyers is relatively low since many companies buy MRO goods. However, cooperative buying is not possible due to potential conflicts with anti-trust laws for Siemens on the buyer side. Finally, costs of ASP delivery of e-services are potentially lower since licence costs and set-up costs are shared between Siemens and external customers.

As regards internal production planning and capital goods the knowledge risk is negligible since it is to the benefit of the same company. Depending on the size of the external customer and the specificity of the goods or services procured there might be inhibitions on external customer’s, supplier’s or Siemens’ side. Loss of control, agency costs, conflict with anti-trust law and loss of competitive advantage become critical hurdles. The offering of this service to procure goods and services closer to the core output of potential customers depends on the availability of equal procurement competency and a low level of firm-specific knowledge and processes that need to be transferred. These requirements can be met via the frequent and standardised exchange of information. By employing the procurement staff of the future cus-
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tomer a higher firm specificity can be achieved. The e-service provider could thereby reduce the risk of switching and may even lower switching costs for the customer. On the other hand, outsourcing employees may build an exit barrier for the future customer who could raise the resistance to outsourcing and the resulting undesirable potential strong dependency. One way to overcome these issues is to offer measures to build trust, such as market comparisons, process documentations, transparent and easy monitoring of the defined SLAs, and contracts to reduce these concerns, could be helpful.

In contrast, CXT was only one possible service provider to the Swisscom units without a formal procurement role. The alignment of goals and processes was therefore less intense, and CXT was not fully involved with the procurement departments of all units, neither in organisational terms nor through inter-organisational procurement processes. In contrast to CXT, Siemens Click2Procure took another path to win its parent company's procurement departments. Siemens Click2Procure is organisationally integrated into the central procurement department of Siemens. Click2Procure offers strategic purchasing for selected MRO categories and direct production material (Figure 9-5). A close relation was established through organisational integration in purchasing projects or category management processes. Click2Procure integrated existing procurement know-how and can offer convincing expertise, core purchasing capabilities, and integrated existing information systems, as well as technical know-how via a Siemens internal consulting company. Moreover, Siemens Click2Procure can use the buying power of Siemens to influence suppliers to offer attractive prices, high service levels, and high information quality.

'There is no e-market which offers the combination of strategic procurement services, procurement, and e-market know-how. Others are system providers e.g. T-Systems or have set up a separate unit, e.g. CC-Chemplorer or emaro [now integrated into SAP Hosting] or quibiq. These are the two forms. That procurement really has the money to build such a service is a real USP [unique selling proposition]. Nobody [our competitors] has procurement know-how - let alone the combination of strategic procurement and operative settlement. Nobody is able to attend to the suppliers like we can. If I look at competitors like e-market X, they talk with suppliers about low content quality. E-market X has no power base and leverage. They cannot directly increase the spend by generating more transactions. They can only talk with their shareholders to indirectly increase the volume' (Head of Siemens Buyside Marketplace, 5 August 2003).

Siemens decided to offer a range of procurement outsourcing services to internal customers that include full process outsourcing capabilities (see Figure 9-5 for the strategic, operative purchasing process support and a BCI platform). By contrast, CXT's solution included only procurement BCI platform services, electronic auction services, BPO e-services for ordering, order management and catalogue content management. The strategic advantage of Siemens Click2Procure was that it had a more complete offering and greater success in locking in customers. Customer could more easily realise a direct impact on the balance sheet by outsourcing complete processes instead of only outsourcing the software platform service operations.
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(see CXT case). In 2003, Siemens prepared the offering of these services to the external market.

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<td>- Contracts</td>
<td>- Office supplies, furniture</td>
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<td>- Suppliers</td>
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<td>- Delivery services</td>
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<td>- Volumes</td>
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<td>- Conditions</td>
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<td>- Savings</td>
<td>- IT products, accessories</td>
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Pooling of Demand
- Reduction types & parts
- Standardisation
- Volume pooling
- Process optimisation

Corporate Agreements
- Set up frame contracts
- Prices
- Hourly rates
- Delivery and payment terms and conditions

Strategic Purchasing Processes

To summarise, operational e-services are covered by the SBM Platform. In the set-up phase, integration services complement the service portfolio on the BCI layer. The procurement services are organised in categories for which the strategic procurement process is offered as semi-automated process (hybrid e-service). In addition, information services for supplier performance and e-procurement utilisation are offered as semi-automated processes (see Figure 9-6).

Figure 9-5: Procurement services at SBM Click2Procure

The customer choice model of Jayatilaka et al. (2003) is suggesting that only non-core processes are outsourcable. This can be confirmed in analogy for non-core MRO procurement outsourcing processes. However, if the relationship elements of customer specific knowledge transfer, competitive advantage, conflicts, and risks can be contained, BPO e-services for core processes such as strategic sourcing can become attractive. For full e-services competitive advantages could be maintained if the e-service provider offers customised e-services.
and can guarantee that the software code or people are not accessible by competitors. If this disaggregation of service processes is possible, full e-services or hybrid e-services using off-shoring can become attractive and cost effective.

In the case of CXT it can be stated that it lacked experience in the procurement function or industry. Thronton and March have identified this as one reason why e-tailers failed (Thornton and Marche, 2003, 126). This suggests that a precondition to reap the success potential of procurement BPO e-services is to acquire procurement competencies to be able to offer the appropriate and attractive services. The assessment of acquiring procurement competencies of Swisscom was not given a high priority and this opportunity ceased. Even if only technical business collaboration platform is operated, the need to understand customer processes and the company's own capabilities is crucial. If there is a lack of understanding sales success and the operative satisfaction with the service might suffer.

"(...) the understanding of procurement and process was initially limited. It may come as a surprise because they (CXT) came to sell a standard product - we found that typical and optimised processes and interfaces were not well understood in the run-up to the project" (Head of Corporate Purchasing, Huber+Suhner, 20 June 2003).

The learning from the case comparison is that the availability of procurement know-how and competencies may be increasingly required the higher a service is positioned within the e-service framework. Offering full procurement outsourcing is relatively easy for MRO goods but integration requirements, knowledge risks, concentration risks and competency risks rise if direct production materials or capital goods are outsourced. Measures for overcoming resistance can be set in place to facilitate acceptance by the potential e-service customer. With more business content and task fulfilment at the semantic level control issues become more relevant, and not all customers are willing to hand over competencies to third party providers, as the B+R case shows.

9.2.4 Management of Socio-political Issues

The socio-political comparison of Siemens and CXT positions Siemens with medium to high levels of expert power in procurement, information power, networking power and high position power. Technical integration was solved via Siemens consultancy services. In contrast, CXT was initially unable to offer sufficient technical integration competency. Gaps were ERP integration, a lack of software engineering expertise and XML mapping capabilities. Strategic procurement outsourcing was a service conceptualised but never implemented (see ch. 5). The power base comparison of CXT and Siemens SBM shows Siemens offering a wider range of competencies. Siemens offers strategic procurement process outsourcing e-services (BPO e-service) and in-depth information about supplier performance (I&K e-services). Figure 9-7 shows estimated power bases derived from case data. Siemens SBM and CXT are comparable in terms of their operative procurement platform services. Siemens
SBM achieves a comparatively higher reward and has greater coercive power arising from its ability to influence suppliers to meet requirements. For example, suppliers are keen on meeting deadlines and offering top quality content whereas e-markets with less position power receive a lower service level. This reward and coercive power is likely to benefit 3rd party customers of Siemens SBM as well.

Full ● signifies a high power position, ○ signifies relatively high power position, □ signifies medium power, ◊ signifies little power, and ○ signifies no power.

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Figure 9-7: Power base analysis of Siemens vs. CXT (as per 2003)

CXT decided not to integrate strategic procurement process competencies. It experienced far greater difficulties in convincing the units of its parent company compared to Siemens. It could have helped to convince more Swisscom units if an analysis of the power dimension, unit goals, trust issues and process coverage had resulted in offering strategic procurement outsourcing. The offering of strategic procurement services alone may have been adequate overcoming the adoption barriers but would nonetheless not have guaranteed long-term success since heterogeneous procurement needs and goals might have still been too great.

A strong corporate culture at CXT was not possible due to discontinuities in the leadership, frequent fluctuation of teams and little collaboration between organisational units. Therefore the ability to cope with change was hindered by the strong sub-cultures which had little common ground, shared experience, and overlapping corporate culture. A lesson is that expensive corporate events and promises of stock options are not sufficient to build a cooperative and cohesive corporate culture. Dysfunctionalities of strong subcultures were not avoided or managed to reduces the negative effects on CXT’s overall performance.
A relevant element is the trust of the buying organisation in the service provider that the company can deliver a high quality procurement service. Monitoring of procurement processes and prices achieved as well as benchmarking appear to be tools relevant for achieving a higher level of trust (ch. 2.5.2) (cf. Petrovic et al., 2003). Similarly, service level agreement monitoring services may help to increase the level of trust and decrease the perceived control deficit about the contract compliance of suppliers and e-service customers (see Appendix L.3).

E-Trade Solutions managed to achieve a higher acceptance after integration into Swisscom IT-Services. It added competencies of ICT integration by securing better access to IT people through organisational integration. The re-integration into Swisscom increased awareness and reduced the resistance, competency and power questions CXT had to deal with. The socio-political barrier to outsourcing was considerably reduced, as shown by the following quote:

'(...) Besides that, in Swisscom the acceptance is high - especially with the invoicing solution. A lot of things happen. Apart from the order management, we have already two e-invoicing projects running and two are in the project offering phase - that is all within Swisscom. With EBP [SAP Desktop Purchasing Software] not all contracts are signed but the goal is that we expect a wide roll-out in the summer. It looks pretty good. Part of the reason [for success] is due to the integration into Swisscom. The acceptance is higher although this is not the right word. We are closer to Swisscom. One feels that it is beneficial' (Head of eTrade Solutions, 16 February 2004).

9.2.5 Conclusions and Learnings on E-service Capabilities

The cases showed that e-services not only require technology but also a close alignment between customers, the business model, as well as resources and capabilities.

The proposal has been put forward that integration should not only be considered from a technology perspective. Though there may be a number of technical hurdles to overcome, it is business and socio-political barriers which can prevent a technologically feasible solution from becoming a widely used and valuable e-service. The need for integration may be higher for business process outsourcing e-services but depends on the flexibility of the integration infrastructure and the level of standardisation of the customer's and provider's processes and ICT infrastructures.

The comparison of the cases indicates that the competitive advantage and attractiveness to potential customers of e-services rises if sourcing and procurement process know-how and capabilities, category content knowledge and integration capabilities can be offered convincingly. It can be deduced that the higher in the e-service framework a service is positioned the more this becomes relevant. The success of Siemens Click2Procure highlights that closing the basic feedback-control mechanism by offering rich information services about the performance of the service provider and suppliers is favourable (see also ch. 8.4). The data indicates that complex BPO and I&K e-services business models can be successful and convinc-
9.3 Management of Utilisation

By the same token, additional e-services can complete the spectrum if the required competencies can be added. Examples are e-services supporting the sourcing process for direct production goods such as landed cost calculation or inspection (see chapter 5). Other internal services can be automated service level agreement monitoring or integration of more downstream logistics services (see Appendix 1.3).

Based on the data, the proposal is to enhance the task environment by adding four specific elements not covered by the research by Jayatilaka et al. (2003). (1) The integration need defined by the size and complexity as well as compatibility with existing infrastructure (see ch. 9.2.1 and Appendix L.4). (2) The process domain knowledge was identified as critical element to offer procurement process outsourcing services (see ch. 9.2.3). (3) The original model undervalues the socio-political dimension. The data suggests that aspects of acceptance and reflections on the business model in terms of power, change and trust building are relevant to be successful. The original authors indirectly indicated this deficit and propose to test it in other contexts. This test resulted in the addition of trust into the capabilities of the e-service provider (see B-R case) and the expected power shifts resulting from an e-service use.

One specific insight for e-services providers who develop their own software such as Ariba is that they have a competitive advantage in being able to react faster as they offer the BCI service and have the ability to enhance and redesign the software in house. The drawback is that modifications and local adaptations are difficult or more expensive.

9.3 Management of Utilisation

The data of chapter 8 suggests that buyers and suppliers were dissatisfied with the degree of use. The management of utilisation expands the discussion on the importance of the use dimension of the e-service success model for providers and customers. This section proposes an operative management concept to be able to influence the use of an e-service. It consists of

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**Figure 9-8: Extended e-service customer choice model**

![Figure 9-8: Extended e-service customer choice model](image-url)
defining key measures, monitoring them, defining measures and enforcing them in order to achieve the desired success. The centrality of the topic is corroborated by Hyder et al. (2002, 8) who define controlling through measurement as 3rd level of the eSourcing Capability Model for IT-enabled service providers. All dimensions of the e-service success model should be measured - e.g. Watson et al. (2001) stress the measuring of service quality— but here the focus will be on utilisation.

The introduction to the topic (ch. 9.3.1) is followed by the case insights and findings. The proposal of measures to increase the success of e-services through improved monitoring (ch. 9.3.4) is complemented by an example to demonstrate its application (see Appendix H.3). The conclusions present the implications on different types of e-services as well as for the service provider and its customers in their cooperative effort to increase the success potential. The management of utilisation is mutually interdependent with the other emergent themes of customer orientation and learning.

The cases show that achieving a critical mass of actors is crucial but not sufficient for successful e-services in procurement. The direct correlation of success of the e-service and use because of underlying use-based business models are a key difference to the success of MIS analysed in the D&M'92 IS success model.

9.3.1 Case Data on the Management of Utilisation

Utilisation addresses the after sales service process of an e-service provider as well as the organisational decision maker that sourced the e-service on the customer side. Both have an interest in achieving high level of utilisation if the e-service delivers the promised output in the defined quality. E-service providers have realised that utilisation is a key performance indicator that defines the success of their business:

'The main topic is utilisation. To convince a multinational to use and rollout a system is quite an effort. [There are] 15 reasons against it: usability, old suppliers, suppliers want to enter with special offers, size of the organisation, politics, big white spots not identified, “not invented here” phenomena (...)’ (Head of Siemens Click2Procure, 4 July 2003).

The quote above suggests that utilisation becomes a key performance measure to manage and control the implementation and use of e-services. The cases studied stress that purely achieving a high number of organisations as user following network theory assumptions is not enough. Several suppliers were unhappy with low amount of orders they received and the fact that customers still ordered manually or sourced their needs from other MRO suppliers. The actual utilisation of e-services not the potential to use them provides benefits for the participants.

'(...) we believed that it would progress faster and we could do much more business. But now it is almost a dead-end. The acceptance was there. If it had been more positive we would have invested to establish the integration. But with investments we have been cautious, until we see that there
9.3 Management of Utilisation

are many transactions. We will not invest in advance in new solutions just to see if by chance the utilisation rises. With hindsight, not integrating might turn out to be the better strategy for us in the end [compared to investment in the beginning]’ (Key Account Manager, SeetalSchaller, 12 September 2003).

Suppliers identified hurdles such as low utilisation of electronic ordering combined with perceived high pricing of the e-services. Since high prices for set-up, catalogue services and transactions may have further reduced willingness to access and use e-services, the focus should be on increasing utilisation for both customer groups. In achieving demand-side positive network effects it is not the mere number of contracted organisations (critical mass) but the utilisation of an e-service that defines the value for the actors involved. Greater utilisation raises the benefits of more sales revenue without incurring additional relationship-specific fixed costs for suppliers. In the early phases suppliers had to suffer from the negative effects of a buyer oriented e-market. One of the suppliers said:

‘The accounting and invoicing structure is not comprehensible. If you ask my boss he would say - CXT is only a cost factor [with no value]!’ (Head of IT, LB Logistikbetriebe, 24 July 2003).

The following arguments build on these findings and extend them. The focus here is on the utilisation of the service by the service consumer.

9.3.2 Analysis and Implications of Utilisation Management for E-Services

The interviewed e-service providers have identified the need to monitor their performance during the operational offering of e-services. The studied e-services applied a transaction-based business where the value can be increased with the facilitation of business transactions. The issue of utilisation of hybrid e-service was a central success factor for providers and customers but only Siemens SBM has actively addressed the theme.

The level of use has short-term implications for transaction-based e-services but also long-term effects on subscription-based e-services. The latter may lose attention of its customers and contracts might not be renewed apart from e-services that fulfil background or emergency tasks (e.g. security, basic infrastructure or data storage e-services).

Network theory postulates that ‘information and communication technologies often exhibit network externalities. There is a long, slow increase in their use until some critical mass is reached, after which the growth rate explodes’ (see Shapiro and Varian, 1999, 313). Positive, demand-side network externalities result from greater numbers of members of the network who believe it will generate increasing benefits for them (see Hofmann, 2001, 76). Positive network externalities and positive network effects lead to increasing returns to scale for information goods and services since the marginal costs of serving an additional customer can be close to zero (see ch. 2 and Choi et al., 1997). From an economist and ex-post viewpoint, positive network externalities can be observed with products like the fax machine or Internet access. The data presented here suggests that, for complex business models such as that of
CXT or Siemens, the tipping point is unlikely to be achieved without the sustained effort of buyers, suppliers and e-service providers. Some of the underlying reasons are the set-up, customising and costs incurred for process changes. Similar to technology standards, e-service providers need to influence the partially subjective assessment and expectations about their future diffusion and market share to convince potential customers that: (1) the e-service will continue to be offered in the future, (2) continue to provide benefits, and (3) will evolve with their needs, thereby reducing the risk of the customers. The challenge has technological and behavioural elements.

Service literature discusses resource utilisation as an element of performance measurement for service businesses (Brignall and Ballantine, 1996, 9; Fitzgerald et al., 1991). The focus here is not on increasing the customer contact and use as it is in traditional services (e.g. hotels or airlines) but to increase the use by customers through an attractive, incentivised and available hybrid e-service. Resource utilisation or capacity utilisation (see Goenroos and Ojasalo 2004, 414) in the service industries are measured by productivity and efficiency. Productivity can be measured by an output-input relation for products but is difficult to measure for services and of limited value (see Goenroos and Ojasalo 2004, 414). The limitations are constituted by the required participation of the customer, the intangible nature of services and their open system production process. Grönros and Ojasalo (2004) maintain that research on productivity in services is scarce due to a lack of viable models. Production efficiency could even turn out to have negative effects on the perceived service quality and customer value, which causes negative economic effects in the long term (e.g. by restricting the availability to save costs).

Brignall and Ballantine (1996, 7) argue that reporting for services is dominated by financial performance which only documents ex-post results of management action and does not address the distinctive needs of services when measuring, monitoring and evaluating performance. Future insights might be derived from the application of yield management systems to e-services.

Utilisation in this context can be defined as degree in percent by which the e-service is used compared to other means to settle the process or task. Ideally, utilisation of 100 percent should be achieved. A high level of utilisation of procurement e-services is required to achieve the prospected benefits for the buying organisation as well as for provider and suppliers. This need is intensified if a use-based revenue model is part of the business model. High utilisation helps to maximise benefit in these cases (e.g. to eliminate other ways of doing business like traditional ordering via fax). However, back-up solutions are still required to cope with failures of electronic means (e.g. ongoing network failures), during the transformation phase towards e-service usage or for exceptions where e-services are not economically feasible. In these cases utilisation of less than 100 percent has to be accepted.
The following lessons were learnt from hybrid MRO transaction-based procurement e-services which require human interaction. A few implications from full e-services are added and the findings can be tentatively extended to non transaction-based business models. To overcome the perceived deficit of an underdeveloped management of utilisation at CXT a proposal will be made that encompasses the above-mentioned issues and integrates the ICT, service and socio-political perspectives.

(1) Transaction-oriented business models should be closely aligned with the ICT infrastructure and capabilities in order to reap the benefits of positive network effects, if higher use leads to increasing returns. This proposition is not new but is enriched by utilisation as the key performance indicator (KPI). The adaptation of the business model should be linked to the evolution of utilisation KPIs delivered by the ICT system (see ch. 9.3.3). This highlights the connectedness between the business concept elements of business architecture, ICS architecture, value proposition, and theory of the business with monitoring in the service provisioning phase.

(2) The benefit of using an e-service must be transparent and holistically analysed and communicated to all involved actors. The value proposition might need to be convincing for functional stakeholders if complex e-services provide benefits to several stakeholders at the same time (see ch. 2.4.4.1). More preparation and organisational work are required to address a higher complexity compared with business-to-consumer models like ebay (www.ebay.com). A complex change process for addressing and convincing actors is required as compared with private individuals as targets in business-to-consumer offerings. To achieve this change an assessment of the potential resistance can help to overcome these barriers to acceptance (e.g. identify the loss of power of certain functions or user groups or other reasons for resistance) (see ch. 2.5.3 and Appendix D.8). Strategies for overcoming the resistance should then be devised and implemented. They can range from improved communication through training to changes of the e-service offering. CXT has the impression that invoicing is easier to sell since the functional focus of the benefits and value proposition is clearer to communicate.

One of the keys is to address the power dimension in e-procurement. Some of the benefits are difficult to achieve as they require changes and affect position power. The head of procurement, for example, might not be interested in process improvements that reduce his headcount. The inherent problem of procurement e-services is the potentially widespread impact of benefits. In most organisations interviewed a functional organisational structure dominates. It is difficult to communicate benefits for procurement, logistics, cost accounting, and finance simultaneously as a meeting with all the responsible persons is difficult to arrange. There is a danger that the full potential cannot be realised, if there is a functional separation of the benefits. The causes for not realising the full potentials do not lie in the offering but in
the organisation, culture, and politics of the potential client. This can be stressed by a new invoicing full e-service of CXT, which focuses only on one functional department:

'We develop a marketing message for invoices with or without ordering information. It should be clear that we can offer the whole process. We will then have an approach from the invoicing side and less from the e-procurement side. The customer can see faster how he can save costs compared to e-procurement with orders and order confirmations. Convincing a customer where he can save money has been more difficult with e-procurement solutions. With invoices, it is much easier to demonstrate where a customer can save money. This is the reason why we will promote this e-service offering' (Head of e-trade solution (former CXT), 16 February 2004).

(3) The e-service provider could concentrate on initiating and fostering sales activities together with a content or component provider of e-services and suppliers. If the e-service transforms an existing relationship into an electronic form, the additional e-service partner has an interest and most likely also the means to influence the utilisation. This can be achieved by supporting the e-service provider in his sales process or by using the past history of the customer and comparing the data with the actual performance. If the e-service utilisation does not develop as expected actions need to be taken to achieve the targeted objectives. Some of these actions have been taken by the supplier Brütsch-Rüegger, as shown by the following quote.

'You can influence it [utilisation]. You do not approach such an [e-sales] activity without a concept. You approach your key customers, where you know what transaction capabilities the customer currently uses and what he might be capable of. You define a concept and then approach the board, head of purchasing, head of procurement, IT and then form kick-off meetings. Inform users, set objectives and define a road-map' (Key Account Manager, Brütsch-Rüegger, 15 August 2003).

The quote serves underline the fact that an e-service provider should commit to increasing utilisation and use customers and other partners as indirect utilisation promoters. This is even more applicable for use based revenue models (e.g. transaction-based models).

(4) Bringing about a change in existing behaviour necessitates the management of users and training. This is particularly true, if the existing channel is still in use. The experience of Brütsch-Rüegger illustrates this finding:

'The two [customers] with little turnover only transact a small proportion of their potential turnover via the e-market. It is a problem of the power of the purchasing department but also the need for training. We learned that users have to be trained individually. You have to go through the training process with each user. (...) CXT wanted money for it and the customers did not accept to pay. Therefore with no training the acceptance was low. It is required that the user understands what happens. Otherwise he does not have a chance [to use the system]' (Key Account Manager, Brütsch-Rüegger, 15 August 2003).

Only if users are willing to learn how to use a new e-service and 'unlearn' previous task fulfilment procedures will utilisation increase, with lock-in effects potentially having a positive effect on the e-service provider and the customers. Involving users at an early stage of the
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project and adapting incentives towards promoting a greater use of the contracted e-service can foster the rate of utilisation.

(5) Monitoring of the utilisation requires a clear definition of the service used and means to measure it. Depending on the type of service, the software environment of customers, and the security constraints the monitoring can be done through (1) data import into corporate business intelligence systems, (2) by using ASP data analysis tools or (3) via ordering e-services from the primary or additional e-service providers. Siemens' Click2Procure analyses the utilisation in the whole process: Who uses the provided strategic procurement information? Who uses the supplier databases? Who places orders via Click2Procure, or are the old ordering processes still operative? The information is presented to the decision makers and then discussed. Finally, actions are defined in the Global Purchasing Board. Appropriate metrics can be derived using the generic metrics of the e-service success model as a starting point (see Appendix H).

(6) The increase in utilisation of e-services is fostered by the definition of subsequent actions if the development does not meet predefined objectives. The parties involved should be clear about their roles and the means through which they wield power which influences current behaviour towards achieving the desired outcome. The actions may involve e-service users, the management of customers as well as the provider and partners. The design and implementation of incentive systems may also support the use of the e-service. The actions and incentive systems should be put in place before the e-service is used to facilitate the change process. However, if utilisation is below the expected ranges and the predefined actions do not improve the utilisation the service provider or the customer should re-evaluate the e-service on a strategic level. The e-service provider could adapt the service to customer needs or the customer could source another e-service with a better output quality.

(7) If the basic e-procurement utilisation raises the potential to develop and integrate further e-services becomes more likely as the following quote stresses:

'The subject of e-procurement has penetrated the German economy by 50% (according to some studies) BUT the utilisation of these 50% is in most companies approximately only 5-40%. With this level of penetration I do not have the critical mass to establish new business models. I do not need to think about it. Only if I have an e-procurement utilisation of 70% then I can think about up selling Web services to my customers.' (Head of click2procure.com, 4 July 2003)

One of the prerequisites for achieving a high degree of utilisation is to change buying processes and know the preferences of customers, before additional e-services will be accepted, which confirms the challenges involved in overcoming resistance to change (see ch. 2.5.3 and Appendix D.8). The e-service readiness and strategy compatibility add to the prerequisites. The challenge of further improving procurement processes is greater for additional BPO and I&K e-services, since the raising of awareness, ensuring the inter-subjective communication
Emergent Themes on E-service Success for E-service Providers

of benefits and changing existing habits and processes are required. If the first core services, such as catalogue buying or sourcing databases for the appropriate product categories, are not fully accepted additional services such as SLA monitoring or landed cost calculations might experience awareness and acceptance problems. This argument is supported by the following quote:

'Only when the basic e-procurement processes are accepted and used is an integration of further e-services achievable. At Siemens we have the critical mass but for many others it is still missing. Before I can realise the benefits of bundling I need the electronic integration and intense use. Only then I can think about more e-services to offer to my customers (...). Until sound penetration of the first e-services in an organisation has been achieved, it is futile to think about a fancy e-service, which does something, nicer, easier, and better. We have some approaches from EBS [a former start-up offering e-services] or others - they were all too early. The critical mass for this kind of offering is missing' (Head of Siemens Click2Procure, 2003).

The quote further stresses the argument raised before that the e-service readiness of customers facilitates the success of up-selling e-services of existing service providers or the entry of new e-service providers.

(9) Initial implications for full e-services can be derived from the SGS case. First, the readiness of the customers for full e-services needs to be identified before offering the service. Otherwise it will be difficult to achieve a high utilisation. SGS had to stop its e-services offerings because customers were not capable or willing of exchanging XML-files in 2000. Further, customers have to accept the redesign of the process. At SGS not only the delivery but also the pricing changed to fixed up-front prices, which was not accepted by customers. Third, if the old channel still co-exists incentives and training might be required to change the behaviour of customers. At SGS customers used the traditional way of interacting with SGS and bargaining about prices.

9.3.3 Proposal of Utilisation Management for E-services

The proposal here is to define e-service utilisation management as a process to plan, define detailed KPIs, set achievement levels and measures, monitor, steer, and implement measures to increase acceptance of e-services using the cyclical management process model of Ulrich (1984b, 53). Utilisation management can be a salient management tool to increase customer satisfaction, retention, and learning. The advantage of utilisation as a KPI is that it can act as a viable alert. It can improve the information supply for the provider, along with facilitating the management of the customer relationship. It is closely related to service delivery.

In contrast to financial performance indicators utilisation measures the direct use of an e-service and reduces the reaction time. The reduced data latency, analysis latency and decision latency increase the value of the information (cf. Hackathorn, 2002) and improve the control system of the service operations. The measurement facilitates alert and exception
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handling as well as medium-term learning processes – these are the implications resulting from an analysis using the proposed control structures based on the Viable Systems Model and Beer's parametric model for key performance indicators (see Appendix H.3). In contrast to time-lagged financial data, the information is available at an earlier point in time and recipients can act before the e-service is questioned as a whole. The application of such measures could have prevented a number of new economy start-ups from being too remote from customers and given them a more timely insight into service acceptance problems and customer behaviour. Utilisation is a KPI that can be used to achieve real-time information about the performance and acceptance of the e-services. It can be used to avoid the time-lag of traditional economic success measures, thereby increasing the viability of the e-service provider, if he uses the information to learn and act should utilisation be too low. Utilisation management can serve as a pre-controlling mechanism to secure success during the roll-out and then in the permanent use of e-services.

Of the KPIs for use proposed by literature (see Appendix H) the following are applicable to the studied context of catalogue buying and direct goods procurement processes.

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<th>Absolute Measures</th>
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<tr>
<td>Number of customers</td>
<td>Frequency of logins</td>
</tr>
<tr>
<td>Number of users</td>
<td>Number of purchases</td>
</tr>
<tr>
<td>Duration of site visits</td>
<td>Number of complaints per user</td>
</tr>
<tr>
<td>Number of information downloads</td>
<td>Number of requests per user</td>
</tr>
<tr>
<td>Purchases per visit</td>
<td></td>
</tr>
<tr>
<td>Time to purchase</td>
<td></td>
</tr>
</tbody>
</table>

Figure 9-9: Example of absolute utilisation measures for e-services in procurement

Depending on the type of product or service a customised number of KPIs can be added to facilitate the analysis of e-service acceptance and buying behaviour of customers. The KPIs define the basis for evaluating the buying pattern and for comparing it with the numbers expected by buyers and suppliers.

9.3.4 Conclusions and Learnings

The data indicates that economic theory on network effects, increasing returns, and economies of scale applied to hybrid e-services requires some amendments. Based on the case insights and theory the following lessons can be put forward:

The design of the business model should purposefully foster positive network effects. In contrast to community models for consumers (e.g. eBay) or procurement communities, the individual requisitioner does not experience positive direct network effects by having a higher number of members. A buying community geared towards realising bundling effects would directly benefit from positive network effects. For suppliers, positive network effects apply only if more of existing or additional buyers use the same e-service to settle their business.
Furthermore, the management of utilisation should be a key task for e-service providers. It implies that the critical mass needs to be achieved, but goes one step further to include the means for measuring and implementing actual value creation brought about by using the e-service. This was not apparent at CXT. Siemens Click2Procure achieved higher utilisation, partly due to closer organisational integration with the corporate procurement departments of its parent company's units and partly due to active management of utilisation. CXT failed to realise that its business model required intense and enduring after sales and customer support. Winning customers for pilot installations is not sufficient if customers are given too little information to enable them to manage utilisation. The offering of flexible analytic business intelligence was postponed and considered not to be crucial.

Greater utilisation requires a functional and high quality e-service, as well as increased levels of trust in the provider and sufficient benefits for the users of the existing e-service, or trust-building actions for a new provider. If utilisation is low, the value of use-based e-services will be too low unless individual transactions have a very high value.

Buyers and suppliers can influence the actual use of the service offering. The service provider should integrate this finding into his value proposition, market segmentation, and sales approach. If it is the provider's intention to achieve positive network effects and increasing returns, two potential development paths result from the experience of the cases and could be taken into account (see Figure 9-10).

<table>
<thead>
<tr>
<th>Market approach</th>
<th>Standard e-service offering</th>
<th>Flexible, customised e-s offering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology and service offering</td>
<td>Market with multiple similar customer needs (low variety)</td>
<td>Market with individual customer needs (high variety)</td>
</tr>
<tr>
<td>Customer type</td>
<td>Standard offering targeted at the customer segment identified</td>
<td>Flexible offering with multiple changes</td>
</tr>
<tr>
<td>Business model development</td>
<td>Tendency of SMEs which do not consider the targeted process as a core process</td>
<td>Tendency of large buying organisations with a certain level of knowledge and experience in the process and which will not accept a standard solution</td>
</tr>
<tr>
<td>Management of utilisation</td>
<td>Intensive study of customer types before offering the service</td>
<td>Learning while offering and customising the service for pilot customers</td>
</tr>
<tr>
<td>Can be offered centrally as service by the provider or as self-service</td>
<td>Central offering by the service provider must allow utilisation data to be customised or exported</td>
<td></td>
</tr>
</tbody>
</table>

Figure 9-10: Approaches of management of utilisation according to customer segment types

If it had had this insight CXT could have sharpened its customer segmentation right from the start. Target customers were large organisations, but little or no process variance was possible due to the technology being inflexible and a lack of technical integration capabilities (cf. Lucas and Olson, 1994). With the integration of the B2B EAI integration server, the technology base became more flexible and the offering matched the target better. CXT spent little sales effort and time to develop monitoring tools to increase the utilisation. The Siemens case showed that management of utilisation requires detailed information about the buying pat-
9.3 Management of Utilisation

terms and usage of the offered service. The provision of utilisation information alone may not be insufficient and should be aligned with organisational processes and tasks. If e-services address many stakeholders, it is seems to be more critical to establish pre-defined processes before going live, along with the measures to be taken if objectives are not achieved. This implies that monitoring e-service utilisation is a prerequisite for establishing the cybernetic control system to manage electronic ordering e-services (see Appendix H.3).

In contrast to hybrid e-services, full e-services with machine-to-machine interaction that fully substitute previous solutions require the integration problem to be resolved before the e-service usage is launched. Combining the dimension of the type of e-service with the sourcing policy of the customer gives rise to the following e-service utilisation grid (see Figure 9-11). The sourcing dimension defines whether the new BPO e-service or I&K e-service will be used exclusively as single source or if it is to intentionally co-exist alongside other sourcing options.

<table>
<thead>
<tr>
<th>Hybrid E-service</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of E-service</td>
<td>(e.g. Traditional ordering via telephone instead of e-procurement)</td>
<td>(e.g. Free to order via e-procurement or other)</td>
</tr>
<tr>
<td>Full E-service</td>
<td>Low</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>(e.g. landed cost calculation integrated into sourcing evaluation)</td>
<td>(e.g. landed cost calculation optional to be used)</td>
</tr>
</tbody>
</table>

**Sourcing**

*Figure 9-11: e-Service utilisation grid classifies the monitoring need*

Quadrant one shows a low need to monitor utilisation since the e-service is fully integrated and no other provider is allowed or integrated. An example would be an e-service for landed cost calculation which adds this information automatically to the shipment request for the proposal of a buyer. If integration into the security system and information exchange are defined and work seamlessly, an utilisation of 100% can be expected.

Quadrant four depicts a situation where the same e-service is sourced but the organisation allows the parallel use of previous sources for that information. Monitoring utilisation is critical to evaluating the usability and output quality of the e-service if users choose other sources to obtain the information required.

*Hybrid e-services* require a more direct interaction with the human user. Quadrant two depicts a situation where single sourcing is requested by management but the requisitioners use other sources due to bad service quality or other reasons, thereby circumventing the e-service. Here the management of utilisation is of medium importance to understand why the
e-service is not fully accepted despite the fact that the management of the customer has defined it as single source.

Quadrant three shows an e-service competing with other sources (e.g. with traditional fax or telephone orders). In this case, the need for managing and monitoring the utilisation is of great importance since the danger of potential users not accepting the e-service and of the provider and the management of the customer not knowing the reasons why and not acting upon what they know is great. Hence, it is vital for the e-service provider and the management of the customer to actively control and influence the utilisation so as to reap the potential benefits. The emphasis in this constellation lies on the e-service provider since he has to compete with existing and known suppliers, processes and routines.

To summarise: a trade-off between the benefits of full e-services and hybrid e-services can be identified. Full e-services require integration with an upfront assessment of integration needs and costs. It implies more complex implementation depending on the e-service readiness of the partners. The time and cost involved in using the e-service are minimal because there is little need to monitor utilisation as a high degree of utilisation is guaranteed in cases of single sourcing. Alternative communication with the customer needs still to be established in order to co-evaluate the e-service with changing requirements.

In the case of hybrid e-services, integration requirements be way fewer (e.g. using an external ASP solution and access via a browser software), but the need for and the consumption of resources required to manage acceptance and learning from customer behaviour with a view to achieving high utilisation is greater. The utilisation management cycle of setting the KPIs, defining measures, monitoring and acting needs to be established. Another influencing factor is the degree to which the service is customised which, in turn, mediates the need and effort required to manage the utilisation. Regarding the type of revenue model, transaction-based models are easy to monitor with the proposed initial performance indicators. It has, however, been argued that most subscription-based and access-based services need to sustain high utilisation in order to keep their customers. Therefore they also require utilisation management activities.

The management of utilisation contributes to filling the gap that arises from the scarcity of evaluation tools for IS-based services as identified by Smithson and Hirscheim (1998, 162). It builds on the learnings from IT outsourcing that monitoring and evaluation of the supplier's performance becomes critical to existing and prospective customers (cf. Willcocks and Fitzgerald, 1994; Lacity and Hirscheim, 1993; Hirscheim and Dibbern, 2002; Willcocks and Lacity, 1999). The practical findings for e-service providers are five attention areas:

1. Combine ICS and business model perspective to understand the rules and define the utilisation accordingly
2. Provide feedback to e-service success model from customer’s perspective
9.4 Summary of Emergent Themes for E-service Success

3. Utilisation management is an easily quantifiable and automatable governance approach to improve the control of e-services. It is directly related to the economic success and becomes a critical measure compared to often indirect and qualitative measurements used for the success used in the D&M'92 IS success model (DeLone and McLean, 1992)

4. Monitoring by the provider and reporting to the customers is a win-win situation

5. Agreed upon action procedures to increase utilisation and planning information to allow for relative key performance indicators

In addition, integrated full e-services are more likely to be accepted after the first e-services in the area of procurement receive a high utilisation (see Siemens SBM case). Full e-services need a closer alignment with the ICT infrastructure.

9.4 Summary of Emergent Themes for E-service Success

The emergent themes are specific elements that turned out to be influential on the success potential of e-services in procurement. The analysis of the data and the cross-case comparisons revealed that learning internally and from customers is critical to avoid time-lags, misunderstandings (e.g. on business model), wrong expectations. Open and frequent communication is a prerequisite to enable individual and organisational learning. The culture, organisational structure and processes within CXT prohibited the communication of external information internally due to strong subcultures. The organisation and the business model were not perfectly directed to customer needs (e.g. buyer oriented business mode which increases implementation barriers). In applying the learning cycle of Lytinen and Robey several recommendations to improve the situation were deduced to change the socio-political inhibitors.

The resources following the resource-based view were not sufficient. Technical gaps were not closed (e.g. ERP integration skills) and several integration challenges were identified. The possibilities to customise and personalise the hybrid e-services was initially low. The resulting low customer satisfaction on the supplier side can be considered as inhibitor to success. The option of integrating procurement process know-how and capabilities was not pursued. Siemens BSM case suggests that it could have been successful to do so.

Management of utilisation as key planning and learning mechanism to help to guarantee the successful roll-out as well as future use of an e-service was introduced in section 9.3. It has been conceptualised as a management tool to facilitate the control of the roll-out process of e-services and the e-service operations. It can be claimed that management of utilisation is vital to learn and adopt e-services thereby securing their success. The capabilities among others elaborated can be proposed as relevant in the analysed context to keep customers. The e-service success model can be a basis to define in collaboration with the customers the current status and the improvement potential to achieve a higher customer satisfaction and success according to the ten dimensions of the success model.
10 Résumé and Implications

The status quo of the use of e-services or Web services is sobering. The foreseen second wave of the e-commerce revolution with e-services has not yet happened (see Chen, 2003, 277, or ch. 4-6) and the service-oriented architectures are not yet standard in businesses despite their proclaimed numerous advantages (see Linthicum, 2004). The obvious answers that the technology is not mature enough or that security issues prevent a widespread adoption might just skim the surface (see Eckert et al., 2002). The thesis identifies and elaborates some of the non-technical reasons that hinder the success of e-services.

The résumé starts with a brief review on the answer to the research question of what e-services are and proceeds with a synopsis of crucial findings. The following section summarises core findings and their contribution to the body of knowledge by relating the implications to the central research question of acceptance and success of e-services (see ch. 10.2). A discussion of the limitations (see ch. 10.3) and a future outlook bring the thesis to a close.

10.1 Summary of Findings and Elaborated Concepts

The situation experienced in 1998 made it imperative to adopt an explorative and interpretive approach to the emerging theme of e-services. Since then the term e-service has been defined in a variety of ways which still suggest an emergent status (see ch. 4). The findings indicate that main issues preventing success may be not purely technical ones.

The thesis is founded on an AR study of the CXT e-market. CXT planned to offer additional e-services to boost revenues and attract additional customers. Adding multiple e-services has been a survival strategy of many e-markets, as Lenz et al. (2001) documented in their European survey. CXT served as an ideal environment for providing data to answer the central research question.

A prerequisite to answering the main research question is to clarify the content of the term e-service. The concept of e-services is specified by a definition and the proposal of a categorisation of different types of e-services (see ch. 4). The definition positions e-services as innovative form of service delivery focusing on customer orientation, business value, and electronic service elements. E-services perform single tasks or whole processes alike and are not constrained to after sales services or support services offered by IT departments as the examples in the procurement area demonstrated (see ch. 5-8).

The e-service framework is elaborated in a way which differentiates layers and content areas to facilitate the description and evaluation of e-services by using a process outsourcing perspective. Three variants of the e-service definition categorise one respective layer. In contrast to BCI e-services, BPO and I&K e-services (semi)automate not technical but business tasks or processes with high business content quality requirements and business responsibility.
10.1 Summary of Findings and Elaborated Concepts

They can be measured by business oriented SLAs (see Appendix I.3). CXT's BDX service offering (see ch. 5.3.5.3) confirmed the postulated hierarchy of the e-services framework. Furthermore, the recursive integration of e-services was demonstrated within this service offering in the integration of inet-logistics e-services. The BCI message exchange e-service was used to transfer the shipping information. The content of the exchanged documents or attachments was opaque or could be integrated into the procurement e-service.

Key characteristics to differentiate e-services are the degree of human interaction, integration, and customising. This categorisation clarifies the research object and reduces the findings to a smaller but more specific area of hybrid e-services. The contribution to knowledge is a terminology and categorisation basis that facilitates the analysis of BCI, BPO and I&K e-services within procurement processes.

The complementary lenses of the analysis framework aided the answering of the remaining research questions. They were used to review the literature, collect data, and analyse the results. The findings are grouped according to the complementary lenses (see Figure 10-1).

<table>
<thead>
<tr>
<th>E-service Lenses</th>
<th>Topics</th>
<th>Summary of Findings</th>
<th>Addressees</th>
<th>Chapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovation &amp; Business Concept</td>
<td>Identification of innovation areas of e-services</td>
<td>Provider</td>
<td>7.2</td>
<td></td>
</tr>
<tr>
<td>Business Concept</td>
<td>Description &amp; analysis tool adapted to e-services</td>
<td>Both</td>
<td>7.3</td>
<td></td>
</tr>
<tr>
<td>Customer Choice Model</td>
<td>Proposal of influencing factors, capabilities and underlying theories to understand e-service customer choice</td>
<td>Customer</td>
<td>9.2.1-9.2.4</td>
<td></td>
</tr>
<tr>
<td>Success Model</td>
<td>Analysis framework of e-service performance from the customer's viewpoint</td>
<td>Customer</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Capabilities</td>
<td>Capability requirements depend on the e-service type offered and process area. E-procurement process know-how and integration capabilities were identified for procurement e-services.</td>
<td>Provider</td>
<td>9.</td>
<td></td>
</tr>
<tr>
<td>Strategy</td>
<td>Differentiate strategy according to e-service type and enhance portfolio management</td>
<td>Provider</td>
<td>Appendix J</td>
<td></td>
</tr>
<tr>
<td>Techniques</td>
<td>Support the design of new e-services as a guide for business practice</td>
<td>Provider</td>
<td>Appendix K</td>
<td></td>
</tr>
<tr>
<td>Utilisation</td>
<td>Proposal for the management of utilisation as learning prerequisite for hybrid e-services</td>
<td>Both</td>
<td>9.3</td>
<td></td>
</tr>
<tr>
<td>Process &amp; Outsourcing</td>
<td>Communication processes</td>
<td>Provider</td>
<td>9.1</td>
<td></td>
</tr>
<tr>
<td>Integration</td>
<td>Business, ICT and social integration issues</td>
<td>Both</td>
<td>9.2</td>
<td></td>
</tr>
<tr>
<td>ESLC Process model</td>
<td>Generic process model proposal for the life cycle of e-services</td>
<td>Both</td>
<td>7.5</td>
<td></td>
</tr>
<tr>
<td>E-service engineering enablers</td>
<td>Supportive environment and cultural aspects to improve service engineering</td>
<td>Provider</td>
<td>7.4</td>
<td></td>
</tr>
</tbody>
</table>

Figure 10-1: Summary of models and findings
10 Résumé and Implications

<table>
<thead>
<tr>
<th>E-service Lenses</th>
<th>Topics</th>
<th>Summary of Findings</th>
<th>Addressees</th>
<th>Chapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socio-political</td>
<td>Power analysis</td>
<td>Identification of power bases, assessment of potential resistance and potential measures to overcome resistance</td>
<td>Both</td>
<td>9.2.4 &amp; Appendix</td>
</tr>
<tr>
<td>Learning</td>
<td>Learning of the provider during the life-cycle by communication and managing utilisation</td>
<td>Provider</td>
<td>9.1, 9.3</td>
<td></td>
</tr>
<tr>
<td>Trust</td>
<td>Trust building measures to overcome resistance</td>
<td>Both</td>
<td>8.4</td>
<td></td>
</tr>
<tr>
<td>Culture</td>
<td>Avoid dysfunctionalities of strong subcultures</td>
<td>Provider</td>
<td>9.2.4</td>
<td></td>
</tr>
</tbody>
</table>

*Figure 10-1: Summary of models and findings (continued)*

10.2 Core Findings of the Thesis

The presented thesis strives to improve practice by using AR as an 'enabling science' research method that aims to develop action competencies for the members of the studied organisations (see Susman and Evered, 1978, 599). This is appropriate for an applied discipline, 'where researchers are concerned with the ability of studies to inform and guide management practice' (see Bensaou and Venkatraman, 1993, 15) and extends the normative support of models and frameworks by improving the actual situations of the contexts researched.

A selection of AR, principles of grounded theory and case research methods in an interpretive paradigm is used to derive novel or adapted concepts, frameworks, models and guides to deal with the invention, development, and use of e-services. These results are directed to avoid the fallacies and failures humans are prone to in complex and changing environments (cf. Dorner, 1997) through increasing the capability and competency of organisational members to decide on and act towards increasing the success of e-services. The resulting substantive theory forms the basis for future research and its contribution to extant knowledge will be emphasised below:

The novelty of the results is based on the empirical data analysed. The findings represent the first in-depth effort of researching e-services using an interpretive and AR-based approach. Not only a rich amount of data from different sources but also a holistic literature review was conducted by applying the five lenses introduced in ch. 2. This formed the basis for a thorough analysis. Designed similar to Eisenhardt's (1989) mix of research methods but following an interpretive paradigm the emergent research results extend or adapt existing theory elements by proposing substantive theory. The academic reflection process resulted in a holistic approach that (1) created new knowledge (e.g. business model monitoring based on utilisation), (2) adapted existing theories (e.g. D&M'92-04 model), and (3) confirmed findings by others in the chosen context (cf. Lyytinen and Robey, 1999) for the chosen context. The resulting novel contributions to the existing body of literature reviewed are ordered according to the research area and their key addressees (see Figure 10-2).
10.2 Core Findings of the Thesis

The section spanning key findings are summarised below. They start with a key finding from each element of the research area and developing a concluding finding in the context of the whole thesis.

10.2.1 Impact of the E-Service Provision Process on E-Service Success

The phenomenon of e-services is described in a rich way using existing literature and the analysed data. The in-depth analysis covers the implications of hybrid and full e-services as well as three life cycle concepts of e-services. The identification of concepts that support the e-service development process was a second prerequisite in understanding how to increase the success potential after defining and categorising the term itself (research question 3). The e-service life cycle concepts of e-service invention and e-service business concepts were elaborated using AR-based intervention and rival cases to assess the potential for analytical generalisation. In contrast the knowledge enabling concept is adapted from theory but has not yet been applied to the e-service context. It emerged as underlying deficit after introducing a refined service engineering process and during the data analysis process. The concepts were elaborated with the aim of reducing the initial confusion and being able to structure the e-service life cycle of an e-service provider. The findings extend existing theory elements and introduce into the complex decision area of e-services covering IT, management, service elements and social domains simultaneously.

The concepts can have an indirect impact on the success of e-services by reducing the coordination and communication effort and thus helping to avoid misunderstandings. Chapter 7 closes with an overview of the life cycle of e-service processes of providers and pilot customers. The e-service life cycle model applies the Customer Service Life Cycle model of Ives and Mason (1990) and proposes a separation of back-office and customer-facing operations. It aims to increase the understanding as well as completeness, effectiveness and efficiency in the management of e-services. The findings can be extended to other cases if the situation is similar and the recommendation is suitable to the decision-maker who is aware of the specifics of the new context. The e-service life cycle process framework represents a first proposal...
10 Résumé and Implications

of an empirical data backed approach to structure the required activities. Future research can apply the e-service life cycle process model to other contexts.

The application of the concepts to increase the success potential of innovating with e-services on a detailed level is described in Appendix K. It is an example to answer the fourth research question on how to innovate with e-services by proposing a technique to invent e-services and tools for managing e-service development projects.

10.2.2 E-service Customer View on E-service Success

A second contribution to the body of knowledge is an elaborated and empirically grounded e-service success model for hybrid e-services. In contrast to the D&M'04 model the proposed model has been derived inductively from practical case data (see ch. 8.4.2). Although the design of the initial questionnaire was influenced by the D&M'92 model’s categories additional elements and relations emerged from the data which were partially corroborated by the analysis of the enfolding literature originating from the D&M'92 model. The refined D&M'02 model was adapted by adding new dimensions and relations to include future-oriented elements and to encompass the critique on selected elements (cf. Van Dyke et al., 1999) and methodological problems (see ch. 8.3.4).

The research goal was to identify a means for raising acceptance and enhancing the success of e-services. The identification, assessment, adaptation and application of the D&M'92 to D&M'04 IS success models to the context of e-services is a crucial result. It is proposed as assessment and control model of e-services effects on customers. Its purpose is to minimise the customer's risk and maximise the net benefits he will experience by using e-services.

The intensive work with success models lead to refine the context description they are applied to. A clear classification of the context of the data that is measured with the e-service success model is proposed in chapter 8.1.

The e-service success model presents a proposal for e-service customers to assess and monitor the value of a contracted e-service. It represents the first qualitative assessment of the process model underlying the D&M'04 model. The process logic pursued here is in line with Newman and Robey (1992) who argue that in socio-technical systems the process logic might be advantageous over deterministic and time independent positivist approaches such as variance models. Therefore a variance testing is likely to be done with caution but the thesis has strived to provide a basis for doing it on a sound basis.

The e-service success model can be suggested as a 'vehicle' for communicating the impact of e-services on the customer side. It can thus be perceived as learning tool for achieving an improved common understanding and, ultimately, increase the success. The proposed model includes the technical, economic and social side of e-services which aim to provide an encompassing and yet parsimonious framework. One key reason in favour of the e-service suc-
10.2 Core Findings of the Thesis

The AR study experience and reflections upon the answers of customers and comparisons with rival cases led to several deficiencies within the CXT context: (1) Inefficient customer approach and communication processes both internal and external, (2) Negative learning cycle, (3) Lack of integration capabilities, (4) Lack of internal integration into the parent company, (5) Missing procurement know-how, (6) Insufficient emphasis on building and using power bases, (7) Missing of utilisation management. Deficiencies (4) - (7) were addressed at Siemens which contributed to its greater success in attracting its customers and delivering convincing procurement e-services. This fact provides some extra “validation power” that CXT could have increased its success if it had taken all these issues into account more thoroughly.

However, a comprehensive assessment of the two cases needs to consider that different business models were pursued. Siemens offered BPO and I&K e-services that take on business responsibility. In contrast, CXT decided to limit its value proposition to the BCI e-service level offering only an electronic platform without taking on business responsibility (ICT services outsourcing). Therefore, the success level that Siemens achieved may not be achievable for CXT. Reasons can be that buyers are less organisationally tied to CXT and they still have to perform strategic procurement tasks. On the supplier side CXT is not managing the contractual relationship with the supplier. Therefore the relationship complexity for buyers and suppliers increases with CXT or other pure BCI e-service providers as additional partner compared to a bilateral relationship of BPO e-services offered by Siemens Click2Procure that include the strategic procurement tasks. Siemens Click2Procure has further developed control and active monitoring e-services through organisational involvement and I&K e-services that allow a more coherent, complete, better aligned and more successful offering. The example
indicates that achievement of success is complex and dependent on the match of e-service type, business model offered, e-service readiness, and e-service success achievement.

The application of other formal theory such as the Lythinnen and Robey’s (1999) learning cycle contributes to the scientific community as it indicates that it is applicable to e-services and that it can be used to derive useful practical implications. The validation of this results using AR was not possible since it occurred after the termination of the AR research period.

If the results of an e-service success model assessment are shared in practice the provider can analyse, learn, and adapt to reduce his risk of failure to satisfy the customer and improve the benefits. Ultimately the success for both parties can be increases (win-win situation). E-service providers can use the model to reflect upon their current or planned future performance. The application of the e-service success model by a provider should lead to better insights into the dependencies and influencing factors that define the achieved or achievable success level.

The crucial emergent capability of an e-service provider is his ability to learn. Learning mechanisms identified were (1) adaptation of the e-service offering to customer needs through intensive communication with the customer (see ch. 9.1), (2) establishing of a self-enforcing learning cycle to improve the organisational learning (see ch. 9.1), and (3) establishing of a monitoring mechanism in the context of hybrid e-services to foster the utilisation and ultimately the success for the provider and the customer (see ch. 9.3). If these learning mechanisms are established they can contribute to reduce the offering uncertainty of innovative e-services and thereby reduce the risk of failure.

10.2.4 High Level Findings on E-service Success

Finally, a forth major practical finding is that complex e-service systems are difficult to understand and the multi-theory and multi-method approach facilitated some more abstract analysis and findings which are based on the sum of insights. These resultant common themes range across models, frameworks and e-service roles of providers and customers. These guidelines apply to theory development and practice to avoid what Dorner (1997) called the logic of failure in complex situations. Reductive modelling and hypothesis building is not suitable for complex social phenomena. Instead, empirically grounded concepts, models, and frameworks were proposed to enable future researchers and practitioners to facilitate decision making and action taking through (partially) applying the findings by drawing analogies or use pattern-matching strategy. The comparison between CXT and Siemens Click2Procure highlighted that multiple inputs are required to explain the success or (partial) failure of context specific e-service offerings. Thereby, guidance to increase a more holistic understanding of the situations may lead to less over generalised, law-like findings which avoids failure in new complex future contexts.
10.2 Core Findings of the Thesis

Another key aggregate finding gained by applying the proposed ‘think tools’ is to identify and evade business concept and execution mismatch fallacies. Siemens achieved a better relationship quality and output by focusing on the buyer and supplier relationship and by wielding sufficient power. The mismatch of officially being neutral but de-facto targeted to the buyer side is obvious if the business rules and assumptions are compared with the actual resulting behaviour. Suppliers were much less satisfied with CXT. Their moderate success limited the buyers’ satisfaction to attract new buyers and consequently the total effect of the e-services.

The lesson is that the consistency of the business concept can be better assessed, if the e-service success model is applied to both customer groups equally. The controlling and comparison of the business concept and its elements with actual behaviour and processes is supposedly facilitated using the concepts, models and frameworks proposed. The application of the concepts increases the likelihood of achieving success by avoiding premature and inconsistent action in the early phases of an e-service life cycle. Most of the proposed concepts and elements are under the purposeful design of the e-service provider who should establish and maintain an information intensive relationship with his customers and should be aware of the process and socio-political lenses. Combined with the proposed internal learning mechanisms and the learning from customers the success and survivability are likely to increase. The identification and management of utilisation is one prominent example to reduce one source of dissatisfaction (see ch. 8.2 and 9.2). The proposed measures avoid that the planned utilisation becomes a barrier to success. The management of utilisation can be a tool to overcome this situation (see Appendix T).

Findings from the socio-political lens stress the importance of the communication between customers as a prerequisite to learning for an e-service provider which was sometimes problem-laden at CXT. The need for customising and addressing suppliers as equally important customers was not managed accordingly, in a situation where there was no strong power base. Internal and external communication and learning deficiencies were the result aggravated by a corporate culture that inhibited the free flow of information between departments. The analysis of the power dimension and political manoeuvring stressed the difficulties of communicating with and motivating customers adequately. Judging from the data the customer approach was not adequately taking into account the customers’ individual situation.

The data showed that the change process to introduce e-services requires establishing or using power bases to position e-services at the management level of customers. In contrast to B2C studies (e.g. Gefen and Detmar, 2004), wielding multiple power bases is needed to influence multiple actors in order to achieve the acceptance, adoption and to gain a positive impact from using an e-service (see ch. 9.3).
The e-service life cycle process model was proposed as an aid to structure the processes and organisation design for a provider and customers of e-services to increase the responsiveness and efficiency (see ch. 7.4). The model links providers' and customers' inter-organisational processes applying the process and outsourcing lens. A prerequisite for both parties is the strategic orientation towards outsourcing and the possession of the required e-service readiness (see Appendix J).

In summary, all three complementary lenses and the proposed models, frameworks, and concepts are required to understand and ultimately improve the success of e-services. The constituting lenses were required to elaborate the e-service characteristics and influenced the complementary lenses in providing the fundament to base the holistic change argument towards e-service on. The results are biased to the invention and innovation phase due to the data driven research approach. A pivotal finding is that the process and outsourcing and the socio-political lens emerged to be relevant to fully understand and to be able to actively improve business situations. Figure 10-3 summarises the key results ordered into an e-service life cycle model starting with the invention, the first pilot (innovation), adoption and success phases. Diffusion activities are required to achieve intensive communication about the innovation among the members of a social system (see Rogers 2003, 5) as well as a high responsiveness of the e-service provider in the first two phases to bring about social change and establish a new e-service successfully.

Figure 10-3: Holistic e-service life cycle model

If a customer has made the decision that the e-service provides a net benefit the adoption and a system change follow. The success phase describes the evaluation of an existing e-service. The currently unrelated constructs can be aligned on a detailed level to form a consistent
10.3 Limitations of Research

logic of the interplay of customer approach capabilities, e-service concept, e-service type, e-service capabilities and e-service engineering concepts on the provider side. If this is achieved the success potential to attract customers should increase. The holistic life cycle model indicates that a ‘fit as gestalt’ (see Venkatraman, 1989, 432) was achieved for hybrid e-services. Further research can identify patterns and conditions but a simple cause and effect model to holistic e-service success is unlikely to emerge since too many influencing factors and changes of social systems are likely to prevent that.

The AR-cycle proved to be suitable to explain the research approach and simultaneously get the required involvement of practice. Without the partial employment at CXT many of the results would not have been uncovered due to a lack of rich data and the possibility to refine the research question and test early findings.

10.3 Limitations of Research

The thesis aims to enhance the understanding of the design and offering of e-services based on the experience of an AR study and triangulation cases. Despite the purposefully broad approach taken, the limitations are plentiful. A number of topics were only touched on the analysis of the success or failures during early e-service implementations. For example, trust in the e-service provider, security or electronic contract law were intentionally given little or no attention to since the customers did not perceive it as a major issue. This might not necessarily be the case in other contexts (cf. Croom and Johnston, 2003) and for non-customers, which were only indirectly analysed by third party studies (see Appendix B). Technological related questions such as master data, document, or B2B protocol standards and architectural issues were in the focus at the start of the research but are only touched on in the final version of the thesis, as other issues that dominated the data, were less volatile, and more relevant to success. The issues of cooperation need assessment, cooperation strategies and cooperation management were also only touched on and not used to discuss previous work (cf. Alt et al., 2000a, Fleisch et al., 1999). Partnering processes and supportive organisational structures can be further advancements for future research (cf. Karmarkar, 2004; Alt et al., 2000a).

The themes above were not discussed in detail since they (1) did not turn out to be critical, (2) were considered as temporary in nature (e.g. deficits of specific versions of protocol standards) or (3) did not turn out to be central for the interviewees. The themes merit dedicated research and were only briefly addressed in this work so as to be able to focus on the core issues. Integration and degree of customising of e-services were not fully developed as central themes of the thesis despite the fact that they can become major differentiators. Not all concepts and processes of the e-service life cycle process model identified have been elaborated due to resource limitations, lack of access to data, and frequent changes.
The collection of qualitative data to build the *e-service success model* gathered the interviewee's opinion and assessment only on the dimension level. A more detailed future approach could make use of a context specific selection of the metrics per dimension to explore the success more thoroughly (see Appendix H). The metrics are the result of an extensive literature analysis of 35 papers on e-services, IS efficiency, service quality, MIS effectiveness, and Web site success but have not yet been applied to the AR study context.

The statements and findings discussed are history and context-bound and can only be transferred with caution. The analytical generalisation depends on the task and context conditions following the interpretive research methodology chosen. The achievement of e-service success was explained using the elaborated model based on the data. It can be used to analyse and to cautiously predict the effects of changes using process theory logic. A transfer to other contexts is possible in principle if the context conditions are similar. The epistemological stance questions linear causality and accepts that 'outcome is likely (but not certain) under some conditions and unlikely under others' (see Markus and Robey 1988, 593). The findings can only present a substantive theory that requires testing in other contexts and does not yet have the status of formal theory. The results are less strict than positivist research results, but within an interpretive epistemological stance, more suitable for studying socio-technical organisations and change.

Unfortunately little sufficient direct data was retained about non-customers and their motivations not to accept the offerings. The data of the two non-customers of SIG and Danzas is not suitable. The former did not trust CXT and demanded a direct goods solution which was not available and the latter was bound to use the services of the parent company. The inclusion of non-customers and their acceptance barriers remains therefore an area for future research.

Finally, the majority of the findings can only cautiously be extended to full e-services. The interview partners were primarily experiencing hybrid e-services where the buyers had direct human interaction with the e-service. The suppliers started with a cumbersome hybrid *e-service* and only one moved comprehensively to a full e-service. A promising approach for extending the success model further has been indicated through by Goodhue and Thomson's (1995) task-technology fit for *full e-services*. The perspective may help to assess the suitability of automated *full e-services*. It was not elaborated as it cannot be sufficiently founded on available data.

**10.4 Future Outlook**

More research will be required to assess whether the concepts, frameworks, models, capabilities, techniques, and other insights still constitute valid support in other research contexts in the same domain. The research results are intended to be applicable to business practice as well, when identifying and developing or using e-services in similar contexts. With hindsight
of having completed the thesis barriers for success were dominantly socio-political, strategic or conceptual misfits, and process gaps. This corresponds with Carr (2003) who argues that sufficient ICT resources are generally available but their use can be inefficient.

Other researchers are welcome to apply or challenge the findings in new contexts. Future interpretive research can use a selection of the proposed measures to explore the dimensions even further or focus on single relationships. Comparing a large number of cases to perform variance testing can be another future application— it is however, methodologically questionable if the implied strict causal and time-independent relations apply to e-services (see ch. 3.3.3.2). A quantitative evaluation could take the form of testing the added relationships of the e-service success model, if an appropriate sample can be identified and the methodological concerns can be ruled out (see ch. 10.4). The sample would define the selection of appropriate measures and their weighting for a quantitative assessment.

The application of the findings on e-service success to new contexts or the application of qualitative research with suitable data can provide the basis for a number of empirical research projects, that can be differentiated by (1) their content focus, (2) the data source, (3) the purpose of the analysis and the (4) the data gathering methods (see Figure 10-4).

<table>
<thead>
<tr>
<th>Assessment areas</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content</td>
<td>(1) Use; (2) User satisfaction; (3) Net Benefit (individual/management/ organisational)</td>
</tr>
<tr>
<td>Data source</td>
<td>(1) User; (2) Project Manager; (3) Organisational Unit; (4) All</td>
</tr>
<tr>
<td>Analysis purpose</td>
<td>(1) Testing of the process model; (2) Testing of a variance model; (3) Testing of the e-service life cycle management suitability (from e-service design to the monitoring of offered e-services by using selected metrics of the dimensions as input to the goal system of e-services)</td>
</tr>
<tr>
<td>Data gathering method</td>
<td>(1) AR study; (2) Semi-structured interview; (3) Questionnaire</td>
</tr>
</tbody>
</table>

Figure 10-4: Overview of possible future applications of the e-service success model

With the continuing evolution of Web service standards and its support by business software applications, a number of technical challenges will be less costly to solve in the future and the technologies will be used more frequently to support service oriented architectures. Remote frequency identification technology (RFID), for example, has a high potential to promote e-service based offerings in the future. With RFID tags, more information about the flow of goods will be available (cf. Fleisch and Dierkes, 2003). This is a further application area of the two trends of RFID and e-services which complement each other. It will require research and business practice effort in order to deliver meaningful results to both academia and business world.
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Appendix A: Choice of Research Approach and Methodology

A.1. Research Methodology

Research methodology is in a simple definition a 'way of thinking about and studying social reality' (see Strauss and Corbin, 1998, 3). This section aims for making the fundamental philosophical assumptions transparent to the reader, identify the philosophical roots and relate strengths and weaknesses of this perspective to the purpose of the research (cf. Klein and Myers, 1999).

The thesis focuses on the contemporary phenomenon of e-services and accepts the sociological stance that human reality is a socially constructed (see Berger and Luckmann, 1966, 211). This choice is grounded on the nature of e-services, which can be interpreted differently by individuals and consequently may have a different acceptance, usage patterns, and different valuations on its success. By covering the social and the information systems perspective both research backgrounds need to be addressed.

The phenomenon is at the centre of many research disciplines and being at an early stage of research, it requires an interdisciplinary and multi-theory based approach in order to encompass the relevant elements. Since e-services are contemporary and emergent phenomena, it is best to study them in a natural context (see Darke et al., 1998, 278). Krcmar (1998) argues in a similar vein and posits that research in management and especially in its information systems support in inter-business settings is time and context dependent. The multi-research method approach can be further corroborated by Sydow, who identifies clear advantages in inter-organisational settings (Sydow, 1992) such as its emergent openness (see Sydow and Windeler, 1994).

A.1.1 Philosophical Stance

Lincoln and Guba (1985) elaborate three 'paradigm eras' that inquiry has passed. A paradigm is a systematic set of beliefs that guides action with accompanying methods (see Lincoln and Guba, 1985; Guba, 1990, 17). The choice of the paradigm helps to reduce complexity by limiting the possible perspectives and axioms. Paradigms can represent people's value judgements, norms, standards, frames of reference, perspectives, ideologies, theories and are approved procedures that govern their thinking and action (see Gummesson, 2000, 18). The three eras are characterized by specific 'basic beliefs'. The pre-positivist is dated from the time of Aristotle through the early eighteenth century coming to close with David Hume's work. This paradigm era was largely concerned with passive observation. The more relevant paradigms for current research, which allow for a more active role of the researcher, are the positivist and the interpretive paradigm. Lincoln and Guba (1985) call this paradigm post-
positivistic. Gummesson (2000, 18) positions hermeneutics from the Greek hermeneutikos against the positivist approach. The author prefers the term interpretive along with many other authors such as Wollnik (1995, 304) or Walsham (1995) for reasons explained below. The chosen research paradigm influences the research methodology in terms of goals, methods, and results (see Darke et al., 1998, 274). Figure Appendix A-1 highlights the main differences between positivistic and interpretive research.

<table>
<thead>
<tr>
<th>Assumptions</th>
<th>Positivistic Stance</th>
<th>Interpretive Stance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Characteristics of the Area of Concern</td>
<td>Reproducible experiments independent of time and location, models or experimental settings. Social and natural sciences are identical.</td>
<td>Statements are history and context bound; socio-technical systems are subject to individual interpretation.</td>
</tr>
<tr>
<td>Ontological</td>
<td>Single external reality that can be examined in separate parts</td>
<td>Multiple socially constructed realities (Berger and Luckmann 1966, 211)</td>
</tr>
<tr>
<td>Axiological</td>
<td>Value-free and free of bias</td>
<td>Value-bound</td>
</tr>
<tr>
<td>Epistemological</td>
<td>May be separated from what is being researched.</td>
<td>Mutually influences the situation the researcher is examining. Inseparable of the researched.</td>
</tr>
<tr>
<td>Possibility of causal linkages</td>
<td>Linear causality; there are no effects without causes and no causes without effects</td>
<td>Mutual simultaneous shaping of entities. Cause and effect relations are impossible or difficult to identify.</td>
</tr>
<tr>
<td>Possibility of Generalization</td>
<td>Statistical generalization</td>
<td>Probable generalization (Lincoln and Guba, 1985) or analytical generalization (Yin 1994)</td>
</tr>
<tr>
<td>Dominant mode of inference</td>
<td>Deduction</td>
<td>Dominantly induction (Although statements of relationship or hypotheses evolve from data the process of interpretation of data and discussions about it involve deduction (see Strauss and Corbin 136))</td>
</tr>
<tr>
<td>Research Design</td>
<td>Pre-defined, sequential</td>
<td>Emergent, iterative and evolving</td>
</tr>
<tr>
<td>Methods for data collection</td>
<td>Questionnaire, measurements and computed results</td>
<td>Un- or semi-structured interview, observations, document research</td>
</tr>
<tr>
<td>Main Proponents</td>
<td>Began early 19th century with the Vienna Circle with scientists like Rudolf Carnap, Hans Hahn, Otto Neurath, Moritz Schlick (Lincoln and Guba, 1985, 19); current proponents (Clark, 1972)</td>
<td>IS-related: (Walsham, 1993; Winograd and Flores, 1986; Checkland and Holwell, 1998a) general: (Lincoln and Guba, 1985); (Berger and Luckmann, 1966); (Strauss and Corbin, 1998).</td>
</tr>
</tbody>
</table>

*Figure Appendix A-1: Characteristics of research traditions*
Appendix A: Choice of Research Approach and Methodology

The research question approaches a topic, which not only covers information systems and information technology but also managerial and organisational issues, which increases the need to apply qualitative research methods (cf. Meyers, 2003; Walsham, 1995).

Positivist research is described as 'scientific method [...] based on a peculiar way of understanding the world: a world represented as an ensemble of entities, objects and people. The findings are reproducible and time and location independent. But such an understanding does not support us in the way we normally encounter (and learn to know) the [social] world: by dealing with it as a set of interdependent tools' (Ciborra 2002).

An approach more amenable to interdependent, emergent and systemic problems is interpretive research. It represents context and history bound statements on socio-technical systems based on the processing of individual interpretations. Reproducibility is inherently difficult if not impossible in social research as the number of influences and conditions is nearly unlimited and unique at a time and context. Reproducibility is redefined for interpretive research as assuming a similar set of conditions, other researchers should be able to come up with either the same or a very similar theoretical explanation about the phenomenon under investigation (Lincoln and Guba, 1985, 267).

Positivist research complies with a nomothetic approach to inquiry, which tries to test hypotheses drawn from existing knowledge in the predefined field. The outcome is law-like generalisations, which may be used for prediction and control. The assumption of positivist research that experiments are reproducible and time independent are not valid for dynamic business environments and socio-technical systems and emerging phenomena like e-services. Instead interpretive research is ideographic. It is based on the particular individual.

Similarly the ontological assumption of a single reality is not appropriate for information systems which are subject to interpretation (Orlikowski, 1992) and may even increase the multiple realities human beings live in (cf. Berger and Luckmann, 1966) by adding another dimension for individual interpretation. Since researcher and the participants from business have different backgrounds, objectives and experience, the research is based on multiple realities.

From an axiological point of view the research is not value free since it is based on subjective meanings (Lincoln and Guba, 1985, 38) of the inquirer and the context. The research is value-bound due to perceptions and assessments of a single researcher. It is normative in that it provides design recommendations and procedures, if the reader can identify a high fittingness to the context of his concern. He can then draw an analytical generalization (cf. Yin, 1994) to apply and adopt the findings to his context. The breadth of topics to be covered and the novelty of the research area allow for an eclectic approach on the underlying theory only.

The results are influenced by the researcher, the researched, the chosen theories and paradigms as well as the context. In contrast to the positivist view the interpretive epistemological
stance accepts that the researcher and the researched are inseparable and that a mutual interaction between these entities occurs.

Simple cause and effect relationships are rarely discovered and the purpose is not to generalize from the few analysed cases and deduct universal laws. Instead probable inference (Reese, 1980, 251), working hypotheses (Lincoln and Guba, 1985, 122) or analytical generalisations (Yin, 1994) are possible. The focus of the research is more on the explanatory power, which Lincoln and Guba (1985) defined as 'the ability to explain what might happen in given situations'. The theory speaks for the specific contexts or populations from which it was derived and applies back to them. The transferability to new contexts is largely done by the context aware reader, who realises that context A and context B show a high degree of fittingness (Lincoln and Guba, 1985, 124). In order to achieve this, a rich description of the context is required to enable the reader to assess the degree of fittingness.

The organisational metaphor of Morgan (1986) which fits best to the interpretive stance is that of a political system, where individuals shape structures and processes. In the positivistic stance organisations are more likely to be seen as machines with mechanistic and predictable behaviour.

Induction from the data is the dominant mode of reasoning and the data is obtained in interviews, observations and document research in interpretive research whereas in positivist research experiments, questionnaires and statistical measurements are the dominant modes of reference.

A.1.2 Choice of Research Methodology

Following inductive scientific approaches means deriving the research objective from practical phenomena. Successive scientific work reconstructs and consolidates the phenomena (Stroeker, 1973). The 'design is emergent since what will be learned at a site is always dependent on the interaction between investigator and the context, and the interaction is also not fully predictable' (see Lincoln and Guba, 1985, 208). The iterative learning process starts with a definition of the area of concern that was derived through collaboration between researchers and practitioners. The methods used are detailed in section 3.3.1.

Interpretive research assumes that 'access to reality (given or socially constructed) is only through social constructions such as language, consciousness and shared meanings' (Meyers, 2003). This implies that there is no objective reality, which can be discovered and replicated by others. All knowledge from an interpretive approach is socially constructed and thus subjective. Interpretive approaches can be positioned against positivist approaches in that they are 'applied to more complex, undetermined situations, and allow for mutually influencing relationships, and multiple-perspectives on reality' (translated by the author) (Wollnik, 1995, 320). It requires time-location bound interactions and the detailed analysis of individual cog-
Appendix A: Choice of Research Approach and Methodology

Interpretive schemes and multiple sources of data. It is 'aimed at producing an understanding of the context of the information system, and the process whereby the information system influences and is influenced by the context' (Walsham, 1993, 4ff). The context includes the organizational, social structures in the minds of the human participants involved in designing and using information systems and e-services. The process describes the dynamics of the transformation and changes in the perception and meaning over time. Interpretive research is according to Walsham (1995, 378) a better approach to study information systems in organisations. However, it is still in its infancy compared to other disciplines and is forming its network of IS researchers (Walsham, 1995, 376) and therefore the research leans also on more mature methods from other disciplines with similar challenges (e.g. Lincoln and Guba, 1985; 1990).

The approach taken is interpretive as a specific stance of qualitative research. Qualitative research is the most adequate and efficient way to obtain the type of information required for achieving the desired results. Since access to qualitative data was easier this formed a further favourable argument for this research area.

The author chose an interpretive, qualitative and inductive approach based on its fit with the research question and on the belief that its epistemological view and methods are far more promising to deliver meaningful results than experiments for an emerging phenomenon in socio-technical systems. In a similar vein Glaser and Strauss (1967) call it speculative theory, if hypothesis testing or logio-deductive approaches are applied to the study of concurrent phenomena with little profound previous work. Also, emerging phenomena are not a good basis for quantitative and especially statistical mathematic operations since words, motivations and meanings are under constant change. An example is the term e-service itself, which is used for many not overlapping meanings (see ch. 2). Qualitative research instead uses qualitative data, such as interviews, documents, and participant observation, to understand and explain social phenomena. Kaplan and Maxwell (1994) argue that the goal of understanding a phenomenon from the point of view of the participants and its particular social and institutional context is largely lost when textual data are quantified (Meyers, 2003). A further limitation to use quantitative approaches was the lack of statistically relevant numbers of e-services to rely on statistical significance and validity. Combined with the potential danger of losing insights due to averaging effects the positivist approach in its quantitative statistical form was declined.

A summary of the reasons why a positivist approach was considered as less suitable is:

- First, the concept of e-services was too novel, under researched, and emergent to define a set of predefined variables and stable hypotheses. The research mode of induction required and open focus due to lack of ex-ante research structures.
- Second, the sampling would have been too small to conduct a statistically significant study since only a limited amount of heterogeneous sources for data gathering were available.
Bibliography

- The focus of the research is too complex and multi-faceted to be captured in a strictly pre-defined design. No allowances for changes, emergent issues and iterative cycles would have limited the findings.
- Socio-technical nature with a high emphasis on user acceptance, meanings, values, and motivations.
- Uses an eclectic approach to theories that is best suited for inter-organisational settings (Sydow, 1992).

The axioms of interpretive research or naturalistic inquiry as termed by Lincoln and Guba (1985) focus on the social component of information systems research. They strongly recommend that the researcher accepts the underlying assumptions before commencing the research and data collection (see Lincoln and Guba, 1985). This is important to look at when the results should guide researchers and business practice. This section provided reasons why the interpretive, inductive and qualitative approach was chosen.

A.1.3 Role of Theory in Inductive Interpretive Research

Theory in interpretive tradition requires being interesting and meaningful to other readers. The goal is the creation of intersubjectively tested theoretical approaches, which are exposed through verbal and written discourse (see Walsham, 1993, 6). Theory can be compared, evaluated and improved when the context and findings are described in a rich yet concise form. Since theory is 'both a way of seeing and a way of not-seeing' (see Walsham, 1993, 6) multiple theories are applied since practice is guided by multiple theories if at all. Often these theories are not explicit theories but theories in use (cf. Lyytinen and Robey, 1999).

The approach taken is not a logico-deductive approach using ex-ante assumptions and hypothesis as this may lead to early closure due to the search for data that matches the theory. Instead the approach is that theory is generated from the data. Following Strauss and Corbin (1998, 15) who define theory as 'a set of well-developed concepts related through statements of relationship, which together constitute an integrated framework that can be used to explain or predict phenomena'; theory is seen as the result of structuring the data.

For the domain of sociology Glaser and Strauss (1967, 3) define the interrelated jobs of theory as (1) enable prediction and explanation of behaviour, (2) to be useful in theoretical advance in sociology, (3) to be usable in practical applications – prediction and explanation should be able to give the practitioner understanding and some control of situations; (4) to provide a perspective on behaviour and a stance to be taken toward data; and (5) to guide and provide a style for research on particular areas of behaviour. Theory should also be readily understandable to sociologist of any viewpoint, to students and to layman.' These principles are adapted to encompass the information systems and e-service elements.
Appendix A: Choice of Research Approach and Methodology

The difference of taking this lens on theory is that it cannot be completely refuted by more data or replaced. Popper's (1959, 42) criteria of falsification for good theory does only apply to post-positivistic research, since this kind of theory does not strive for universal validity. Instead of logically deduced theory, which may pick examples after the idea has occurred to extend the confirming power, research that builds on the principles of grounded theory is based on real data. The theory therefore is closely intertwined with the data itself and the theory generation processes.

The changes of data and context in socio-technical systems leads to an analogous perception of theory as a process (see Glaser and Strauss, 1967). It is perceived as an ever-developing entity, not as perfected product. Inductive research can be used to stimulate further research in similar contexts, compare or develop further concepts or procedures. The process of how the theory is generated is of high relevance since it is context dependent. In contrast to logico-deductive research interpretive research is closer to practice in content and words. Due to the active participation during the research process it is comparatively open and encompassing for evolving issues in the phenomenon under study. It is avoided to force data to apply to categories or properties that stem from another theory. This 'arouses the disbelief of both colleagues and laymen from the start' (see Glaser and Strauss, 1967, 37).

The approach based on case involvement via AR can only achieve the level of substantive theory instead of formal theory. Glaser and Strauss (1967, 32) define substantive theory as developed for a substantive or empirical area of inquiry. They counter position it against formal theory, which is developed for a formal or conceptual area of inquiry. Substantive theory is not 'blinded' by theory in terms of limiting the perception by focusing only of a few elements of the real world. Substantive theory is less generally applicable but has its foundation from the data analysed. Based on the findings of substantive theory formal theories can be developed. In this research only substantive theory is achievable. It can confirm formal or other substantive theory but is not a basis to build formal theory on its own. To accelerate the identification of concepts the author chose to complement existing experience with existing theory to gain an understanding of the phenomena. This pre-understanding was in accordance with Glaser and Strauss (1967) not used for positivist theory testing but to facilitate the generation of emergent substantive theory.

Theoretical sampling is used in substantive theory to analyse similar or different cases to validate the findings but it cannot achieve the level of a formal theory (cf. Strauss and Corbin, 1998).
A.2. Value of Research Results

The value of research in the interpretive tradition of socio-technical systems and its criterion for progress are assessed by the practical problem-solving capabilities of its models, concepts and instructions for action (see Ulrich, 1984b, 178). The research does not aim for the discovery of general laws (nomothetic) but is more concerned with the uniqueness of each particular situation (idiographic) (see Meyers, 2003).

In contrast to positivist research with an ex-ante fixed research design and theory to be falsified or confirmed, interpretive research operates in open systems where unassailable trustworthiness is not possible. ‘No amount of member checking, triangulation, persistent observation, auditing or whatever can ever compel, it can at best persuade’ (see Lincoln and Guba, 1985, 329). A theory in the sense of grounded theory enables the reader not only to understand a phenomenon but also ‘to explain and predict events, thereby providing guides to action’ (see Strauss and Corbin, 1998, 25). This is in line with Ulrich (1970) who sees the research goal for applied science to support and facilitate the design of business reality. He pertains that research should ‘focus on understanding practical situations, decision and action alternatives in order to generate future-oriented concepts and design recommendations for meaningful practical action’. Theory development based on data ‘can usually not be completely refuted by more data or replaced by other theory (...) since it is too intimately linked to data’ (see Glaser and Strauss, 1967, 4). Theory is derived from data and ‘a single case can indicate a general conceptual category or property; a few more cases can confirm the indication’ (see Glaser and Strauss, 1967, 30). The contribution to theory building differs from the positivistic cause and effect relation (cf. Hempel and Oppenheim, 1948) towards an explorative and socio-technical approach (cf. Mumford, 1994). Following Strauss and Corbin (1998, 15) who define theory as ‘a set of well-developed concepts related through statements of relationship, which together constitute an integrated framework that can be used to explain or predict phenomena’, theory is seen as the result of structuring the data.

From these particular situations researched the explanatory power is used to ‘explain what might happen in given situations’ (Strauss and Corbin, 1998, 267). The results on an aggregated level are the following:

- First, the identification of explanations for failures and hurdles to adopt e-services sets the basis for the further analysis. It focuses on the social construction of e-services in the CXT context and is triangulated by additional case studies. Not all relevant participants were explicitly confronted with the elaborated deficiencies and dysfunctional situations and properties. This is the case since these results were elaborated after active involvement with CXT and a reorganisation process prevented ex-post access to the former key decision makers.
Appendix A: Choice of Research Approach and Methodology

- Second, the elaboration of concepts describes the life-cycle of e-services in their specific context. This result is defining the phenomenon of e-services for the chosen context and time. Concepts are used as generic term, which forms building blocks of a theory. They are specified by defining categories, properties of categories, dimensions and subcategories (Strauss and Corbin, 1998, 101).

- Third, based on the concept development theorising is seen as an 'act of constructing from data an explanatory scheme that systematically integrates various concepts through statements of relationship' (Strauss and Corbin, 1998, 25). It provides a conceptual ordering and adds a process component. Theorising is done via techniques representing the elaboration of results, which were tested in application specific contexts in reality. Techniques are ways to improve the understanding, share meanings about e-services, offer procedural steps and thereby improve the development and use of e-services. This contribution applies to academia and business practice. The academic value lies in the linking of categories used to describe e-services in order to build substantive theory. The business value lies in proposing guides to action if the reader identifies similar context factors and challenges.

- Fourth, an assessment of existing literature in failures, business concepts and innovation for B2B procurement processes based on the case studies is given. This contribution closes the discussion by comparing and applying more general formal theories ad indicated in chapter 2 and additional ones to the case study data and the elaborated substantive theory.

A higher level of analytical generalisation was attempted by identifying the degree of replication through cross-case analysis (see Yin, 1994, 45). The advantages of the approach are:

- A higher degree of confidence in the findings can be achieved through the analysis of similar or contrasting cases.

- New facets of the same case or within other cases were identified.

The fallacy of 'over generalisations' due to analysis of multiple cases on 'a high levels of inference, aggregating out the local webs of causality, and ending with a smooth set of generalisations that may not apply to any single case' is avoided (Huberman and Miles, 1998). To avoid this fallacy a strategy called 'stacking comparable cases' by Miles and Hubermann (1994, 176) is applied.

The value of research can be assessed on several levels as proposed by Strauss and Corbin (1998, 268):

1. The validity, reliability and credibility of the data,
2. The theory itself,
3. The adequacy of the research process and
The empirical grounding of the research.

The theory itself can only be evaluated by the reader. The explanation of the research process (3) as well as the empirical basis (4) are covered in chapter 3. The coverage of the first level is ensuing (see Figure Appendix A-5).

To summarise, the value of the research lies in structuring and presenting concepts and techniques, which were triangulated by multiple sources within the action-research based CXT case and additional (rival) case studies. This process also helped to achieve a high level of validity and trustworthiness into the results. The value lies in a rich description of the conditions and inter-personal interpretation to lead to meaningful insights for academia and potentially to actions for the business practice reader. However, it must be stressed that the insights are not law-like but require the reader’s context knowledge to adapt to specific situations. The application and extension of the D&M’92 Model applies existing theory to the field of e-services. It supports the elaboration of the nature of success for e-services and the relationships between the dimensions. The process model logic is applied which is corroborated by Markus and Robey (1988) who recommend it for IT-based change contexts. The degree of certainty can only be a high likelihood that the relations can be similar in different but comparable contexts.

Inferences about e-services from the case studies and especially the single case of CXT are based on an interpretive epistemological stance. In accordance with Walsham (1993, 15) it can be maintained that the 'validity of an extrapolation from one or more individual cases depends not on the representativeness of such cases in a statistical sense, but on the plausibility and cogency of the logical reasoning used in describing the results from the cases, and in drawing conclusions from them'.

To meet the value criteria of qualitative action research using an interpretive approach, the argumentation of Lincoln and Guba (1985, 328) can be applied. They refute the quantitative criteria of trustworthiness, which includes internal and external validity, reliability and objectivity, due to the inherent inability of the chosen approach to deliver reproducible results that can be found in experiment settings of positivistic research. Instead, they propose the following criteria, which are also used by Hirschmann (1986) to assess interpretive research (see Figure Appendix A-2).
Appendix A: Choice of Research Approach and Methodology

<table>
<thead>
<tr>
<th>Criterion Area</th>
<th>Technique</th>
<th>Sub-technique</th>
<th>Goal Achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credibility</td>
<td>Activities to increase the probability of high credibility</td>
<td>Prolonged engagement</td>
<td>Yes (18 months at CXT)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Persistent observation</td>
<td>Yes (permanently within the 18 months)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Triangulation</td>
<td>Yes (multiple sources, methods, investigators &amp; theories)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Peer debriefing</td>
<td>Yes (within the competence centre work in St. Gall)</td>
</tr>
<tr>
<td></td>
<td>Native case analysis</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Referential adequacy</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Member checks (in process and terminal)</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Transferability</td>
<td>Thick description</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Dependability</td>
<td>Dependability audit</td>
<td></td>
<td>n/a for a Ph.D.</td>
</tr>
<tr>
<td>Confirmability</td>
<td>Confirmanability audit</td>
<td></td>
<td>n/a for a Ph.D before examination</td>
</tr>
</tbody>
</table>

Figure Appendix A-2: Validity of the research

The credibility was achieved by the contributors and interviewees who checked the research validity, however, more important is to achieve credibility for the reader. This is possible through meeting the criteria of Figure Appendix A-2 and presenting extensive descriptions of cases and background information. If it is acceptable that absolute unassailability is not achievable, a high goal achievement in most of the criteria has been achieved, with exception to the dependability and conformability which are not applicable.

The results of the research are subject to a limited transferability, since any results and observations are inevitably time and context dependent. This holds even truer for fast changing environments like that of e-services. However, some ‘contingencies’ that allow sound presumptions as to where future development areas will be, some evidence as to how far certain developments realistically have come, what their potential is, and how they could be applied was achieved. Instead of designing artificial and reproducible settings, the research strived to influence the natural situation from within. Based on the reflections on the data and literature guides for future research were presented. These are the: (1) e-service framework, (2) e-service types, (3) e-service concepts, (4) e-service provider life cycle, (5) e-service innovation and customer service life-cycle, (6) techniques, the (7) e-service success model, (8) e-service choice model and emerging results. The relationships between the results were explained as they were apparent in the CXT case.
Appendix B: Data Sources and Interviews

Phase 1 included several topics to define the research area (see Figure Appendix B-1).

<table>
<thead>
<tr>
<th>Time span</th>
<th>Practice Partner</th>
<th>Main Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>08/1998-04/1999</td>
<td>Deutsche Telekom AG</td>
<td>E-procurement system evaluation and configuration</td>
</tr>
<tr>
<td>05/1999-07/2000</td>
<td>Deutsche Telekom AG</td>
<td>Architecture enhancements for e-business</td>
</tr>
<tr>
<td>02/1999-09/2000</td>
<td>HiServ (now HP)</td>
<td>Business concept design</td>
</tr>
<tr>
<td>05/1999-06/2000</td>
<td>HiServ (now HP)</td>
<td>E-service offering for e-markets</td>
</tr>
<tr>
<td>11/1999</td>
<td>HiServ (now HP)</td>
<td>Networkability assessment</td>
</tr>
<tr>
<td>03/2000</td>
<td>International automotive producer</td>
<td>Procurement strategy implementation</td>
</tr>
</tbody>
</table>

Figure Appendix B-1: Overview of initial studies with AR-based involvement

The research project partners (see Figure Appendix B-2) within phase 2 were:

<table>
<thead>
<tr>
<th>Time Span</th>
<th>Name</th>
<th>Main Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>08/2000-02/2001</td>
<td>CXT AG</td>
<td>e-service invention and service development process</td>
</tr>
<tr>
<td>05/2001-08/2001</td>
<td>CXT AG</td>
<td>Business concept and vendor selection for e-logistics</td>
</tr>
<tr>
<td>02/2001-03/2001</td>
<td>Huber+Suhner AG</td>
<td>ASP e-procurement solution success story</td>
</tr>
<tr>
<td>03/2001-06/2001</td>
<td>CXT AG</td>
<td>Business Document eXchange services</td>
</tr>
<tr>
<td>07/2001-09/2001</td>
<td>inet-Logistics</td>
<td>Integration of a logistics broker (4PL)</td>
</tr>
</tbody>
</table>

Figure Appendix B-2: Overview of main case studies with AR and case study-based involvement

The CXT case employs multiple data collection methods to allow for an internal triangulation between multiple sources (see Appendix B-3):

**Sources for Data Collection**
- Field notes of direct observations
- Project proposals and discussions with employees
- Project management with individuals or groups
- Researcher’s notes pertaining to the work in which he was involved (e.g. meeting notes, project presentations, reports)
- Several hundreds of documents, including memos, manuals, presentations, project plans, service descriptions, service development meeting protocols etc.
- Interviews (internal, customers, prospects, partners, market researchers)
- Surveys (e.g. Building Bridges Report (Joslin et al., 2001), managing e-service studies about CXT by studies of the Universities HSG (St. Gallen) and two MBA students of EAP (Paris)
- Several workshops organised to test or validate results internally
- Service development councils to institutionalise the e-service development process

Figure Appendix B-3: Overview on data sources
Appendix B: Data Sources and Interviews

Details on the interview partners in phase 3 (triangulation cases) are shown below:

<table>
<thead>
<tr>
<th>Time span</th>
<th>Name (country, industry)</th>
<th>Main Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 weeks</td>
<td>SIG (CH, manufacturing)</td>
<td>Infrastructure and collaboration effort with partners</td>
</tr>
<tr>
<td>4 weeks</td>
<td>Danzas (CH, transportation)</td>
<td>Approach of a logistics provider to e-services and e-business.</td>
</tr>
<tr>
<td>3 weeks</td>
<td>Tariffic (USA, international trade enabler)</td>
<td>Provider of an e-service</td>
</tr>
<tr>
<td>1 week</td>
<td>SGS (CH, inspection service)</td>
<td>Provider of an e-service</td>
</tr>
<tr>
<td>3 weeks</td>
<td>Chemical company (CH)</td>
<td>Potential user of e-procurement services</td>
</tr>
<tr>
<td>08/2001-10/2001</td>
<td>IBM Research (USA, contracting software provider)</td>
<td>Contracting e-services</td>
</tr>
<tr>
<td>4 weeks</td>
<td>Ariba (USA, e-procurement software provider)</td>
<td>Alternative business model for e-services of a competitor of Cl</td>
</tr>
<tr>
<td>1998-2001</td>
<td>CommerceOne (USA, e-procurement and e-service provider)</td>
<td>Software framework for e-services and provider of e-services</td>
</tr>
</tbody>
</table>

*Figure Appendix B-4: Overview of main cases with case study approach in 1999-2002*

Interview partners for semi-structure taped interviews of phase 4 (2003):

<table>
<thead>
<tr>
<th>Company</th>
<th>Company Role</th>
<th>Interviewee</th>
<th>Functional Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Click2procure</td>
<td>Procurement e-market provider</td>
<td>Mr. Nenninger</td>
<td>Vice President Siemens Buyside Marketplace</td>
</tr>
<tr>
<td>UBS</td>
<td>CXT e-market customer</td>
<td>Mr. Mikeler</td>
<td>Project Manager</td>
</tr>
<tr>
<td>Huber+Suhner</td>
<td>CXT ASP e-procurement customer</td>
<td>Dr. Hofstetter</td>
<td>Head of Corporate Purchasing</td>
</tr>
<tr>
<td>LB Logistikbetriebe</td>
<td>CXT e-market supplier</td>
<td>Mr. Labhardt</td>
<td>IT Manager</td>
</tr>
<tr>
<td>Brütsch-Rüegger</td>
<td>CXT e-market supplier</td>
<td>Mr. Yurtsever</td>
<td>Key Account Sales (2 interviews)</td>
</tr>
<tr>
<td>Brütsch-Rüegger</td>
<td>CXT e-market supplier</td>
<td>Mr. Wirth</td>
<td>CIO</td>
</tr>
<tr>
<td>SeetalSchaller</td>
<td>CXT e-market supplier</td>
<td>Mr. Widmer</td>
<td>Key Account Sales</td>
</tr>
<tr>
<td>Ex-CXT</td>
<td>E-market provider</td>
<td>Mr. Burger</td>
<td>Head of Business Development</td>
</tr>
<tr>
<td>E-trade</td>
<td>E-market provider</td>
<td>Dr. Steiner</td>
<td>Head of E-trade</td>
</tr>
</tbody>
</table>

*Figure Appendix B-5: Overview of interviews in 2003*
Appendix B: Data Sources and Interviews

Several cases are analysed according to a similar scheme, which was driven by a set of standard questions as shown in Figure Appendix B-6. There has been allowance for emergent subjects during interviews. The cases were analysed with the NVivo software. The questionnaire for customers of CXT is presented below:

<table>
<thead>
<tr>
<th>Main Subjects of the Questionnaire</th>
</tr>
</thead>
<tbody>
<tr>
<td>What were your expectations?</td>
</tr>
<tr>
<td>What were your project objectives?</td>
</tr>
<tr>
<td>How did you perceive the performance of CXT within time?</td>
</tr>
<tr>
<td>What were your main benefits?</td>
</tr>
<tr>
<td>How did CXT sell the solution?</td>
</tr>
<tr>
<td>How did the relationship with CXT evolve?</td>
</tr>
<tr>
<td>Were you offered additional services?</td>
</tr>
<tr>
<td>What is a business model for you?</td>
</tr>
<tr>
<td>What is your IT architecture?</td>
</tr>
<tr>
<td>How were services delivered and used?</td>
</tr>
<tr>
<td>System quality?</td>
</tr>
<tr>
<td>Information quality?</td>
</tr>
<tr>
<td>Service quality (new dimension)?</td>
</tr>
<tr>
<td>Use?</td>
</tr>
<tr>
<td>How are your user acceptance, user desires and user expectation?</td>
</tr>
<tr>
<td>Level of user satisfaction?</td>
</tr>
<tr>
<td>Individual impact?</td>
</tr>
<tr>
<td>Organisational impact?</td>
</tr>
<tr>
<td>What is your acceptance of e-services or IS outsourcing in general?</td>
</tr>
<tr>
<td>What are/were your benefits?</td>
</tr>
<tr>
<td>Changes (requirements, planned or unplanned changes)?</td>
</tr>
<tr>
<td>Politics (internal politics: sponsor, barriers, opposition)?</td>
</tr>
<tr>
<td>Results of using the service (esp. economic impact)?</td>
</tr>
</tbody>
</table>

Figure Appendix B-6: Overview on the questions for the interviews with CXT’s customers

The interview with the rival case Siemens Click2Procure is depicted below:

<table>
<thead>
<tr>
<th>No.</th>
<th>Category</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Current Situation?</td>
<td>What is your responsibility?</td>
</tr>
<tr>
<td>2</td>
<td>Current Situation?</td>
<td>What is your organisational form?</td>
</tr>
<tr>
<td>3</td>
<td>Current Situation?</td>
<td>How did the eMarket evolve?</td>
</tr>
<tr>
<td>4</td>
<td>Current Situation?</td>
<td>Which products and services do you offer?</td>
</tr>
<tr>
<td>5</td>
<td>Business Concept</td>
<td>What is a business model for you?</td>
</tr>
<tr>
<td>6</td>
<td>Business Concept</td>
<td>What was the business model of your company? Which components?</td>
</tr>
<tr>
<td>7</td>
<td>Business Concept</td>
<td>What is a business case for you? Which components?</td>
</tr>
<tr>
<td>8</td>
<td>Business Concept</td>
<td>What is the SPLS/Siemens procurement strategy?</td>
</tr>
<tr>
<td>9</td>
<td>History of Marketing &amp; Sales</td>
<td>How do you win customers?</td>
</tr>
<tr>
<td>10</td>
<td>e-services?</td>
<td>What was the key value proposition? How did it evolve?</td>
</tr>
<tr>
<td>11</td>
<td>Assessment of e-services?</td>
<td>What are e-services for you?</td>
</tr>
<tr>
<td>12</td>
<td>Assessment of e-services?</td>
<td>How do you see catalog services?</td>
</tr>
<tr>
<td>13</td>
<td>Assessment of e-services?</td>
<td>How do you see auction services?</td>
</tr>
<tr>
<td>14</td>
<td>Assessment of e-services?</td>
<td>Do you see a future revenue potential in WebServices?</td>
</tr>
<tr>
<td>15</td>
<td>Assessment of future e-services?</td>
<td>Which major categories exist?</td>
</tr>
<tr>
<td>16</td>
<td>Assessment of future e-services?</td>
<td>Will they be a major revenue generator in the future?</td>
</tr>
<tr>
<td>17</td>
<td>Assessment of future e-services?</td>
<td>How do you invent, innovate and introduce new services?</td>
</tr>
<tr>
<td>18</td>
<td>Assessment of future e-services?</td>
<td>Which method or standard procedure do you use to evaluate e-services?</td>
</tr>
<tr>
<td>19</td>
<td>Surprising learnings?</td>
<td>Which surprises / disappointments?</td>
</tr>
</tbody>
</table>

Figure Appendix B-7: List of questions for the interview with Siemens Buyside Marketplace

(2.07.2003)
Appendix C: Comparison of Product & Information Characteristics

The different nature of information and physical resources provides insights into the different mechanisms and rules of the Information economy (Martiny and Klotz, 1989; Krcmar, 1997; Choi et al., 1997). Figure Appendix C-1 lists the different characteristics.

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Material resources</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Value</strong></td>
<td>High cost of reproduction</td>
<td>Little reproduction costs (Choi et al., 1997)</td>
</tr>
<tr>
<td></td>
<td>Marginal costs tend to equal average costs</td>
<td>Marginal costs close to zero, but high fixed costs to produce information</td>
</tr>
<tr>
<td></td>
<td>Price or value are objective</td>
<td>Price or value are subjective</td>
</tr>
<tr>
<td></td>
<td>Loss of value through use</td>
<td>Gain of value through use</td>
</tr>
<tr>
<td></td>
<td>Loss of value when shared</td>
<td>Gain of value when shared</td>
</tr>
<tr>
<td></td>
<td>Price building proven</td>
<td>Price building largely unknown</td>
</tr>
<tr>
<td></td>
<td>Cost transparent</td>
<td>Costs difficult to measure</td>
</tr>
<tr>
<td><strong>Output</strong></td>
<td>Identification and protection</td>
<td>Difficulties in protecting it</td>
</tr>
<tr>
<td></td>
<td>Individual possession</td>
<td>Multiple possession possible</td>
</tr>
<tr>
<td></td>
<td>Difficult to distribute</td>
<td>Easy to distribute (almost with the speed of light and unlimited addresses)</td>
</tr>
<tr>
<td></td>
<td>Assessment of inventory</td>
<td>Difficulties assessing the value of information</td>
</tr>
<tr>
<td><strong>Status of scientific research</strong></td>
<td>Proven theory (cost accounting and production models).</td>
<td>Theory and model deficit</td>
</tr>
</tbody>
</table>

*Figure Appendix C-1: Differences between material resources and information*
Appendix D: Procurement Process Overview and Power

D.1. Strategic Procurement

The scope setting activities start with an analysis of the procurement vision covering the procurement’s self-image, policy on working together with internal and external customers, and ethical regulations (see Boutellier and Locker, 1998, 12). It is crucial to achieve the alignment of corporate goals with purchasing performance.

The procurement strategy defines the procurement organisation within the continuum of decentral and central, defines strategic programs that contain decisions about internal resources, partnerships and future directions to stay competitive and be able to develop, design activities and methods how to solve problems and challenges (see Bleicher, 1996a, 81).

The process oriented part of strategic procurement starts with a permanent activity of supply market analysis and monitoring. It is a general screening activity required to be able to make sound procurement decisions and bring in innovations from the supply market (cf. Hamm, 1998).

The strategic sourcing describes based on the internal resources, strategies of the business unit, corporate strategy and partner strategies specific make, buy or partner decisions. If buy or partner decisions are made, the identification and selection of suppliers follow.

Supplier Relationship Management is an ongoing activity that secures the contract fulfilment. The strategic procurement process is supported by a process management and reporting system (see Pampel, 1999, 565; Braunstetter and Hasenstab, 2001, 508). These elements set the environment for specific strategic procurement decisions (see Figure Appendix D-1).

Strategic Procurement Activities (Norms & Guidelines)

- Procurement Vision & Policy
- Procurement Strategy
  - Organisation
  - Strategic Programs
  - Problem Solving

Strategic & Tactical Procurement Processes

- Process Management
- Supply Market Analysis & Monitoring
- Strategic Sourcing
  - Identification
  - Selection
- Category Management
- Supplier Relationship Management

Figure Appendix D-1: Strategic procurement

The strategic sourcing can be best understood as small projects that follow the process depicted in Figure Appendix D-2 according to Patterson and Amman (2000).
Depending on the type of company and input required the procurement processes vary. A broad classification of production types discerns between mass production, small series, and custom order production. Each of them has different procurement requirements and the procurement activity may start at different stages. The same is true for service organisations.

Based on generic processes that require adaptations depending on the specific procurement situation, the sourcing processes for online-auctions, catalogue buying, procurement of direct production inputs, and services will be briefly described.

### D.2. Operative Sourcing: Dynamic Trading or Online-Auction

The dynamic trading process fulfils a small step in the procurement process. A company can potentially use it for any type of input to negotiate price and/or other contract elements. However, it is best suited for inputs that fit into the following three broad categories (Klein, 2000):

- Commodities in order to increase transparency and enable ad hoc price determination
- Perishable products (e.g. airline seats) to maintain a specific price level within the traditional channel for a specific customer group
- Goods of limited availability (e.g. fine arts, communication frequencies)

The relationship configurations this process supports best are characterized by intentionally one to many or many to many relationships. With the term dynamic trading one can summarize the following processes:

- Tenders which can be invited in two ways (see Brenner et al. 2000, 116) as a concealed and single transaction (traditional tender) or an open one where suppliers can see the prices and have multiple bids (reverse auction)
- Forward auction: Typically, a seller has excess goods or very standardized products, which are offered to buyers.
- Exchanges: A many-to-many situation applies for goods and services that can be traded in a similar way as financial exchanges operate. Characteristics for exchanges are that the products or services are highly standardized, are traded in big quantities, and many buyers and suppliers participate.

The scope can be extended with the availability of multi-attribute bidding of recent auction software, which allows more than one goal and multiple elements within one auction. A configuration of a reverse auction process shows an electronic auction supported via CXT as third
Appendix D: Procurement Process Overview and Power

party e-service provider. The third party owns and runs the software and provides training and support services during the reverse auction (see Figure Appendix D-3).

![Figure Appendix D-3: Reverse auction process via intermediary](image)

D.3. Operative Sourcing: Catalogue Buying

This process is used for products that benefit from a catalogue representation. Potential benefits are price comparisons and decentralized choices. It can be implemented as one-to-one as well as one-to-many relationship, if comparisons are allowed. The goals are increased transparency, streamlined processes, and low failure rates. From a buyer perspective efficiency goals are dominant. From a supplier's perspective increased sales and a stable relationship are the dominant goals. Catalogue buying has been first used to support the procurement of MRO and office supplies, which can be characterized as unplanned, fixed suppliers, catalogueable.

The three types of catalogue management that are most common are (see Brenner et al. 2000, 118) supplier-based, intermediate-based, and buyer-based. By adding the stability of the buyer-supplier relationship Figure Appendix D-4 summarizes the different options.

![Figure Appendix D-4: Catalogue buying variants](image)

Determining factors are who procures, how stable the relationship is, what the goals are, and what the power relationship is. One example is a stable, long-term procurement need, with a choice of suppliers on best price. The buyer procures his goods decentrally via a catalogue at the buyer’s side due to integration requirements. If the goal is to identify and compare new suppliers, based on a trusted catalogue provider or other trusted third parties to be able to trust in their ability to deliver the promised goods the dynamic, multi-supplier catalogue is the best
suited. Figure Appendix D-5 depicts a generic process for catalogue buying following (Dolmetsch, 2000, 131).

A more holistic process will include suppliers and may include intermediaries, e-service providers, and fulfilment partners.

D.4. Operative Sourcing: Direct Production Goods

The early use of production planning systems and EDI connections with strategic suppliers is increasingly extended towards collaborative design and planning.

We suggest a simplified process in Figure Appendix D-6 where the buyer selects the supplier selection in an early stage. Alternative processes would include request-for-proposal processes in parallel to the collaborative engineering and design processes. It is a characteristic of the process that it is less standardized than the MRO goods procurement process.

We define collaborative processes for direct production goods as coordinated effort of people or organisations to define and/or produce a collaboratively defined output. It involves a shared management of resources, co-destiny, trust and intensive exchange of information. It can be characterized by linking core competencies via an infrastructure that increasingly resembles in-house intensity of information exchange (cf. Semlinger, 1993).

The dominant goals of sourcing plannable direct goods is to reduce procurement risks, synchronize supply chains, to learn from the partner, or to increase the competitive advantage for both parties by co-evolution or gaining market dominance via co-option (see Doz and Hamel, 1998, 36). In contrast the procurement process of MRO goods focuses on process efficiency and product prices. The main characteristic of the procurement process for direct goods is that it is plannable demand which is automatically generated from the buyer’s production planning
or advanced planning system. It is dependent on the sales processes and is often performed logically centralized by a few specialists.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Collaborative e-procurement (close partnership)</th>
<th>Indirect/MRO e-procurement (limited partnership)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operative Order</td>
<td>MRPII, APS</td>
<td>Catalogues</td>
</tr>
<tr>
<td>Design</td>
<td>Collaborative build or engineer to order</td>
<td>Only mass customizing</td>
</tr>
<tr>
<td>Forecasted</td>
<td>YES</td>
<td>Rarely/difficult</td>
</tr>
<tr>
<td>Planning</td>
<td>YES</td>
<td>Only rough yearly numbers</td>
</tr>
<tr>
<td>Order frequency</td>
<td>Scheduled</td>
<td>Unscheduled</td>
</tr>
<tr>
<td>Average value</td>
<td>&gt; $5000</td>
<td>&lt;$2500</td>
</tr>
<tr>
<td>Transit Mode</td>
<td>TL, Rail, LTL</td>
<td>LTL, Parcel, Air Express</td>
</tr>
<tr>
<td>Number of Suppliers</td>
<td>&lt; 250</td>
<td>&gt; 5000</td>
</tr>
<tr>
<td>% of expenditures</td>
<td>&gt; 80%</td>
<td>&lt; 20%</td>
</tr>
<tr>
<td>% of transactions</td>
<td>&lt; 20%</td>
<td>&gt; 80%</td>
</tr>
<tr>
<td>Administration cost</td>
<td>&lt; 0.5%</td>
<td>&gt; 25%</td>
</tr>
<tr>
<td>as % of material cost</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Goals</td>
<td>Competitive advantage in the core output</td>
<td>Increase of process efficiency and outsourcing of non-core activities.</td>
</tr>
</tbody>
</table>

Figure Appendix D-7: Difference between the two ends of the continuum

Between those two extremes depicted in Figure Appendix D-7 there is a myriad of hybrid forms shaped by the power relationship, the procurement goals, and the type of goods that shape the process that is required.

The process is often characterized in a one-to-one relationship when considering highly specific or custom made products. Many-to-many relationships for commodity goods like raw materials are possible, but often manufacturers rely for quality reasons only on a few suppliers. Planned production products and services imply often a more complex relationship, high quality standards, high trust levels, and higher information intensity. Due to their frequent one-to-one character (e.g. Bosch as a supplier to many car manufactures) integration with an e-market is not necessarily required. However, it could be beneficial in terms of reduction of integration costs (cf. Buxmann, 1996) or a mega buyer or a consortium of buyers (e.g. Covisint) requires its supplier to use a certain exchange to minimize risks, achieve a strategic advantage, and be able to integrate SMEs.

Process variants of closer collaboration between buyers and suppliers are vendor managed inventory, collaborative planning and forecasting in the consumer goods industry. Often the more powerful actor uses its position to increase the switching costs. An example is the automotive industry (cf. Semlinger, 1993).

D.5. Operative Sourcing: Services

A further specification is to include the procurement of services. Since the requirements for services pose an additional challenge due to the different nature of services (see ch. 2.3). Ser-
Appendix D: Procurement Process Overview and Power

Services are often customer specific and involve the use of an external factor, which influences the design of the process.

An example is the requirement of a manufacturing company to procure painting services via the e-procurement system. This helps the company to fulfill its role as a general contractor for specific tasks. The challenge is that the amount of work varies and an availability check has to be included.

D.6. Retirement Phase

In this phase the after sales service processes or maintenance service for facilities, plant equipment or software (e.g. training or automated upgrades via intraware).

D.7. Process Management

Without an efficient process management and business intelligence information buyers hardly reap the full potential of an e-procurement processes. Providers like inforay.com can provide additional value add to track the information from diverse sources.

D.8. Power and Politics in E-Procurement

D.8.1 Power Shaping E-procurement Relationships

New intermediaries such as information brokers or electronic markets open new potentials for efficiencies or enable completely new business models. Similarly new e-services can change the procurement process and the power relations. One of the main goals for successful e-business ventures is to establish the critical mass and realization of positive network effects in order to have the power to change the current status (Shapiro and Varian, 1999). Especially challengers and specifically small start-ups need to achieve this in order to be able to challenge the position and power of an incumbent. The concept of power bases (French and Raven, 1968), or sources of power (cf. Pfeffer, 1992, Thorelli, 1986) and its application to procurement processes (Farrell and Schroder, 1999) are antecedents to define influence strategies to achieve desired objectives (Venkatesh et al., 1995). Inter-organisational power constitutes from a combination of the following power bases:

Position power: Power that comes from an actor's position in a particular network of relationships and the power it can give him to manipulate and mobilize resources (see Hosking and Moreley, 1991, 142). A company with a high position power can influence its business network to accept a specific business practice like a specific data exchange standard.

Power bases are the history, reputation, brand, size, ecosystem and relative competitive position towards partners and competitors. Covisint is an example of an e-market formed by five leading automotive companies, who intended to increase their position power by
forming this consortium. Within an organisation these power bases are the position, market share, affiliated rights, agreed values and processes.

**Legitimate power:** Power derived from a formal authority like anti-trust organisations or (supra-) national government institutions. Power bases are national or international law defined by regulatory authorities or the normative power of associations.

**Expert power:** (Believed) Knowledge, skills, experience of a person or an organisation. Power bases are special domain knowledge or capabilities that are relevant for other actors.

**Reward and coercive power:** Power that arises within closed groups, such as a consortium, a stable supply chain or an oligopoly, where the members have to comply with specific rules and are rewarded or punished accordingly. Another source could be an oligopoly where a market dominating partner can indirectly influence the behaviour of other supply chain partners. An example would be a standard to become a supply chain partner. Providers can be private exchanges where a consortium of companies forms an intermediate. Power bases: group rules, regulations or market share.

**Business model power:** Potential to influence another organisation through a superior business model and its penetration in the market. It should apply to most start-up companies since they do not hold position power. Power bases: capability to innovate, know-how, communication and implementation skills.

**Information power** exists when an actor has or is perceived to have special information that other actors desire. This is a source for intermediaries. However electronic intermediaries have to cope with the positive or negative effects of the information paradox (cf. Wigand et al., 1997) which might weaken the power base, if information is freely available from other sources or once revealed there is no willingness to pay. Power bases: information possession or access to information.

**Networking power:** People or organisations with perceived privileged connection to powerful individuals or organisations. This facilitates the use of resources that one does not own and increases the flexibility to react to changes. Power bases are: personal contacts, ability to form new contacts, and ability to work with networks and understand how they are different from traditional relationships.

The power bases are applied to the supply chain but are not limited to this area. The position power and the possible influence strategies can help to understand why different possible supply chain configurations are maintained and what would be required to change them. The other sources of power are of interest to explain why a business network has evolved in a specific form and how it may be changed. The five types are Buyer-driven (N:1), Buyer-consortium-driven (few:1:M), neutral Market Maker-driven (N:1:M), Supplier-consortium-driven (N:1:few), Supplier-driven (1:M) (cf. Kaplan and Sawhney, 2000; Ovum, 2000).
Figure Appendix D-8 shows 1:m and n:1 as one legal entity with its own e-market and few:1:m and n:1:few as a consortium with a 3rd party offering the e-market.

Figure Appendix D-8: Overview on possible configuration of relationships

An example of a buyer-driven relationship is the example of Covisint (n:1:few). The consortium of automotive manufacturers intended to increase its power base against suppliers and share a common infrastructure (www.covisint.com). An example for supplier-driven e-markets is the consortium of OEM manufacturers (www.e2open.com) who want to ease their collaboration to meet buyers and distributors needs (few:1:m). Depending on the power basis of the relevant actors, different models might apply which would have implications on possible business models, the supply chain processes and e-services required. Another influencing factor is the existing dyad type (e.g. supplier-retailer-consumer or supplier-wholesaler-retailer-consumer), which define different types of actors. Nakayama (2000) has addressed the impact of EDI on bargaining power in the grocery industry. He found out that wholesalers perceive to lose their bargaining power when using EDI with their suppliers due to a loss in information power. However wholesalers gained power if prices were cheaper and the added services with the use of EDI like more accurate information or coordination of shipping were included. A further insight from the grocery industry was that an increase of power related positively with increased trust and cooperation through the exchange of EDI documents.

Farrell and Schroder (1999) defined influence strategies of exchange coalitions, personal appeals, inspirational appeals, legitimating pressure, rational persuasions and consultation. Applications of these influence strategies can be to use power to exchange against other rewards or information (exchange coalition), to pressure other actor(s) by legitimate power or rewards (personal appeals), to address the others’ enthusiasm by appealing to the values and aspirations (inspirational appeals) by using referent power. Similarly referent power may be used to appeal to feelings of loyalty and friendship (personal appeals). The use of legitimate power may result claiming authority or consistency with organisational policies, practices and coalitions (legitimating). Another influence strategy based on legitimate power is to exercise power by demands, threats, frequent checking or persistent reminders (pressure). Expert power may be used to use logic and evidence to persuade others (rational persuasion). Expert power or legitimate power may be exercised by involving others to achieve the desired outcome (consultation).
Appendix D: Procurement Process Overview and Power

The above influence strategies are examples for influence tactics to change another actor’s attitudes, beliefs, values or behaviours and one’s own power base. The outcome of the influence strategies may vary in attitude from internationalisation, identification, and in behaviour from compliance to resistance.

### D.8.2 Use of Power in Information Systems and e-services

Cooper and Zmund (1990) found that political and learning models are more useful than rational models for understanding the process of introducing IS or the organisational impact from IS implementation. The concept is widely discussed in the IS Research (cf. Jasperson et al., 2002). Within the interpretive paradigm they discern organisational and emergent approaches. Within the emergent category (Markus, 1983) analysed the application of the concept of power in overcoming resistance to use information systems. Markus (1983) analysed the role of power from an implementer’s perspective when introducing MIS using a people, system and interaction theory perspective. Markus argues that the interaction perspective proved to be advantageous since it allows for more precise explanation, understanding and prediction of resistance to newly introduced information systems. Resistance is seen as a relative property and involves active disruption or removal of a system. Other courses of passive resistance are non use, ignorance, lack of training or fear to use the system. Markus identifies that an organisational subunit that gains control over data will accept new systems, one that loses control will likely resist.

Figure Appendix D-9 highlights the contingencies of an interaction theory perspective applied to a specific case. The resistance of a planned power shift can be reduced by purposeful political tactics like user involvement and a favourable initial power distribution.

![](image)

*Figure Appendix D-9: Political perspective of system implementations*

In analogy these insights can be extended towards e-services that provide information. Future adaptation and validation for e-services offering transaction or collaborative platform services may be required.
Appendix E: E-Service Concept Details

E.1. Role Specific Goals

E.1.1 Goals of Buyers

The goals of buyers are explained by two extremes of MRO products and services on the one end and strategic products and services on the other end. Buyers want to reduce total procurement costs (see Cater, 1999, 93) for MRO products and services (C-goods and services), which are non-production and not strategic. This includes the internal and external procurement process, storage, asset management, logistics costs, and total time consumed by the procurement process, including invoice consolidation, payment, and after-sales.

Means for meeting these goals are a streamlined acquisition process, decentralised access to e-procurement systems, and easy-to-use system as well as optimised business networks. The level of integration with ERP systems depends on company policies and systems used. It varies from solely financial systems integration to full integration, using the e-procurement software as a unified front-end. An ASP e-procurement solution, combined with e-services for catalogue management, logistics integration (e.g. express delivery), electronic payment, coupled with an efficient business intelligence service about these transactions, offers a potential solution to reduce the need for human involvement and capital investment. Croom and Johnston among others (cf. Dolmetsch, 2000, Aberdeen, 1999) stress the process compliance to avoid maverick buying and the user satisfaction with the e-procurement system as key goals (2003).

In the case of strategic inputs (A-goods and services), buyers have a greater need to minimise risks of input shortages. They can achieve this by carefully selecting and monitoring the suppliers in terms of in-time delivery and quality (see Cater, 1999, 94, Arnolds et al., 1998, 320), while still minimising the total cost of acquisition. Furthermore, the integration requirements are considerably higher as they aim to synchronise of the entire supply chain and to generate an advantage through partnering and increased flexibility. The transfer of design and planning information as well as complex production run results and forecasts between companies requires a high intensity of information exchange (Semlinger, 1993). The integration mode and potential for cost-efficient implementation determine the achievable level of integration between the trading partners involved. Supply chain management software from SAP or 12 can facilitate the exchange of inventory or planning data for high-end solutions. These applications reduce procurement cycle times and costs through a higher degree of automation, enforce procurement policies, and enable the aggregation of needs. Using e-services and applications to support processes that facilitate the identification and selection of suppliers and
increase the transparency can reduce acquisition costs in strategic sourcing processes. Qualitative improvements in the sourcing process range from identifying better suppliers to the reduction of the procurement cycle time (see Hofmann, 2001, 171). E-services can improve the integration, facilitate the information exchange, and offer quality assessment and control e-services (e.g. SGS on Site in ch. 6.4.1). Further, e-services can support the identification and assessment of suppliers and their capabilities.

E.1.2 Goals of Suppliers

Essential goals of the suppliers' sales process are to reduce sales costs, and increase the revenues, and increase customer retention (Hofmann, 2001, 169).

The quantitative efficiency goals of suppliers are process improvements leading to a reduction of sales costs. They can achieve this by reducing administration costs, identifying opportunities by means of improved information availability, and reducing the sales cycle time. E-services can help suppliers, for example, to outsource administrative tasks and increase the amount of quantity and improve the quality of information available by using external information e-services.

Suppliers can increase their effectiveness by widening the reach, breadth and depth of the e-business sales channel and by managing its unique characteristics efficiently. They aim at seizing cross-selling and up-selling potentials. These can be leveraged by partnering with complementary e-service providers or other suppliers. An example is a catalogue-based e-market that covers the needs of many buyers and increases the sales opportunities for all participating sellers by leveraging network effects. If suppliers are able to increase their business by selling large proportions via e-markets, then they can increase the positive effects of making more revenue with no or at least less than proportional costs. They can use e-services to outsource standardised software to ASPs like Cone trade's Supply Order Service. Further means of improvement for suppliers are to contract catalogue management and buyer assessment.

For direct goods, a closer integration facilitates the production or warehouse planning. High quality delivery processes support the customer retention. Collaborative design and planning processes further have the potential to improve the customer relationship. E-services such as shared planning or collaboration platforms can provide these benefits without requiring investments on both sides. The flexibility to react to customer demands can be increased if the information intensity measured by the frequency and breadth of documents exchanged is raised.
E.1.3 Goals of Intermediaries

For 'middlesmen', e-services provide a potential for increasing effectiveness by being able to offer new services to their existing community. Examples of intermediaries are e-markets, trading communities, wholesalers, and information brokers or infomediaries. They focus on the economies of scope and customer relationship management (see Hagel and Singer, 1999, 135). The goal of intermediaries is to increase their margin and consequently their revenue. They can achieve this by syndicating or re-selling information-based e-services (cf. Werbach, 2000) or by offering further process support. Intermediaries need to select those e-services which are applicable to the majority of their buyers and suppliers or ones which are highly valuable to specific customer segments. A second key goal is to increase customer retention and win new customers. To meet these goals intermediaries need to decide if they want to make, buy or cooperate to offer identified e-service to better achieve their key corporate goals.

At the same time, cost cutting is achievable if the intermediary can use e-services to become more efficient and increase its value to its customers. Examples could be infrastructure services for raising the level of trust in electronic transactions. The intermediary could contract an authentication and rating e-service to increase the trust in trading partners instead of establishing its own rating system and brand (e.g. avantrust - a joint venture of AIG and Dun&Bradstreet - offered an identification service in 2001 which is not operative anymore).

E.1.4 Goals of E-service Providers

E-service providers seek to compensate their risks and expenses of developing and deploying services. Therefore their main goal is to sell their e-services to as many customers as possible with as little individual coding and limited customising as possible. This situation might cause a dilemma, if personalisation and customisation are required to achieve a high value for the customer. Reasons could be that a customer might want to retain competitive advantage or request to able to adapt to customer internal processes. One solution for mitigating the dilemma is to offer a high degree of networkability and increase the networkability of customers. It is defined as the capability of an organisation to establish, maintain and develop relationships with other organisations in order to pursue new common business opportunities or improve the results of an existing business through co-operation (see Fleisch et al., 1999, 776).

A design goal is that the e-service offering process should be efficient and easy to integrate into the customers' processes. This can help to reduce the adoption hurdles and initiate positive direct and indirect network effects can help to achieve a critical mass of customers and if e-services for sub-groups can be established Reed's law can provide a further leverage effect.
Appendix E: E-Service Concept Details

(Reed, 2001) (see Appendix G.3). If high investments and fixed costs were incurred in offering e-services, economies of scope (see Hagel and Singer, 1999, 135) and economies of scale (Wigand et al., 1997) for reproduction of information-based services should be applied.

A further design goal is to create lock-in effects through a high service level or a cost efficient competitive bundling of services. E-services can leverage the benefit of complementary partners if the offering can be combined (cf. Brandenburger and Nalebuff, 1996). If the goal of the potential e-service provider is to innovate customer’s processes and resources, then he should focus on speed, creative people and a battle for talent (see Hagel and Singer, 1999, 135). Another goal could be to permeate innovations by syndicating its business model to other intermediaries. An e-service provider could specialise in syndicating to long-term e-service operators for standard e-services.

More specific goals concerning the content of the service depend on the main application area. For example, an e-service for logistics can help to reduce investment in and costs for transportation, storage or warehousing. Standardisation can facilitate the combination of e-services to open new markets (e.g. development around Web service standards). E-service providers can use e-services themselves to save costs on infrastructure or internal administration via e-services.

### E.2. Further Definitions of e-services

<table>
<thead>
<tr>
<th>Topic</th>
<th>Definition</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value-added service</td>
<td>Secondary services, which, combined with the primary service, build a service bundle that offers additional benefit over other service bundles in specific consumer segments, and aids differentiation from these.</td>
<td>Translated from (Laakmann, 1995, 22)</td>
</tr>
<tr>
<td>Value-added service</td>
<td>Service that differentiates itself from other services by, for example, instead of offering only voice, offering a palette of services such as Internet access</td>
<td>(Morrow and Vijayananda, 2003, 15)</td>
</tr>
<tr>
<td>e-services (HP)</td>
<td>(..) is any asset that you make available via the Net to drive new revenue streams or create new efficiencies. (Documented in presentations in 1999)</td>
<td><a href="http://www.e-speak.hp.com/architecture/whatis.shtml">www.e-speak.hp.com/architecture/whatis.shtml</a>, accessed 15.10.01</td>
</tr>
<tr>
<td>e-services</td>
<td>(..) are loosely coupled software modules delivered over Internet technologies</td>
<td>(Plummer and Smith, 2000, 2)</td>
</tr>
<tr>
<td>e-service (Giga-Group)</td>
<td>(..) is an application API provided at an Internet URL that can be invoked so as to obtain a service, which may be delivered directly via the Internet or indirectly via other means. By implication, an e-service is intended to be dynamically integrated into a business process at runtime, rather than requiring specific programming to that interface to have been done ahead of time.</td>
<td>(Gilpin, 2000) 20.09.2000</td>
</tr>
<tr>
<td>Topic (Company)</td>
<td>Definition</td>
<td>Source</td>
</tr>
<tr>
<td>-----------------</td>
<td>------------</td>
<td>--------</td>
</tr>
<tr>
<td><strong>Web service</strong> (Giga-Group)</td>
<td>(...) is a specific 'branded' type of e-service, term used by Microsoft, IBM, Ariba, and some others participating in the UDDI initiative.</td>
<td>(Gilpin, 2000) 20.09.2000</td>
</tr>
<tr>
<td><strong>e-services</strong></td>
<td>(...) either perform coordination tasks (e.g. payment transactions) or they are sub-processes which many companies require in a similar form and therefore purchase in electronic form.</td>
<td>(Österle 2000, 43)</td>
</tr>
<tr>
<td><strong>Web Services IBM</strong></td>
<td>(...) are modular applications that perform specific tasks and are accessible through open protocols (such as HTTP). <strong>Business information.</strong> Share information with consumers or other businesses. You can use Web services to expand your reach through services like news streams, local weather reports, and stock quotes. <strong>Business integration.</strong> Provide transactional, fee-based services for your customers. Create a global value network of suppliers that you can leverage as they conduct commerce. Offer Web services such as auction e-marketplaces, reservation systems, and credit checking. <strong>Business process externalisation.</strong> Differentiate yourself from the competition by creating a global value chain. Use Web services to dynamically integrate your processes with those of other e-businesses, or to streamlining your own.</td>
<td><a href="http://www-106.ibm.com/developerworks/webservices/library/ibm-lunar.html?dwzone=webservices">http://www-106.ibm.com/developerworks/webservices/library/ibm-lunar.html?dwzone=webservices</a>, accessed 7.7.01, of Nov. 2000</td>
</tr>
<tr>
<td><strong>XML Web Services Microsoft</strong></td>
<td>(...) allow applications to communicate regardless of operating system or programming language via the Internet. XML Web services (...) offer a direct means for applications to interact with other applications. Applications hosted internally, as well as on remote systems, can communicate via the Internet by using XML and SOAP messages.</td>
<td><a href="http://www.microsoft.com/technet/xmlservices.asp">http://www.microsoft.com/technet/xmlservices.asp</a> updated 06.01, accessed 7.7.01</td>
</tr>
<tr>
<td><strong>Web Services XML Fund</strong></td>
<td>(...) are components, which connect computers and devices with each other, using the Internet. It is a generic term for the architecture that provides data in an open format across the Internet on a dynamic basis.</td>
<td><a href="http://xmlfund.com/main.asp?section=inside&amp;options=webservices">http://xmlfund.com/main.asp?section=inside&amp;options=webservices</a>, 14.04.01</td>
</tr>
<tr>
<td><strong>Web services IBM</strong></td>
<td>(...) is an Internet-based, modular applications that perform a specific business task and conform to a particular technical format. The technical format ensures each of these self-contained business services is an application that will easily integrate with other services (from the same or different companies) to create a complete business process. This interoperability allows businesses to dynamically publish, discover and aggregate a range of Web services through the Internet to more easily create innovative products, business processes and value chains.</td>
<td><a href="http://www.xml.org/xml/ressources_focus_web_service.shtml">http://www.xml.org/xml/ressources_focus_web_service.shtml</a> by Marc Colan accessed 07.08.01</td>
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<tr>
<td><strong>Web services Heather Kreger (IBM Software Group)</strong></td>
<td>(...) is an interface that describes a collection of operations that are network-accessible through standardized XML messaging. A Web service is described using a standard, formal XML notion, called its service description. It covers all the details necessary to interact with the service, including message formats (that detail the operations), transport protocols and location. The interface hides the implementation details of the service, allowing it to be used independently of the hardware or software platform on which it is implemented and also independently of the programming language in which it is written. This allows and encourages Web Services-based applications to be</td>
<td>(Kreger, 2001)</td>
</tr>
</tbody>
</table>
### Appendix E: E-Service Concept Details

<table>
<thead>
<tr>
<th>Web Services (SUN)</th>
<th>loosely coupled, component-oriented, cross-technology implementations. Web Services fulfill a specific task or a set of tasks. They can be used alone or with other Web Services to carry out a complex aggregation or a business transaction.</th>
</tr>
</thead>
<tbody>
<tr>
<td>...</td>
<td><a href="http://www.sun.com/sunonesun">http://www.sun.com/sunonesun</a> (SUN, 2001)</td>
</tr>
<tr>
<td>Web Services (HP)</td>
<td>(...) is a unit of business, application, or system functionality that can be accessed over the Web. Web services are applicable to any type of Web environment, be it Internet, intranet, or extranet, with a focus on business-to-consumer, business-to-business, department-to-department, or peer-to-peer communication. A Web service consumer may be a human who is accessing the service through a desktop or wireless browser, it could be an application program, or it could be another Web service. Web service exhibits the following characteristics:</td>
</tr>
<tr>
<td>e-service quality (e-SQ)</td>
<td>(...) the extent to which a Web site facilitates efficient and effective shopping, purchasing, and delivery of products and services</td>
</tr>
<tr>
<td>Marketing</td>
<td>(...) way of electronically delivering something of value to a customer that will solve some problem or provide some usefulness to make their life easier</td>
</tr>
<tr>
<td>Marketing</td>
<td>Provision of service over electronic networks such as the Internet</td>
</tr>
<tr>
<td>IT</td>
<td>Web services are a new breed of web applications. They are self-contained, self-describing, modular applications that can be published, located and invoked across the web. Web services perform functions, which can be anything form simple requests to complicated business processes. Once a web service is deployed, other applications (and other web services) can discover and invoke the deployed service. XML messaging is used to interact with a web service.</td>
</tr>
<tr>
<td>e-services (Management)</td>
<td>comprised of all interactive services that are delivered on the Internet using advanced telecommunications, information, and multimedia technologies</td>
</tr>
<tr>
<td>Marketing</td>
<td>further stage of e-commerce</td>
</tr>
<tr>
<td>Service</td>
<td>Encompassing anything but physical products and its transfer in both the upstream and downstream channels</td>
</tr>
<tr>
<td>Operations Management</td>
<td>are comprised of all interactive services that are delivered on the Internet using advanced telecommunications, information, and multimedia technologies</td>
</tr>
</tbody>
</table>

*Figure Appendix E-1: Overview on e-service and web service definitions*
Appendix F: Examples of e-service Providers in Procurement

The chosen process-based approach highlights the use of e-services that are directly supporting customer processes. The following overview presents a selection of providers for the e-services within e-procurement contacted from 2000 to 2002:

<table>
<thead>
<tr>
<th>e-service</th>
<th>Type</th>
<th>Service Description</th>
<th>Customer Type</th>
<th>URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logistics server</td>
<td>e-logistics Integration</td>
<td>Pricing &amp; CEP logistics settlement service</td>
<td>Buyer, Supplier</td>
<td><a href="http://www.inetlogistics.com">www.inetlogistics.com</a></td>
</tr>
<tr>
<td>Ansfac</td>
<td>Financial e-service</td>
<td>Electronic Invoice Present and Payment solution</td>
<td>Buyers and Suppliers</td>
<td><a href="http://www.answork.com">www.answork.com</a> (nomore active)</td>
</tr>
<tr>
<td>Catalogue &amp; Content Mgmt.</td>
<td>Information e-service</td>
<td>Multi-vendor catalogue management and ERP master data management service</td>
<td>Suppliers and buyers</td>
<td><a href="http://www.CXT.com">www.CXT.com</a> (now e-trade)</td>
</tr>
<tr>
<td>Pallystick</td>
<td>Invoicing &amp; Payment</td>
<td>Invoicing solution for e-markets</td>
<td>Supplier</td>
<td><a href="http://www.pasinternational.com">www.pasinternational.com</a> (nomore active)</td>
</tr>
</tbody>
</table>

**Figure Appendix F-1:** BPO e-services for MRO goods

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Service Description</th>
<th>Customer Type</th>
<th>URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>SGS on Site</td>
<td>Business Process</td>
<td>Inspection service for global sourcing (see ch. 5)</td>
<td>Buyer</td>
<td><a href="http://www.sgs">www.sgs</a> onsite.com</td>
</tr>
<tr>
<td>tariffic</td>
<td>Logistics Information</td>
<td>Landed cost calculation service covering 150 countries (see ch. 5)</td>
<td>Buyer</td>
<td><a href="http://www.tariffic.com">www.tariffic.com</a></td>
</tr>
<tr>
<td>escrow</td>
<td>Financial Settlement</td>
<td>Secure trade via a third party monitoring the transfer of goods and money.</td>
<td>Buyer, supplier</td>
<td><a href="http://www.escrow.com">www.escrow.com</a></td>
</tr>
<tr>
<td>Covisint</td>
<td>Document Exchange</td>
<td>Offers BCI e-services. Covisint sees itself as 'Industry Operating System' provider of application sharing, portal and EDI messaging.</td>
<td>Manufacturer, supplier</td>
<td><a href="http://www.covisint.com">www.covisint.com</a></td>
</tr>
</tbody>
</table>

**Figure Appendix F-2:** BPO e-services for direct production goods
### Appendix F: Examples of e-service Providers in Procurement

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Service Description</th>
<th>Customer Type</th>
<th>URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avantrust</td>
<td>Credit check</td>
<td>Avantrust ID (Joint Venture of AIG and Dun &amp; Bradstreet)</td>
<td>Buyer, supplier, e-markets</td>
<td><a href="http://www.avantrust.com">www.avantrust.com</a> (nomore active)</td>
</tr>
<tr>
<td>Open Ratings</td>
<td>Post-transaction Information</td>
<td>Reliability of supplier</td>
<td>Buyer</td>
<td><a href="http://www.openratings.com">www.openratings.com</a></td>
</tr>
<tr>
<td>FindMRO</td>
<td>Pre-transaction information</td>
<td>Product and supplier search service</td>
<td>Distributed Groups</td>
<td><a href="http://www.findmro.com">www.findmro.com</a> (nomore active)</td>
</tr>
<tr>
<td>Dun &amp; Bradstreet</td>
<td>Transaction independent information</td>
<td>Unified identifier of a company (DUNS® number) and several other information services.</td>
<td>Buyer, supplier, e-markets</td>
<td><a href="http://www.dnb.com">www.dnb.com</a></td>
</tr>
<tr>
<td>SLA Management</td>
<td>e-service spanning information</td>
<td>see chapter 4.6</td>
<td>Buyer, supplier, e-market, e-service providers</td>
<td></td>
</tr>
</tbody>
</table>

*Figure Appendix F-3: Examples for I&K e-services*

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Service Description</th>
<th>Customer Type</th>
<th>URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avantrust</td>
<td>Security, trust</td>
<td>Avantrust ID</td>
<td>Buyer, supplier, e-markets</td>
<td><a href="http://www.avantrust.com">www.avantrust.com</a> (nomore active)</td>
</tr>
<tr>
<td>Seeburger</td>
<td>Messaging</td>
<td>EDI services (software and clearing services)</td>
<td>B2B EDI Customers</td>
<td><a href="http://www.seeburger.com">www.seeburger.com</a>;</td>
</tr>
<tr>
<td>WebEx</td>
<td>Conference Support (P:P)</td>
<td>WebEx OnStage, offering the ability to reach broad audiences through live online seminars.</td>
<td>Distributed Groups</td>
<td><a href="http://www.webex.com">www.webex.com</a></td>
</tr>
</tbody>
</table>

*Figure Appendix F-4: BCI e-services*
Appendix G: Concept Details

G.1. E-Service Innovation Concept

G.1.1 Generic Object Identification for E-service Inventions

To identify the areas for innovation, an organisation and a business network are shown in a simplified cybernetic model (see Ferstl and Sinz, 1993, 28) compared to more complete models like the viable systems model (cf. Beer, 1981). The model covers the internal and the network perspective and depicts multiple areas for e-service based innovation (see Figure Appendix G-1).

**Figure Appendix G-1: Areas for invention**

The analysis of identified innovation objects for e-services starts with a definition of e-services in three properties that characterise their nature. First, the content is defined by the process which the e-service supports or tasks that it performs. Second, Input/Output defines the nature of the product or service. Delivery defines access by the respective customer. Third coordination describes the means of managing interdependencies before, during or after delivery. Each e-service innovation idea can be categorised in the four properties, as shown in Figure Appendix G-2.

<table>
<thead>
<tr>
<th>E-service Properties</th>
<th>Beginning of Continuum</th>
<th>End of Continuum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content</td>
<td>Physical process/task</td>
<td>Hybrid process/task</td>
</tr>
<tr>
<td></td>
<td>Physical</td>
<td>Hybrid</td>
</tr>
<tr>
<td>Input/Output</td>
<td>Physical</td>
<td>Hybrid</td>
</tr>
<tr>
<td>Delivery</td>
<td>Physical</td>
<td>Automated</td>
</tr>
<tr>
<td>Coordination</td>
<td>Physical (via physical means or human beings)</td>
<td>Hybrid (combination of human and digital interaction)</td>
</tr>
<tr>
<td></td>
<td>Hybird e-service</td>
<td>Full e-service</td>
</tr>
<tr>
<td>No e-service character</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figure Appendix G-2: E-service categorisation**

Hybrid e-services are semi-automated and require human interaction. Full e-services can be defined as fully automated e-services of interacting machines. Figure Appendix G-3 contains examples of e-services for the ordering processes of MRO goods.
Appendix G: Concept Details

<table>
<thead>
<tr>
<th>Process element</th>
<th>E-service Innovation</th>
<th>I/O</th>
<th>Coordination</th>
<th>Delivery</th>
<th>E-Service Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catalogue management e-service (I&amp;K level)</td>
<td>Transformation of physical to digital or format change</td>
<td>Digital</td>
<td>Human interaction and quality proof</td>
<td>Digital</td>
<td>Hybrid</td>
</tr>
<tr>
<td>Desktop purchasing E-service (BPO level)</td>
<td>Digital ordering</td>
<td>Digital &amp; Physical</td>
<td>Semi-automated with human interaction</td>
<td>Physical</td>
<td>Hybrid</td>
</tr>
<tr>
<td>Order management E-service (BPO level)</td>
<td>Digital order reception</td>
<td>Automated</td>
<td>Semi-automated web order confirmation / download</td>
<td>Digital &amp; Physical</td>
<td>Hybrid</td>
</tr>
<tr>
<td>Integration E-service (e.g. EDI to XML mapping e-service) (BCI level)</td>
<td>Digital documents delivery</td>
<td>Digital</td>
<td>Automated</td>
<td>Digital</td>
<td>Full</td>
</tr>
<tr>
<td>Direct ordering from bill of materials and production planning (BCI level)</td>
<td>Electronic ordering based on pre-defined material numbers</td>
<td>Physical product or service delivery</td>
<td>Automated</td>
<td>Physical</td>
<td>Hybrid</td>
</tr>
</tbody>
</table>

*Figure Appendix G-3: Examples of ordering process procurement e-services*

Further e-services supporting other than ordering processes are described in the additional cases (e.g. SGS or Tariffic in ch. 6) or in Appendix F.

Invention objects with e-services have been identified and will be discussed in the following sections: (1) Inputs and outputs (depending on the role of the user), (2) use of e-services for process innovation (content), and (3) inter-organisational coordination (cf. Fleisch, 2001, 193, Boutellier et al., 1999, 53).

**G.1.1.1 Innovation of Inputs and Outputs**

Products and services are one innovation area, if they can be transformed by using e-services. E-services can support the transformation of a company’s physical inputs and outputs towards digital ones. The potential of digitalising goods and services has been analysed in literature from an ICT (cf. Hui and Chau, 2002; Kling and Lamb, 2000; Bieberbach and Hermann, 1999) and economic perspective (cf. Shapiro and Varian, 1999, Zerdick et al., 2001). Information-based products (e.g. paper-based price quotation) can be converted into information products (e.g. automated online price check) with the advantage of leveraging the independence of space, time, and socio-economics by using Internet technologies. Another example would be the transformation of a person-to-person product training about software functionality for order entry that is substituted by a computer based training module (application-to-person). The final transformation would be an automated software update that automates the order entry via an agreed upon XML format (application-to-application) of an order processing e-service. This example would substitute the need for training humans to use the new
software functionality by assigning the task of order entry to a machine and automatically updating future product enhancements once they are accepted by the e-service customer (see Figure Appendix G-4).

<table>
<thead>
<tr>
<th>Information Products</th>
<th>Application to Person</th>
<th>Application to Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Information Service</td>
<td>Human Interaction Service Delivery</td>
<td>Automated Information Product Delivery or Substitution</td>
</tr>
<tr>
<td>(eg. training at a training center)</td>
<td>(eg. training software)</td>
<td>(eg. web based landed cost calculation)</td>
</tr>
</tbody>
</table>

*Figure Appendix G-4: Digitalisation of information products*

Additional benefits may apply, such as lower prices through reduced procurement, production, and distribution costs, increased availability, and low reproduction costs. These are relevant inputs for the e-service business concept (see ch. 7.3).

In the service sector, a transformation from human-based services to ICT-enabled delivery of services is another innovation area where the level of effectiveness and efficiency can be raised. Due to the simultaneity of production and delivery in services (see ch. 2) the nature of the goods and their delivery are not discernable. The challenge is to maintain the interactive character of services and automate (parts of) the service. Figure Appendix G-5 provides an example of a landed cost calculation via a telephone operator of a logistics provider (person-to-person). This can be improved by software that allows for online landed cost calculations (application-to-person; e.g. case of tariffic in ch. 6). The highest development stage of this service would be an online request from the users shipping software to an automated landed cost calculation service (application-to-application). Other services which are supported by ICT are Internet telephony, online consulting services or online therapy services. However, early complex and interactive examples cited by (Hui and Chau, 2002) were not able to survive (e.g. cyberanalysis.com, realitytherapy.com).

*Figure Appendix G-5: Digitalisation of information services*

Hui and Chau (2002) classify (1) tools and utilities, (2) online services, and (3) content based digital products as relevant digitalised inputs or outputs for full digital delivery. Their classification does not include full e-services between businesses (application to application) which was added above.

The implication for suppliers is that they should innovate their output wherever possible and share the benefits with the buyers. For a buying organisation, the innovation of inputs can be
helpful to identify input categories, appropriate suppliers, and the form in which these will be procurable in the future. Supply market innovations may create new products, services, forms of delivery, and better customer satisfaction for the buying organisation.

Figure Appendix G-6 shows the contrasting nature of the output as against the form of output according to the classification of Hill (1999) (see ch. 4). E-services are located in the electronic output form dimension and can contain digitalised services, intangible and tangible goods. Hybrid e-services can contain elements of both.

For non-digital products, the enrichment through information and coordination is a viable strategy for differentiation. These enrichments can be delivered in the form of e-services. Choi and Whinston (2000, 199) argue that suppliers can enhance the attractiveness of their products and services by transforming them into ‘smart’ products. On top of their physical core, they provide additional information by being able to exchange information and by customising the content on the basis of customer information.

Hui and Chau (2002, 74) propose (1) the delivery mode, (2) granularity, and (3) trialability as further elements for defining the delivery and ultimately the success of digital products and services. The delivery mode can be full delivery via the Internet (e.g. download) or interactive delivery. Granularity specifies the divisibility of digital products. Trialability defines the degree to which the digital product or service is suited for trials. The criteria of trialability and granularity are important for achieving trust. The information paradox prevents full release of information for information based products (cf. Picot et al., 2001) which can be solved by releasing only the parts of the information the customer is willing to pay for (e.g. trial accounts or limited access). Similarly, services need to be partially testable or limited in time. These considerations have a strong link to the business concept design (see ch. 7.3), as they have significant implications for the e-service offering, pricing and customer acceptance. To summarise, products and services can be digitalised or enriched with information to turn them into ‘smart’ products or services. The areas and examples highlighted above present levers for inventing new opportunities to enhance the efficiency and effectiveness in procurement and supply organisations.
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G.1.1.2 ICT enabled E-service Innovation in Procurement Processes

ICT can be an important lever for innovation (see Appendix G on procurement subprocesses), as many authors stress (cf. Picot et al., 2001; Choi et al., 1997; Lockett, 1996). It can be used to increase efficiency, effectiveness and can enable new ways of doing business (see Lockett, 1996, 123). A starting point for ICT-based process innovation is the identification of categories where ICT can have an impact on a specific process or organisational task. Several authors (cf. Davenport, 1993, 51; Ferstl and Sinz, 1993; Applegate, 1994) have identified ICT enabled innovation categories (see Figure Appendix G-7 for an extended list). If a provider or potential customer identifies a process improvement potential, these ICT impacts can be applied to qualify the procurement process improvements via using or offering e-services as production or delivery process.

<table>
<thead>
<tr>
<th>Impact</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automational</td>
<td>Eliminating human labour from process</td>
</tr>
<tr>
<td>Informational</td>
<td>Capturing process information for purposes of understanding</td>
</tr>
<tr>
<td>Integrative</td>
<td>Coordination between tasks and processes</td>
</tr>
<tr>
<td>Geographical</td>
<td>Coordinating processes across distances</td>
</tr>
<tr>
<td>Availability</td>
<td>24x7 availability of systems</td>
</tr>
<tr>
<td>Intellectual</td>
<td>Capturing and distributing intellectual assets</td>
</tr>
<tr>
<td>Analytical</td>
<td>Improving analysis of information and decision-making</td>
</tr>
<tr>
<td>Tracking</td>
<td>Closely monitoring process status and objects</td>
</tr>
<tr>
<td>Sequential</td>
<td>Changing process sequence, or enabling parallelism</td>
</tr>
<tr>
<td>Disintermediating</td>
<td>Eliminating intermediaries from the process</td>
</tr>
<tr>
<td>Speed</td>
<td>Reducing information gathering, processing, storage and distribution time (e.g. to reduce bull-whip effects in the supply chain (cf. Lee et al., 1997))</td>
</tr>
<tr>
<td>Quality</td>
<td>Increasing reliability reduces cost of control and exception handling</td>
</tr>
<tr>
<td>Transparency</td>
<td>Higher consistency, well documented outputs, and richer reports</td>
</tr>
</tbody>
</table>

Figure Appendix G-7: Process innovation through ICT

The e-service content innovation is a process innovation that can be based on a modified task-technology fit model. In contrast to Goodhue and Thompson's (1995) original model the third influencing factor can be not only human (hybrid e-service) but also the technical environment (full e-service), if the e-service requires integration into the customer's software environment. The antecedents of the task-e-service fit consist of (1) task characteristics, (2) e-service characteristics, and (3) individual characteristics (human characteristics for hybrid e-services) or ICT environment characteristics (full e-service). The task-e-service fit model helps to classify inventions.

ICT process inventions (e.g. specific UDDI servers) can be assigned to the BCI e-service layer. Process innovations in the whole information-to-after sales cycle are relevant for suppliers and buyers. Examples of BPO e-services for sub-processes are sourcing, transport, de-
Appendix G: Concept Details

livery, invoicing, claim settlement, payment or after-sales. Innovation at the information and knowledge level can provide additional e-service innovation potential. E-services can be invented within or between organisations to reap opportunities in the information and knowledge provisioning realm. Business-sourcing information, rating, catalogue content services, intelligence and training e-services are examples of I&K e-services.

An identified e-service process innovation area should contain the process element or task description and the innovation goals. An example would be to innovate an international transportation service by automating the landed cost information process, thereby eliminating limitations of availability, increasing speed, and quality.

G.1.1.3 Innovating Coordination Mechanisms via E-services

Innovation of the coordination mechanisms using ICT can lead to reduced transaction costs (cf. Malone et al., 1987; Malone and Rockart, 1991), if third order effects of coordination are achieved (see ch. 3). It can increase efficiency and flexibility in sourcing, operative procurement, and settlement supported by new applications for all kinds of input (see ch. 2.4.2.3). Since coordination is often pure information processing the invention possibility using ICT is potentially large and justifies a detailed analysis. The options are to digitalise the coordination via inter-organisational electronic workflows or to outsource the coordination service to a third party via an e-service (e.g. an e-market), thereby facilitating the management of the interdependencies (see Malone and Crowston, 1994). Fleisch (2001, 270) extends the coordination theory of Malone et al. (1987; 1994) by proposing design measures to reduce the need for coordination or the selection of e-services to improve the coordination. Fleisch argues that coordination theory is mainly concerned with coordination mechanisms for settling existing coordination problems. In order to reduce the emergence of coordination problems he added design oriented coordination mechanisms (see Figure Appendix G-8) which can be applied to invent e-services.
### Appendix G: Concept Details

<table>
<thead>
<tr>
<th>Design oriented coordination principles</th>
<th>Settlement oriented coordination mechanisms</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Category</strong></td>
<td><strong>Category</strong></td>
</tr>
<tr>
<td>Output</td>
<td>Example mechanism</td>
</tr>
<tr>
<td>Shared design, modularisation, digitalisation</td>
<td>Sequence scheduling, procure new resources</td>
</tr>
<tr>
<td>Process</td>
<td>Example mechanism</td>
</tr>
<tr>
<td>Standardisation, process coupling</td>
<td>Producer/consumer</td>
</tr>
<tr>
<td>ICS</td>
<td>Example mechanism</td>
</tr>
<tr>
<td>Standardisation, integration</td>
<td>Simultaneity constraints</td>
</tr>
<tr>
<td>Culture</td>
<td>Example mechanism</td>
</tr>
<tr>
<td>Trust building</td>
<td>Synchronisation, scheduling</td>
</tr>
<tr>
<td>Human</td>
<td>Example mechanism</td>
</tr>
<tr>
<td>Incentive and motivation systems, skill standards</td>
<td>Task/Subtask</td>
</tr>
<tr>
<td>Organisation</td>
<td>Example mechanism</td>
</tr>
<tr>
<td>Modularisation, distribution of control</td>
<td>Goal selection, task decomposition</td>
</tr>
</tbody>
</table>

#### Figure Appendix G-8: Enhanced categories and examples of coordination mechanisms

Actors inventing e-services can be e-markets or e-service providers that offer integration e-services ranging from pure communication to inter-organisational coordination services (see case of CXT Business Document Exchange service in ch. 5.3.5.3) or companies striving to improve their supply chain. Another case in point when inventing e-services is to find new ways of combining e-services. Existing e-services or connecting existing with a new e-service to build composite e-services is a further potential area for invention. Combinations can form complex or composite e-services, which can be differentiated by the form of integration. Their service content is either pre-bundled and statically wrapped as an e-service or dynamically configured and integrated upon demand via interacting e-services (see dynamic bundling in Figure Appendix G-9), if an adequate collaboration infrastructure is in place (see ch. 2.3). Huendling and Weske (2003) provide an overview of the technical aspects of composite e-services using Web service standards (cf. Zeng et al., 2003). Figure Appendix G-9 depicts the difference between static pre-bundling and the dynamic composition of e-services.

#### Figure Appendix G-9: Forms of integration for e-services
The challenge of inventing and offering e-services is to minimise the effort involved in integrating them into other existing applications of the potential e-service customer (see ch. 3.5) and to maximise the attractiveness and benefits for customers.

G.1.2 Assessment of E-service Inventions

An invention grid can be a starting point for an analysis of the solution potential ICT and e-services can offer. Creativity techniques and a structured service engineering approach (see Faehnrich, 1998, 5) can support the identification of further invention potential.

The first assessment of the e-service inventions prevents an e-service provider from starting too many e-service development projects at the same time. Generic assessment criteria derived from theory and practice are the task-e-service fit consisting of (1) e-service fit to the provider's processes and capabilities, (2) fit to existing customer's processes and capabilities, (3) initial benefit categories for customers envisioned. Furthermore, the perceived need for integration proved to be a central assessment criterion as it influences the design of the e-service and the capabilities required. The need for integration can be differentiated into (1) attractiveness of integration for the customer, (2) effort to integrate for the customer, and (3) effort to offer an integrated e-service for the e-service provider. The decision on the integration need determines whether the potential e-service innovation is to be offered as a full or a hybrid e-service.

Specific assessment criteria for (re)designing or inventing procurement processes are the type of input, the process characteristics, the requisite networkability, and the power relationship. This will be analysed from a buyer's perspective, focusing on input and BPO e-services:

To evaluate the potential of ICT-based coordination, the e-service innovation matrix aids the prioritisation of innovation areas. It is defined by the axis of Dominant Nature of Input and Media of Coordination (see Figure Appendix G-10). For products and services where humans directly perform changes having an effect on humans (e.g. giving a haircut), the potential for using e-services is limited (see quadrant 1). In most cases in the B2B environment a company could evaluate the option of electronic coordination (arrow 3). The limiting factor is that it is not always economically and/or socially acceptable. The electronic coordination of physical products and services has a medium potential for e-services invention (quadrant 2). Examples are logistics information services on the status of deliveries which can be provided as e-service and can form the basis for further e-services (see ch. 6 for Danzas and Tariffic cases). The development towards digital services and products moves the innovation area in the direction of quadrant 3 (arrow 4). This quadrant has the highest potential for improving processes via e-services, as the form of coordination is ICT-based and the output itself is digital. Arrow 2 addresses the possible move from physical to digital products and services, as
discussed above (see ch. 7.1.2.1). Digital inputs already available can be, for instance, procured via electronic means (arrow 1), if no legal or socio-political hurdles prevent digital procurement (e.g. failure of Napster’s to move permanently in this direction due to illegal sale of digital music, see Appendix G.3).

This could lead to inventions that enable electronic coordination for digital products or services if the environment at the business and ICT level and the content allow an electronic coordination. Arrow 5 indicates a revolutionary change, from physical products and manual coordination to pure e-services with digital content and electronic delivery in quadrant 3.

![Diagram](image)

**Figure Appendix G-10: E-service innovation potential assessment matrix**

The service delivery forms the third dimension and follows a similar argumentation like the coordination dimension. It increases the solution area but is omitted here to shorten the argument. The dimensions are physical market place and digital market space distribution (cf. Rayport and Sviokla, 1994).

Malone (1987) identified asset specificity and complexity of the product description as two more key determinants. An input has high asset specificity if other firms cannot readily use it because it requires customised fittings, specific know-how or specific application systems. Causes of this asset specificity can be site and ICT specificity, physical or human asset specificity.

The complexity of the product description determines the amount of information needed to specify the attributes of a product to allow potential buyers a selection. One can use these criteria to define the type of coordination mechanism appropriate for e-procurement implementation, such as catalogue buying, e-auctions or direct order mechanisms of production planning or supply chain optimising software systems.

Information economics research differentiates trust, experience, and the search properties of inputs for determining e-procurable products and services (see Zerdick et al., 2001; Picot et al., 2001, 356). Products that depend on experience and trust tend to be more difficult to sell.
Appendix G: Concept Details

The classification into experience-based products is defined by the subjective opinion of the buyer and his experience. Experience-dominated products require other senses than vision and an assessment of what happens after the purchasing decision. An example is a raw material with a high quality standard. A way to mitigate this is to use third party services, such as SGS, which could do the quality testing and the coordination can be integrated via electronic means (see Chapter 6).

In cases where it is not possible to assess the properties after the purchase due to a lack of time or knowledge other strategies are required. An example is a complex production machine which can only be assessed after a few months in operation. Strategies for circumventing trust and experience-based hurdles are test versions, product variants or limited use for information products (Picot et al., 2001. 358). Other possibilities are patents, reputation, guarantees, or virtual communities and ratings by users. Information properties can partially substitute experience properties (e.g. tests reports of other users of the product or e-service). Another strategy is to use trusted intermediaries (e.g. e-market or rating services) (Choi et al., 1997).

To summarise, dominantly information products or services are amenable to e-service mediated input, while others need to be transformed before they become 'e-procureable' or can be coordinated via e-services. When procuring services, the output requires the interaction of the external factor. With the concepts of mass customising and interactive e-services based on Web service technologies (see ch. 3.5) it may become increasingly possible. The advantage of a network approach for its members lies in protecting competitive advantages and being able to combine strengths in order to reap monopoly rents (see Chapter 2).

The process characteristics can be classified according to process specificity and number of transactions. The first describes the degree of company-specific knowledge and process elements, and thus the ability to offer an e-service. The number of transactions defines the degree of benefit an increased automation can have. If the number of transactions is low the impact of a full e-service needs to be large to justify an investment into changing existing processes. Electronic reverse auction e-services are an example where the benefit can outweigh the investment.

To provide a framework for outsourcing services Apte and Manson defined a measurement instrument that uses three criteria: (1) information intensity, (2) customer contact need, and (3) physical presence need (1995, 1254). This approach is a useful assessment for the transformation of services to e-services.

Requisite networkability defines the required level of organisational and ICT elements to enable a required integration level. Similarly Upton and McAffee have called the phenomenon lowest-common denominator of IT sophistication among partners (1996, 126). They further
Appendix G: Concept Details

added the relationship stage between partners and the level of functionality that maps the e-service levels defined in chapter 4.

Finally, the power dimension defines the likelihood of an e-service being accepted in the supply chain (see ch. 2.5). Inter-organisational e-services (e.g. using an e-market) are more likely to be accepted if the buyer has a strong power base. This can be used to coerce suppliers into using a specific e-service to do business with the buyer. If a buyer can wield only little position, networking and coercive power the acceptance on the supplier side can be low and may risk the economic viability of the e-service invention. Figure Appendix G-11 summarises the input category assessment criteria from a buyer’s perspective using the theoretical and practical elements introduced above.

<table>
<thead>
<tr>
<th>Category</th>
<th>Sub-category</th>
<th>Low Potential</th>
<th>High Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product or service characteristics</td>
<td>Task-e-Service fit</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Asset specificity</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Complexity of description</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>- Amount of information</td>
<td></td>
<td>Unique identifier</td>
</tr>
<tr>
<td></td>
<td>- Pace of change</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Difficulty to codify</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Ease of identifying the input</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Number of variants</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Information/trust/experience</td>
<td>Trust oriented</td>
<td>Information oriented</td>
</tr>
<tr>
<td></td>
<td>Information intensity</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Process</td>
<td>Process specificity</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td># Transactions</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Human customer contact need</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Physical presence need</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Integration need</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Task-e-Service fit</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Power</td>
<td>Influencing potential</td>
<td>Buyer dependent on supplier (low position, networking, and coercive power)</td>
<td>Supplier dependent on buyer (high position, networking, and coercive power)</td>
</tr>
<tr>
<td>Requisite Networkability</td>
<td>Sophistication of ICT infrastructure required</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Status of Suppliers</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Status of Buyers</td>
<td>Low</td>
<td>High</td>
</tr>
</tbody>
</table>

*Figure Appendix G-11: E-procurement assessment of input categories from a buyer’s perspective*

The argumentation showed that, even for physical goods, there is innovation potential through digitalising the coordination and the information-to-pay cycle between companies. It depends on the availability of e-service providers, applications, know-how, capabilities, and readiness of the trading partners as to whether an approach via an intermediary, e-service, point-to-point connection or keeping the as-is form is the most suitable. The analysis of the product or service and process characteristics combined with the power and requisite networkability assessment can aid the definition and prioritisation of e-services.
G.2. Comprehensive Business Concept

G.2.1 Literature Overview on Business Model Components

The business model literature can be separated into two streams. The first one is focusing on defining the components of business models and the other defines types of business models. Some authors do both. The component view is more generic and fundamental. It will be favoured in this thesis since it forms the basis for new business model combinations. Some examples will be depicted in the component view. The type approach is limited due to fixed characteristics.

Timmers (1998; 1999, 32) was one of the first authors to provide an elaborated concept for a business model in the e-commerce context. It served as a basis for analysing business models. It focuses on the exchange relations, the actors, benefits and sources of revenues. Figure Appendix G-12 summarises the proposals of authors pursuing the component view.

<table>
<thead>
<tr>
<th>Components of a Business Model</th>
<th>Author(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>An architecture for product, service and information flows, including a description of the various business actors and their roles; and a description of the potential benefits for the various business actors; and a description of the sources of revenue.</td>
<td>(Timmers, 1999, 32)</td>
</tr>
<tr>
<td>(...) the business and ICS architecture, rules, potential benefits and the sources of revenue.</td>
<td>(Klueber, 2000)</td>
</tr>
<tr>
<td>(It) is described by four characteristics: strategic objectives, sources of revenue, critical success factors, and core competencies required.</td>
<td>(Weill and Vitale, 2001, 25)</td>
</tr>
<tr>
<td>Customer value, scope, pricing, revenue source, connected activities, implementation, capabilities, sustainability.</td>
<td>(Afuah and Tucci, 2001, 45)</td>
</tr>
<tr>
<td>Customers, competition, offering, activities and organisation, resources, suppliers, scope of management (e.g. constraints on actors, cognitive and social limitations in time)</td>
<td>(Hedman and Kalling, 2003)</td>
</tr>
</tbody>
</table>

*Figure Appendix G-12: Synopsis of e-business model components*

Common to all definitions is the customer value, the sources of revenue and the resources required to offer the desired output. The following approaches deserve a more detailed discussion. Hamel (2000) defines an encompassing business concept from a strategy viewpoint with the following components (see Figure Appendix G-13):

*Figure Appendix G-13: Business model components according to Hamel*
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The concept emphasises the elements of customer value proposition (customer benefits), embodiment in a value network, as well as the classification of the underlying assumptions and key drivers of the business concept (Efficient/Unique/Fit/Profit Boosters).

With a focus on ICT implementation, Eriksson and Penker (2000) propose an approach to model business concepts in Unified Modelling Language (UML) to facilitate ensuing coding. They provide UML extensions to model business models such as goals, business processes, business rules and resources. They (2000, 18) add pragmatic rules, which are specific guidelines for how to use these elements. Their meta model and concepts in UML are far from being implementable but share a familiar logic and are more easily understood and detailed by software architects and engineers. Despite the advantages, it must be clear at an early stage that the business case needs coding in the implementation phase. Otherwise, the effort to formalize the description in UML is of limited value at this early stage of assessing the idea of a new e-service.

An example of a fine-grained business model is proposed by Wirtz (2000, 81). He proposes a detailed elaboration of competition, buyer, and capital model (see Figure Appendix G-14). If the goal is to limit the resource consumption in defining a business concept, the required effort would surmount available time and resources, as these can be scarce in early e-service development phases.

![Figure Appendix G-14: Business model components by Wirtz (2000, 83)](image)

The component view on business models helps to clarify the idea, identify the value proposition and the role of the e-service in the value chain. They can serve as structuring tools to guide e-service development.

G.2.2 Literature Overview on Business Model Types

The definition of specific e-business models (type view) has the advantage of higher understandability since they are easier to describe and visualize. Trapscott et al. (2000) define the level of value integration and the power relationship as main determinants for e-business relationships. They discern self-organising mechanisms for participants with equal power and hierarchical for uneven power relationships. The type of products and services exchanged are not in the centre of analysis of their approach. Their framework helps to differentiate from
open markets and from deep integration where the intermediary offers products its customers cannot buy on the market (see Figure Appendix G-15).

Figure Appendix G-15: E-business model types according to Trapscott et al.

Timmers defines ten generic e-business models and positions them in a matrix (see Figure Appendix G-156). The first dimension stresses the level of functional integration which is similar to Trapscott’s value integration dimension. The second dimension is the degree of innovation, which determines the need for change and the difficulty to implement it successfully. Further, he supplements his definition by adding a marketing model that describes the marketing strategy of the business actor under consideration.

Rappa (2001) also pursues the type approach. He defines seven functional business models. The MIT e-business Process Repository (cf. MIT, 2001) presents the generic flows of goods and services and proposes six basic business models and corresponding e-business variants. Figure Appendix G-17 provides an overview of e-business types from different authors, which focus on the value chain role of the provider according to generic procurement phases.
Appendix G: Concept Details

<table>
<thead>
<tr>
<th>Classification</th>
<th>Weill/Vitale</th>
<th>Rappa</th>
<th>MIT</th>
<th>Timmers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information</td>
<td>Intermediary</td>
<td>Brokerage</td>
<td>Broker via the web</td>
<td>Information Broker</td>
</tr>
<tr>
<td></td>
<td>Content Provider</td>
<td>Infomediary (extractor)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Advertising; Subscription</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Virtual Community</td>
<td>Community</td>
<td></td>
<td>Virtual Communities</td>
</tr>
<tr>
<td>Aggregation</td>
<td>Full-Service Provider</td>
<td>Extract web audience</td>
<td></td>
<td>3rd party marketplace</td>
</tr>
<tr>
<td>Intention</td>
<td></td>
<td></td>
<td></td>
<td>e-auction</td>
</tr>
<tr>
<td>Procurement</td>
<td></td>
<td></td>
<td></td>
<td>e-procurement</td>
</tr>
<tr>
<td>Production</td>
<td></td>
<td>Manufacturer (creator)</td>
<td>Create to stock, Create to order</td>
<td>Collaboration Platform</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>Shared Infrastructure</td>
<td></td>
<td>e-services via the web</td>
<td>Value Chain Service Provider</td>
</tr>
<tr>
<td>Integration</td>
<td>Value Net Integrator</td>
<td></td>
<td></td>
<td>Value Chain Integrator</td>
</tr>
<tr>
<td></td>
<td>Whole-of-Government</td>
<td>Utility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distribution</td>
<td>Direct to Customer</td>
<td>Merchant</td>
<td>Distribute via Internet</td>
<td>e-shop; e-mall</td>
</tr>
</tbody>
</table>

*Figure Appendix G-17: Comparison of component e-business types*

G.2.3 Elements of the Business Concept

G.2.3.1 Business Architecture

The business architecture may depict a complex business environment of a full e-service integrator and its business network or a simple e-service as part of a customer-oriented offering. It contains actors, roles, and the strategic orientation required to support a company’s own process or to insource a specific customer process. It covers processes that integrate well with the customer’s processes and business network internal delivery processes. The processes are complemented by the corresponding flows of outputs, information, and financial funds. The initial step of designing the business architecture is to identify the customer process and tasks which the invention is to address. Then the innovator identifies the business network or the business eco-system (see Moore, 1996, 26). Other actors may be required to offer the envisaged service. Some business concept innovations, such as defining process or technical standards require partnerships to be formed at the start (see Hamel, 2000, 91). The chosen notation is a slightly enhanced version of Weill and Vitale (2001) which has been introduced in Chapter 4. Figure Appendix G-18 shows the business architecture for the CXT Business Document eXchange (BDX) service as an example of a Business Collaboration Infrastructure e-service.
The BDX was to exchange business documents like orders or invoices via the CXT e-market. CXT offered document mapping, conversion and routing services between different standards. A planned development stage was that this would allow the offering of other e-services once the basic connectivity services had been accepted by customers. The exchanged documents were XML or EDI documents for direct and MRO goods. Figure Appendix G-18 depicts the primary business relationship between buyer and seller and the pure electronic relationship with CXT for the coordination of the document exchange e-service. Additional services were technical services for setting up a connection between the heterogeneous ICT systems of business partners. The Global Trading Web (GTW) was the international network of interoperable e-markets that used CI technology.

G.2.3.2 Underlying Theory of the Business

CXT initially assumed that it could generate a monopoly situation if one considers Switzerland as an almost independent market for MRO goods. The assumption that an n:1:m MRO e-market could be established which could attract all Swiss companies had to be revised as the business environment of procurement was more complex than initially assumed and customers demanded specific solutions.

The above-mentioned CXT case experience was one of many which showed that understanding the underlying rules and assumptions of a business concept are a core element in managing e-services. The 'Theory of the Business' covers the laws and assumptions about an innovator's own strategy as well as the movements and strategies of other actors and the interdependencies the business concept builds on. It is based on Ducker's definition of 'assumptions about markets, identifying customers and competitors, their values and behaviour. They are
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about technology and its dynamics, about a company's strengths and weaknesses' (see Drucker, 1994, 96). This serves as the basis for analysing the value of a business concept for potential e-services, as well as the preconditions it is based on and affiliated risks. The theory of the business requires dynamic updates since the environment changes frequently: 'Market conditions for major companies are changing, worldwide, every two to three years, bringing with them entirely new rules for how business is conducted and how value is created' (Means and Faulkner, 2000). The rules are specifically targeted towards leveraging the electronic element in e-services. For example, they emphasise how positive feedbacks and network effects can be achieved (see Shapiro and Varian, 1999, 173ff). The theory of the business has the purpose of searching for the highest leverage effects possible at an early phase of e-service development. With Shapiro and Varian (1999, 2) who claim that 'technology changes, economic laws do not', it is aimed to build economic laws explicitly into the business concept so that it can lead to positive returns and be monitored. The active knowledge about their mechanism and their application is required for the designing of successful e-services. Traditional business rules and assumptions are enriched by those that exist in the digital economy (cf. Brandenburger and Nalebuff, 1996; Shapiro and Varian, 1999; Kelly, 1998; Choi et al., 1997; Arrow, 1998; Boulding and Christen, 2001; Arthur, 1994; Porter, 1985; Porter, 2001; Hamel, 2000; Hamel and Prahalad, 1994, Amit and Zott, 2001), which are summarised in Figure Appendix G-19:

<table>
<thead>
<tr>
<th>Economic Rules</th>
<th>ICT-enabled Rules</th>
<th>Assumptions about Strategy and Competitive Forces</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demand &amp; supply side increasing returns</td>
<td>Network effects</td>
<td>First-mover or follower approach</td>
</tr>
<tr>
<td>Sources of positive feedback</td>
<td>1:n</td>
<td>Strategic direction (cost, value, hybrid)</td>
</tr>
<tr>
<td>Economies of scope</td>
<td>1:1 (Metcalfe's law)</td>
<td>Competition</td>
</tr>
<tr>
<td>Economies of scale</td>
<td>n:m (Reed's law)</td>
<td>Customer adoption rate</td>
</tr>
<tr>
<td>Economies of focus</td>
<td></td>
<td>Partners and Complementors</td>
</tr>
<tr>
<td>Learning effects</td>
<td>Benefits of Digitalisation</td>
<td>Substitution</td>
</tr>
<tr>
<td>Competitor lock-out</td>
<td>Zero reproduction costs</td>
<td>Suppliers</td>
</tr>
<tr>
<td>Lock-ins</td>
<td>Time independence</td>
<td>New entrants</td>
</tr>
<tr>
<td>Switching costs</td>
<td>Space independence</td>
<td>Leveraging of existing capabilities</td>
</tr>
<tr>
<td>Unique offering</td>
<td>Versioning of information</td>
<td>Development of competition within the current industry 'boundaries'</td>
</tr>
<tr>
<td>Extension of brand loyalty</td>
<td>Use of standards</td>
<td>Business network relations</td>
</tr>
<tr>
<td>Architectural leadership with partners</td>
<td>Critical mass</td>
<td>Many:1:Many</td>
</tr>
<tr>
<td>Pre-emption of competitor</td>
<td>Dis-/Intermediation</td>
<td>Many:Few:Many</td>
</tr>
<tr>
<td>Strategic Flexibility</td>
<td>Increased market transparency</td>
<td>Many:Many:Many</td>
</tr>
<tr>
<td>Portfolio breadth</td>
<td>Single signal in a supply chain</td>
<td>Multi-Tier-Relationship</td>
</tr>
<tr>
<td>Operating agility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower breakeven</td>
<td>Mass customising</td>
<td></td>
</tr>
</tbody>
</table>

Figure Appendix G-19: Examples of potential rules and areas of assumptions
An innovator can use the list of rules to design a viable business concept that can be turned into a successful business. It forces the innovator to be explicit about his knowledge or assumptions as to why the envisioned e-service will be able to generate revenue based on which rules and assumptions. An example can be positive feedback mechanisms which form the basis for increasing returns which, in turn, can provide a sound foundation for defining a convincing value proposition (cf. Arrow, 1998), as mentioned in Chapter 3. Another example is the synchronisation of information towards a single signal in the supply chain (cf. Fleisch, 2001). Synchronous information exchange throughout the supply chain is one lever for achieving considerable cost reductions by avoiding bull-whip effects (cf. Lee et al., 1997). The exchange of capacity and planning information between producers, customers, as well as in the logistics industry can also help to increase flexibility and visibility.

To visualise the impact rules and assumptions have and how they define the basis for the business logic the feedback-diagrams of holistic thinking are applied (cf. Gomez and Probst, 1995). This makes it possible to represent the key drivers of the business concept in a concise form that facilitates discussing its viability with other people (see Figure Appendix G-20).

E-services that rely on increasing returns have a high success potential, since full e-services incur little or close to no variable costs. An e-service that offers information required by many firms and which can position itself as a unique source of that information can achieve high returns. An example is the Dun and Bradstreet credit check or the provision of the DUNS® number. The level of standardisation has far reaching implications on the business concept, implementation and required resources. A customised or a standardised self-service e-service requires different types of resources, positioning and customer approach. Similarly, the degree of automation influences the assumptions on resources and capabilities of the business environment.

Figure Appendix G-20: Overview of generic e-service rules in an impact diagram
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If the business idea requires the involvement of other organisations the partnering process of selecting partners and management of the partnership are required. For a business concept, the definition of a partner type, its role, competencies and potential partners can suffice to specify the cooperation need.

An assessment of the potential risks in the early phases of an e-service development prevents investments in e-services with a high failure probability. Risks areas may include financial, technological, implementation, customer, and business concept risks, such as cannibalisation of existing offerings and market risks. Legal risks are assessed separately (see ch. 6.3.2.7).

The theory of the business may also serve as a controlling and monitoring element if the business concept is implemented and requires adaptation to a changing environment. Figure Appendix G-21 illustrates the implementation of ongoing management and monitoring of the business model via feedback control mechanisms (see Janszen, 2000, 170). It demonstrates how an established business model, and especially the theory of the business, can be adapted to steer a company. The adaptation of the business model builds on double-loop learning (cf. Argyris and Schon, 1978) and the actions based on the existing business model represent single-loop learning (see ch. 3). The theory of the business and the rules the business model are used to implement the premises or assumption control and strategic implementation control mechanisms (cf. Band and Scanlon, 1995; Steinmann and Schreyögg, 1997, 235). The main controlling elements are efficiency, the fit, uniqueness rules, profit boosters (see Hamel, 2000, 94), and synergy effects. The level of complexity increases when a whole business network collaborates in a joint business. The partners need to have the same understanding and avoid short-term opportunistic behaviour (cf. Doz and Hamel, 1998).

Figure Appendix G-21: Business model adaptation

Appendix G.3 provides an example that stresses the different potential impact of the choice of the type of network effect and its implications on the viability of the implemented business model.
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At CXT, the resource requirements of compiling a business concept needed to be minimised to one or two days in the phases 1-4 of its evolution. Detailed analyses of the company's or the business networks' strengths and weaknesses as well as competitive environment were therefore deferred to the business case compilation.

To summarise, similar considerations apply to the other rules proposed if analysed thoroughly while defining the theory of the business for a business concept.

G.2.3.3 ICS Architecture

To secure the implementability of the e-service envisaged the research data indicates that the inventor should encompass the architectural components required to implement the processes between the involved actors envisioned in the business concept phase. The main components of the ICS architecture are the 'Collaboration Infrastructure' or EAI tools and the application types for offering the e-service. The Business Collaboration Infrastructure (BCI) contains the standards or bilateral agreements used by all actors on protocol, data, document, and process layer. Furthermore, the functionality of software components needed to offer the service to a service customer must be clarified. First specifications on the required security and interoperability levels are optional. Additional statements about the customer, resource and process fit help to identify compatibility with existing resources and customers.

The BDX service of CXT, for example, offered the functionality described below (see Figure Appendix G-22) and was designed to interact with multiple customer systems, document standards and protocols (Figure Appendix G-18). The elements on the BCI layer of e-services are (1) single sign-on to increase the usability, (2) trading partner directory to identify partners (registration), (3) administration, monitoring, tracking and event logging capabilities, (4) document exchange service, requiring automated conversion and mapping service, and the (5) capability of supporting multiple communication protocols and security levels (syntax conversion).

Trading partner pre-requisites

**Trading partner Functionality Standards**

<table>
<thead>
<tr>
<th>Pre-requisites</th>
<th>Functionality</th>
<th>Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>B2B Messaging</td>
<td>Registration</td>
<td>- xCBL to cXML, EDIFACT to xCBL..</td>
</tr>
<tr>
<td>Application</td>
<td>Event Logging</td>
<td>- Order, Invoice, ..</td>
</tr>
<tr>
<td>(e.g. SAP MarketSet</td>
<td></td>
<td>- EDIFACT, cXML, xCBL, RosettaNet</td>
</tr>
<tr>
<td>Connector)</td>
<td>Monitoring</td>
<td>- HTTPS</td>
</tr>
<tr>
<td></td>
<td>Tracking</td>
<td>- TCP/IP, FTP, HTTP</td>
</tr>
<tr>
<td></td>
<td>Mapping to</td>
<td></td>
</tr>
<tr>
<td></td>
<td>customized</td>
<td></td>
</tr>
<tr>
<td></td>
<td>formats</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Syntax</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Conversion</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Document</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Type</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Message</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Format</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Security</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Transport Layer</td>
<td></td>
</tr>
</tbody>
</table>

*Figure Appendix G-22: BDX infrastructure collaboration e-service*
The definition of the functionality, application types and standards aids the definition of customer profiles and provides a basis to estimate resource requirements and potentially required partners to implement the envisioned e-service.

G.2.3.4 Benefits and Value Propositions

The qualitative and quantitative benefits comprise significant elements for realising a win-win situation for all participating actors. Too often only cursory attention is given to the identification and management of benefits (cf. Ward et al., 1996, Peters, 1990). Quantitative benefits can be cost savings or processing time reductions. Qualitative benefits only have indirect impact on cost and time. Examples are information provision via a tracking system, real-time stock availability information or service quality improvements. The benefits form the basis for winning partners and customers for the e-service. Their plausibility is fundamental for assessing the business concept. The tamaguchi function was helpful to create and communicate win-win situations (cf. Doyle and Parker, 1999).

The communication of benefits can be refined if the innovator develops the first draft of the value proposition during the preparation of the business concept. The purpose is to explain why the innovator believes the concept to be valuable to customers in a concise form. Although frequently used in business practice, the semantic content of the term value proposition is unclear and varies from individual to individual (see Weill and Vitale, 2001, 43). This can cause confusion and failure to elaborate on the knowledge and intentions about value propositions. The common denominator of the value proposition is equal to the main comparative benefit a customer will have with the envisaged product or service. Kotler (1999, 32) defines the purpose of the core value proposition as follows: 'implant[ing] the offering's key benefit(s) and differentiation in the customers' minds'. The value proposition results from a check of own competencies and intended offerings or those of the business network against the success requirements for each customer segment. That insight aids the positioning of the company so that the target customers know the key benefits embodied in the offering.

At CXT one of the obstacles was that major barriers in customer acceptance were not perceived internally as relevant. Integration needs and working on value propositions were not considered as crucial in the beginning. A negative image can prevail if the value proposition is incomplete or the provider cannot demonstrate his ability to deliver the promised service and service quality. In the early phases CXT had difficulties communicating the value of its offering, best expressed by the following quote:

'generally speaking the value proposition was initially not convincing enough and CXT had too little experience to be trustworthy' (Head of Corporate Purchasing, H+S, 20 June 2003).

To avoid these impressions the definition and discussion of the full value proposition may help. Kotler proposed to include additional benefits of the offering which may comprise unar-
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ticulated or standard needs that do not help to differentiate but are required to convince and keep a customer. Value propositions for new offerings must take on an outward looking perspective from the customer point of view. This is especially relevant when the offering requires a change of the current habits. Understanding what customers are trying to achieve and what their goals are can mean that the product or service helps them get closer to attaining their (unarticulated) goals and may fulfill needs they are not yet fully aware of. The status of this understanding is crucial to identifying the most efficient approach to communicating and finally selling the offering to the customer. Hartmann et al. argue that competition is less about products or benefits; it is about competition between opposing value propositions (see Hartman et al., 2000, 161).

A conjoint analysis (cf. Laakmann, 1995) or key customer interviews are well-tested tools for gaining fundamental knowledge of the customer’s (unarticulated) needs and identifying the full value proposition. Their application to new forms of information and coordination-based e-services proved to be difficult at CXT. The provider may need to bundle e-services if the complexity of too many choices and too little benefit defers a customer's purchasing decision. To design bundles one should discern between (1) perceived features, (2) 'required' features that are only relevant if exceptions occur, and (3) standard features. Since more than one value propositions are required to attract customers Kolter’s morphological grid (1999, 58) can be used as to position an offering, which would be helpful in CXT’s context:

<table>
<thead>
<tr>
<th>Category</th>
<th>Example</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attribute positioning</td>
<td>Tariffic (see ch. 6) claimed to have the most extensive coverage of countries for landed cost calculation</td>
<td>Highlight a unique attribute</td>
</tr>
<tr>
<td>Benefit positioning</td>
<td>Volvo claims to have safer cars</td>
<td>Defines the key benefit</td>
</tr>
<tr>
<td>Use/application position-ing</td>
<td>Nike claims to have the best racing shoes</td>
<td>Best position for a certain application</td>
</tr>
<tr>
<td>User positioning</td>
<td>Apple computers for graphic designers</td>
<td>Target at a specific user group</td>
</tr>
<tr>
<td>Competitor positioning</td>
<td>7 up calls itself the Uncola</td>
<td>Active differentiation</td>
</tr>
<tr>
<td>Category positioning</td>
<td>Xerox means copy machines</td>
<td>Position within a specific category</td>
</tr>
<tr>
<td>Quality/price positioning</td>
<td>Aldi as value for money</td>
<td>Target your segment</td>
</tr>
</tbody>
</table>

*Figure Appendix G-23: Defining the core value proposition*

This analysis avoids underpositioning, overpositioning, confused positioning (contradicting positions), irrelevant positioning, and doubtful positioning (no credentials that the company can deliver what it claims). The positioning of the value proposition in relation to prices according to Kotler can be (1) the luxury sector (more for more), (2) same functionality and lower price (more for the same), (3) price discounts (same for less), (4) reduced functionality and lower price (less for much less), and (5) winner (more for less).
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The final bar in later phases of the service development is to balance the total value versus the total perceived life-cycle costs. Conjoint measurements are helpful if the product is known but are not as helpful if the customer needs a considerable amount of education. The aforementioned elements are instrumental in specifying the benefits and the value proposition of the e-service offering for the addressed customers. The innovator will have to add a more detailed analysis, if the service development progresses beyond the business concept.

G.2.3.5 Sources of Revenue

The sources of revenue correspond to the mode in which actors pay for the e-service. Potential sources of revenue and the underlying value drivers are summarised in Figure Appendix G-24.

![Diagram](image)

Figure Appendix G-24: Sources of revenue for e-service providers

Indirect sources of revenue are revenues not generated from the targeted consumer of the e-service, but from third parties who benefit from the opportunity of gaining the attention of e-service customers. Examples are advertising fees, commissions, or kickbacks for successful sales of third parties or information about their customer base.

An additional category of revenues streams is syndication. Werbach (2000, 86) defines syndication as involving the sale of the same electronic good to many customers who then integrate it with other offerings and redistribute it. The concept stems from the media industry and can be transferred to other information goods and e-services which deliver information goods or services. The intermediary using the service could be an e-market, a pure infomediary, or a distributor who is enhancing its offering via e-services. The role of corporate capabilities changes from something to be protected to information-based products which are sold (see Werbach, 2000, 90).

Appropriate sources of revenue that customers will accept can be identified by using the major benefits and value propositions as indicators. Additionally, the distribution of revenues within a business network might have to be taken into account. When specifying the sources of revenue, an estimation of the range should be possible in such an early phase of the
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e-service life cycle. The definition of sources of revenues prevents from investing in services customers will not be willing to pay for. At CXT some services could have been stopped earlier, if this rule would have been applied more strictly.

The reasons why, at this early stage, a revenue model is more suitable than defining a pricing model are the following: Firstly, it is difficult to assess the customer's responsiveness to new or unclear value propositions (e.g. realised turnover via an e-market) before the experience of a pilot. Secondly, the assessment of a company's own capabilities before offering the service requires experience in similar previous offerings, which is not the case for start-ups. Thirdly, e-services have a high upfront investment prior to being able to offer the service and few variable costs. These reasons contribute to the difficulties in assessing the correct price, customer segmentation and bundling. Therefore volume, price and costs can remain difficult to define at this early stage. One approach to reducing the uncertainty is to have pilot customers (Eisenhardt and Brown, 1999). For CXT postponing the final pricing to the piloting phase was adequate. The company needed to identify the challenges of a new service offering and to be able to specify the service characteristics (e.g. level of customising, service level agreements).

G.2.3.6 Customer Marketing and Sales Concept

At CXT, customer profiling was not well developed and was superimposed by the external requirement to present a wide sales potential to the investor. As a consequence, almost all customer groups were targeted and business concepts were developed. Service development could have benefited from clearer customer profiles and customer awareness at an earlier stage.

One requirement derived from the experience is to have a rough idea of the customer target segment and the customers approach for a consistent business concept that matches with the e-service operations (cf. Roth, 2001). The customer approach via mass marketing or via individual sales efforts requires different resources, processes and e-service content. A salient element is to identify specific customer profiles. This facilitates the identification of the market potential as well helping to communicate the service value to other people not involved in the business concept development. In practice, people seem to try to avoid answering this question but it proved to be a good pragmatic check. If no customer profile can be identified then the sales process might be difficult, if not impossible, in the later phases. At minimum, it should be possible to define customer types (e.g. private customer types or customers of a specific industry).

A lesson at CXT was to avoid relying simply on broad unvalidated market data. For example, the justification for the auction service was based on figures from a market research company on potential development in Europe broken, down to the level of Switzerland. It might have
been more helpful to formulate customer profiles, customer processes and establish how they could be substantiated before writing a detailed business case, buy the software and set-up the service. Furthermore, for Petrovic et al. elaborated that open communication, reliability and trustworthiness are critical to the acceptance of electronic transactions (cf. 2003) and their achievement needs to be integrated into the customer approach. A project manager of the purchasing department of one of the main customers said the following about the approach towards customers:

'They tried to sell what they were not technically able to offer. Two years later they can now deliver their promises. More openness would have helped to get a clearer picture of what is possible' (Project Manager, 4 August 2003).

An ideal approach is to understand the customer service life cycle (see ch 2.4.5 and a refined version ch. 7.5) and involve customers at an early stage. If customers are attracted and early movers give their feedback to new service ideas, a sound understanding of customer needs and willingness to pay can be gained. This input aids the fine tuning to develop a sound service targeted to customer needs. The marketing concept requires the input of the e-service content, customer segmentation and benefits. In the business concept, a definition of the approach towards customers should be specified. Possible values range from mass marketing to selected individual key account sales. The customer marketing approach needs to map the level of customisation and the degree of ICT capabilities required.

G.2.3.7 Legal Conditions Check

Checking the basic legal conditions ensures that the business concept is legally viable. The inventor should check for potential conflict with intellectual property rights, purchasing contract law, copyrights, tax law, and international trade law (cf. May 2000; Hofmann 2001; Müthlein 1995; Gisler 1999). Especially questions of legal proof and of electronic documents, their storage and auditing processes should be taken into account. The offering of the invoicing document service of CXT was only possible after the Swiss government permitted the transmission and storage of electronic invoices (cf. Egger and Niederberger, 2002). The legal conditions influence the implementability of an e-service, as the invoicing example shows. Until the regulators accepted the electronic invoice the e-service was of little use to the provider or the potential customers.
G.3. Business Rule Example: Reed’s Law

The lowest impact has a 1:m relationship signifying a broadcasting relationship. The value rises constantly with the number of users. A multiple, transaction oriented 1:1 relationship provides a higher value. It has been described as Metcalfs’s law (see ch. 4.2) which was the implicit rule of many of CXT’s service offerings. The value of 1:1 relationships increases approximately in proportion to the square of the number of users (value = n^2). Even greater is the potential if the business concept can build on Reed’s law, which includes other permutations of groups to be formed from the number of participants. Reed (2001) provides an example of AOL where any kind of discussion group can be formed (see Figure Appendix G-25).

These groups provide more value to the members than broadcasting information (1:n) or transaction-oriented offerings such as email (1:1). Transferred to the business-to-business environment, it implies that a greater value can be generated for the participants of services if they allow the benefits for groups or networks to increase without consuming relationship-specific resources by the provider. To benefit from the positive effects of Reed’s law e-services must target the needs of subgroups (e.g. landed cost calculation services). In the e-procurement area the forming of dynamic consortia to buy, sell or to influence authorities or public opinion are possible examples. A prerequisite for leveraging Reed’s law is an easy-to-use and trusted infrastructure accompanied by corporate participants that support the dynamic forming and disbanding of virtual organisations and interest groups. With Web services the technical infrastructure can be formed to reap these effects for those who own the customer relationship (see ch. 3.5). These could be portals, e-markets or e-service providers. The law suggests that collaborating with and forming business networks will generate benefits for trading partners and indirectly for infrastructure providers, if trading partners are flexible and it does not conflict with anti-trust law.
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G.4. Business Model Comparison: Ariba versus Commerce One

To illustrate the application of the presented business concept structure a comparison of two existing business models in their approach to offer a global e-market platform and integrate e-services in the year 2001 is given. The customers could be trading partners, implementation partners, or financial partners. Ariba and Commerce One (C1) successfully started selling e-procurement solutions to customers in the late 90s (cf. Higgins, 2000). Often they were considered competitors; however the two companies were developing into different niches. A more scrutinizing look reveals that they pursue different business models. The difference is even greater when one compares Ariba with C1 and CXT as an example of C1-based e-market.

Ariba operates one central network with a 3-layer architecture, independently scaleable called Ariba Service Network (ASN). Ariba’s strategy is to provide a solution supporting transactional and strategic procurement processes to manage corporate spend on a global level for any type of goods and services. ASN serves as single gateway including business intelligence functionality. The sourcing process circumvents the ASN (see Figure Appendix G-26).

ASN is a global document exchange, directory service, and integration platform in ASP mode. The term network stresses its infrastructure element. It is not positioned as an intermediary business partner between buyer and supplier but as an enabler for electronic transactions. Ariba sees it as the ‘operating system for B2B commerce’ via the Internet to assure parties use common standards.

Ariba supported auctions since beginning of 2000 to cover parts of the intention phase of e-commerce transactions (cf. Schmid, 1993). Ariba had a coverage gap for frame contracting processes. Ariba launched a module called Ariba Contracting and a product called Ariba

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Figure Appendix G-26: Ariba business architecture of the ASN

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Sourcing to close the coverage gaps and complement the auction process. The latter covers blanket orders, volume contracts based on line items per suppliers. Contracts can be generated from a sourcing event and changed based on a sourcing event.

C1 offers software and solutions ranging from consulting to e-market operations. Next to its own e-market operations in USA it supports a network of decentralized e-markets with many independent e-market Makers. CXT’s as independent e-market provider has a different value proposition (see Figure Appendix G-27). CXT is a service company that started to run an e-market as Market Maker based on C1 technology. This implies that only service fees can yield revenues. Similar to Ariba there is a coverage gap for the frame contracting process. In addition to ARIBA’s SN it offers a solution for Buyers and Supplies in ASP mode, catalogue and content management in ASP mode, rich integration tools, and a variety of messaging standards, document conversion and workflow management component (see ch. 5). The integration of third party e-services was demonstrated with inet-logistics (see ch. 5).

![Figure Appendix G-27: Business model of C1 and GTW](image)

A customer evaluating a choice between CXT (CXT) and Ariba solutions will have to decide between a service based on hosted software or can access CXT services and buys software from C1. In the Ariba case he will buy software and an ASN buyer account on the ASN, with access to 10’000s of suppliers all over the world. Those two components logically belong together, as the ASN resides before and the procurement software behind the firewall. Consequently, it is not sufficient to emphasize the benefits and functional differences, but the customer needs, in order to decide between two completely different business models and value propositions. If the difference is not clear to the customer, the consequences can be sub-
optimal decisions. More realistically, the decision should be taken in two phases: a) e-procurement vendor b) service integrator or own services.

Figure Appendix G-28 summarizes the differences between the business models of Ariba and C1 software and e-market maker (CXT) enabled global trade.

<table>
<thead>
<tr>
<th>Category</th>
<th>Ariba</th>
<th>C1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Architectures</td>
<td>Target customers are National Top 50 buyers, suppliers and marketplaces on the supply side of any size</td>
<td>Any size of Buyers, Suppliers, e-markets (public &amp; private)</td>
</tr>
<tr>
<td></td>
<td>Document routing, sourcing and auctions, ASN hosted by Ariba, catalogue upload application for indirect/MRO goods, Ariba Buyer can integrate direct goods, both end user and system (MRP) driven (requisition upload)</td>
<td>Document routing, Ordering, e-market operations, order mgmt., catalogue and content mgmt., auctions, sourcing, 3rd party e-service enabling (e.g. with Clarus for Electronic Bill Presentment) indirect &amp; direct goods (with SAP software)</td>
</tr>
<tr>
<td>ICS</td>
<td>Central ASN with central e-service integration based written in Java, includes supplier registration, content management, order, acknowledgement and invoice routing, news and information services and connectors for EDI/ EDIFACT, email, Fax, HTML and cXML.</td>
<td>e-market application written fully in Java (former ASP) and decentralized e-service integration. MarketSite contains trading partner registry, document routing, customisable user interface</td>
</tr>
<tr>
<td>Theory of Business</td>
<td>Buyer and supplier benefit from a free of charge but proprietary and centralized ASN (lock-in), Ariba gets software license revenues; e-services are centrally integrated</td>
<td>Freedom for any e-marketplace to define its business model; most charge buyer and supplier; C1 grows with critical mass of transactions; e-services are decentralized integrated via the Business Services Framework.</td>
</tr>
<tr>
<td>Revenue Model</td>
<td>ACSN account is part of the procurement solution for buyers. It is free of charge to buyers and suppliers; revenue sharing with commerce service providers for used e-services planned for the future</td>
<td>Account fee, value based ongoing revenues on transactions, set-up costs, consulting; buyers, suppliers, e-markets and e-services providers as target customers</td>
</tr>
<tr>
<td>Value Proposition</td>
<td>Globally available network with a large supplier base. Access to best practice ordering processes for specific commodities such as temporary workers (with timecards) and travel.</td>
<td>Targeted to country markets C1 services and software provides a managed platform with local service providers as e-market Maker (e.g. CXT).</td>
</tr>
<tr>
<td>Customer Sales Approach</td>
<td>Key account management with a personal relationship building objective (e.g. golf tournaments)</td>
<td>Indirect sales via local e-market makers like CXT. Business model is also sold and rolled-out.</td>
</tr>
</tbody>
</table>

Figure Appendix G-28: Summary of different approaches to offer e-market and e-services

Both companies pursue different strategies on how to establish a global trading community and how to integrate e-services. The initiatives of both to integrate external e-services were actively promoted until 2000. Beyond that, both companies stopped the activities of integrating e-service providers due to general profitability concerns and massive drop in stock value. C1 offers the richer vision and higher openness but suffers from a more complex business model involving more partners and is usable for multiple applications such as e-markets or
consortia. Customers have sometimes difficulties to understand who performs which role and how they can leverage the Global Trading Web. The 50 (in peak times) worldwide public e-markets pursue their own goals and it requires additional coordination to work closely together in the Global Trading Web Association. Only a few the e-market Makers do not have trade experience as many have a telecommunications background. Future will show how Web services, BizTalk applications and standards like UDDI or SOAP affect the value proposition of the two companies. So far, none of them has implemented solutions based on these standards.

G.5. Business Model Failure at Napster

Computer science student Shawn Fanning invented and developed Napster in spring 1999. He leveraged the MP3 file developed by Fraunhofer and combined it with peer-to-peer (P2P) computing based software to share digital software files. In January 2001 Napster facilitated the exchange of 3 Billion music songs (NZZ, 2001). One explanation for its failure to establish a permanent innovation of a new distribution channel for music was its inability to devise a viable business concept and implement the business model for it. Figure Appendix G-29 shows the innovation potential enabled through Napster by using digital files and the Internet as distribution channel.

![Figure Appendix G-29: Redesign of the business network in the music industry](image)

Napster used the digital representation of music, which provides value to customers, but so far not a valid business model (Status: 092001). The customer benefits were a higher product range and richness, low cost infrastructure through resource sharing of abundant resources and leveraging the zero reproduction costs of copying and sending files via the Internet. Further positive effects are a high degree of parallel access between peer computers, free trial, and the possibility to customize one’s selection (cf. May and Singer, 2001). These benefits are not possible or far more expensive in the physical world. The actors within the business architecture consist of the musician, Napster as intermediary, and the consumers. They potentially disintermediate music labels, producers, and one or two physical distribution channels.

What Napster missed was to address the legal implications of music sharing and an incentive for the music companies to cooperate with it. Legal authorities forced Napster to close down due to a violation of copyrights. The outcome of one of the five big music companies Bertelsmann acquiring Napster is yet unclear. The business architecture, revenue model, business rules and the legal conditions were not detailed enough to allow for a successful and permanent position in music market.
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G.6. Detailed Knowledge Enabling Context

G.6.1 Instilling an E-service Development Vision

Transferred to e-service development, the findings of Von Krogh et al. (2000, 103) imply that an e-service development vision should provide a mental map of the world in which organisational members currently live. In addition, it should specify the service knowledge that organisational members ought to seek and create.

A top management task is to initiate the process of elaborating an (e-)service vision. They need to identify and gather participants, start the process and commit themselves to participation in defining and redefining that vision.

A good e-service vision is based on the following criteria (see Von Krogh et al., 2000): It should commit to a direction, lay the basis for encouraging new thinking, ideas, paraphrasing, and actions, and should focus on restructuring the current knowledge, services and task system in a company specific style. The e-service vision is used for the external communication of values and to build and maintain the commitment to shaping competitiveness. Von Krogh et al. believe it is most urgently required in the justification of the business concept in the investment proposal phase (TG3). In analogy, the e-service development vision should contain a development direction, an imaginative element and a restructuring element.

In the CXT case, the only imaginative element was that e-services would be a key source of revenue. The development direction and the acceptance of a restructuring element and change, however, were non-existent or not communicated. The dimensions of the e-service development vision and potential values are shown in Figure Appendix G-30.

<table>
<thead>
<tr>
<th>Properties</th>
<th>Dimensions</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-service development vision</td>
<td>Development direction</td>
<td>Unclear - Clear</td>
</tr>
<tr>
<td></td>
<td>Imaginative element</td>
<td>Weak - Strong</td>
</tr>
<tr>
<td></td>
<td>Restructuring element</td>
<td>Low - High</td>
</tr>
</tbody>
</table>

Figure Appendix G-30: Dimensions of the e-service development vision

G.6.2 Managing the Exchange of Information (Conversations)

Von Krogh et al. (2000, 129) classify this as the most influential and, depending on the requirements placed on developing e-services, the most necessary task. The vision and scope of the company must be clear to be able to shape the future, since service development projects can have an unlimited impact on the future value proposition and success of a company. One prerequisite is an atmosphere of great trust and a possibility for open-ended conversational interaction (see Von Krogh et al., 2000, 129). This is necessary to clarify whether old knowledge about the service logic and customer needs is still relevant or has to be unlearned. They recommend four guiding principles for improving the management of information exchange:

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Firstly, actively encourage participation (involvement) and foster this through incentives. Secondly, establish an etiquette for information exchange to avoid personal mobbing and power play. Figure Appendix G-1 provides some examples.

<table>
<thead>
<tr>
<th>Don’ts</th>
<th>Do’s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avoid unnecessary ambiguity (do not confuse things to cover a lack of knowledge)</td>
<td>Be brief (allow others to make their comments and statements)</td>
</tr>
<tr>
<td>Avoid intimidation (do not threaten other participants)</td>
<td>Be orderly (link statements to other themes discussed)</td>
</tr>
<tr>
<td>Avoid exercising authority (do not use power to force conversation into a certain direction)</td>
<td>Help other participants to be brave (allow for free and courageous speech)</td>
</tr>
<tr>
<td>Avoid premature closure</td>
<td>Do not knowingly make false statements</td>
</tr>
</tbody>
</table>

Figure Appendix G-31: Example of information exchange etiquette (see Von Krogh et al., 2000, 135)

Thirdly, edit conversations appropriately to ensure the achievement of agreement and understanding, since individuals perceive the world through language and have their own interpretations of certain terms. Fourthly, foster innovative language to express and inspire new thoughts. It helps to define a framework and structure ideas.

The sharing of tacit knowledge at CXT could have happened in service development council meetings and in unofficial meetings. However, the service development process at CXT did not achieve the cross levelling of knowledge as the status or finished versions of e-services were communicated but rarely read by the members of the organisation. Reasons were communication barriers and lack of acceptance of the process (see ch. 5.3.4.2).

Management should be aware of the process and make the right incisions at the right time. They should not restrict concept development towards a lasting concept (see Von Krogh et al., 2000, 137) but need to interfere if there are no signs of progress (e.g. more new buzz words but no change in the content of the discussions within the service development team).

Finally, a caring atmosphere was identified in the work of von Krogh et al. A caring atmosphere manifests itself in that ‘organisational members take an active interest in applying the insights provided by others’ (see Von Krogh et al., 2000, 9). The dimensions of care are (1) mutual trust, (2) active empathy, (3) access to help, (4) lenience in judgement, and (5) courage. At CXT, unit egoisms dominated and the success of the company as a whole sometimes seemed to be of minor interest.

<table>
<thead>
<tr>
<th>Properties</th>
<th>Dimensions</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effective conversations</td>
<td>Trust, Conversation openness, Edit conversations, Caring atmosphere</td>
<td>Low - High, Low - High, None - active editing, Low - High</td>
</tr>
</tbody>
</table>

Figure Appendix G-32: Dimensions of effective conversations
G.6.3 Mobilising Activists

Von Krogh et al. (2000) claim that mobilising activists is a key activity for maintaining momentum in the concept creation (business concept TG0), the concept justification (investment proposal TG3), and the building of the prototype (service engineering TG4). To achieve this creativity, coordination of knowledge creation and triggering of knowledge creation should be pursued by knowledge activists. This can only be achieved if there are people who can play this role and are motivated to mobilise others.

At CXT, the latter was not the perceived modus operandi after the first change of management. The process of the (e-)service development was not accepted by all members of management. An e-service activist should be a motivator, coordinator and a knowledgeable about the company's vision and strategy (cf. Von Krogh et al., 2000, 173). A knowledge activist fosters knowledge creation by initiating or by facilitating service engineering phases (Von Krogh et al., 2000, 148). Mobilising activists helps to increase creativity, trigger and coordinate knowledge creation. At CXT, the author and a few other non-management employees played the role of knowledge activists, but the communication culture and e-service vision in CXT were not sufficient. The aim of e-service activists is to (1) initiate and focus e-service knowledge creation; (2) reduce time and cost; (3) leverage knowledge-creation initiatives throughout the business network; (4) improve the conditions of those engaged in knowledge creation by relating activities to the bigger picture; (5) prepare participants; (6) include the perspective of the service development teams in the larger task of transforming the company (Von Krogh et al., 2000, 148). The concept category mobilise activist, its sub-categories and its values are depicted in Figure Appendix G-33.

<table>
<thead>
<tr>
<th>Properties</th>
<th>Dimensions</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobilise activists</td>
<td>Creativity</td>
<td>Low - High</td>
</tr>
<tr>
<td></td>
<td>Coordinate knowledge creation</td>
<td>None - operational - anticipative</td>
</tr>
<tr>
<td></td>
<td>Trigger knowledge creation</td>
<td>None - active</td>
</tr>
</tbody>
</table>

Figure Appendix G-33: Dimensions of mobilising activists

G.6.4 Creating the Right Context

The right enabling context plays an important role in achieving the maximum performance in identifying new opportunities and in using the main source of innovation, tacit knowledge, most effectively (see Von Krogh et al., 2000, 176). Achieving this context is possible through organisational structures that foster sound relationships and effective collaboration. The enabling context is a shared space that serves as a foundation for knowledge creation and is definable by a network of interactions. This space can be physical, virtual and mental. Collaborative ICT tools, such as shared workspaces, and flexible collaboration software, such as Grove (www.grove.net), and shared databases or relationship-specific collaboration software (cf. Ibbott and O'Keefe, 2004) are examples of enablers.
According to von Krogh et al. (2000, 179), the following conditions are prerequisites for the right context: The right amount of autonomy for the participants, a certain level of creative chaos, redundancy, and variety aimed at producing a stimulating environment. In addition, a high-care organisation that fosters mutual backing and commitment to supporting the development of shared concepts of subgroups into effective explicit social knowledge of the organisation.

**Literature Case**: Toshiba has formed a cross-divisional group (Advanced-1) to create new businesses. The strategic purpose is to generate more business ideas and share the risk of pursuing them by having this cross-divisional team with top management participation, organised by headquarters (Von Krogh et al., 2000, 180). The group meets every two weeks and has a one-day meeting every three months to review activities. There is a quarterly meeting with the whole management board. Through its function as a forum for innovation and identifying sources of existing knowledge, the group assumes the role of the knowledge-activist with a threefold integrating function: Firstly, it accelerates the coordination between divisions, thus reducing uncertainties about the true value of existing knowledge (Hill, 1994). Secondly, corporate headquarters can avoid performance ambiguities by directly facilitating performance. Thirdly, it facilitates the flow of communicating corporate initiatives, and receives the strong support and commitment of Toshiba’s board members.

Figure Appendix G-34 summarises the dimensions of creating the right context. The alignment with the strategy, values, and ICT is confirmed as key to achieving benefits in inter-organisational relationships supported by inter-organisational systems (cf. Ibbott and O'Keefe, 2004).

<table>
<thead>
<tr>
<th>Properties</th>
<th>Dimensions</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create the right context</td>
<td>Align values</td>
<td>None - aligned</td>
</tr>
<tr>
<td></td>
<td>Align organisational structure</td>
<td>None - aligned</td>
</tr>
<tr>
<td></td>
<td>Align strategy</td>
<td>None - aligned</td>
</tr>
<tr>
<td></td>
<td>Align ICT</td>
<td>None - aligned</td>
</tr>
</tbody>
</table>

**Figure Appendix G-34: Dimensions of creating the right context**

G.6.5 Cross-levelling and Globalising Local Knowledge and Service Components

The final component is to leverage the knowledge created within the organisation and between organisations. This activity could interlink with an e-service development portfolio process and be supported by training and the sharing of documents on a public server with the relevant people.

Cross-levelling strives to spread information about the finished e-service, the total value proposition, and levels of customisation within the company. It strives to achieve a shared understanding about the development direction and customer target groups. The final step in the e-service engineering phase is closely linked to the last e-service knowledge enabling element of globalising local knowledge.
The purpose of globalising local knowledge is to overcome what Von Krogh et al. (2000) call 'the process that makes the knowledge of other far-flung divisions appealing to a local operation', rather than threatening, irrelevant, or too 'foreign'. Globalising local knowledge fosters the spreading of local knowledge and should be supported by incentives to use the available knowledge. It requires a change in the mindset of the local people in units or in other countries towards accepting available knowledge. They have to overcome the 'not invented here barrier'.

The focus of a multiple e-service company like CXT is extensible to the wider context of a global community. In CXT's context it was the Global Trading Web which existed up until beginning of 2003. The author participated in four meetings. The goals were to facilitate international trade and support the exchange of experience and knowledge between national e-markets. It can be assumed that if the knowledge enabler concept was applied the success potential of the GTW meetings would have increased.

This e-service knowledge enabler has been applied within the Global Trading Web. However, the differences between the local e-markets were often greater than expected so the knowledge sharing was mainly driven by a group of people from the software provider. There were regular opportunities of meeting but participation numbers were low and the motivation of the participants to share their new developments or market insights and spend extra time on knowledge sharing was lacking. Moderating activities run by the software provider were not sufficient since their motivation was to sell further services to the e-market service providers like CXT. The communication and knowledge sharing during these meeting was therefore limited due to lack of time and language barriers in open discussions. Tacit knowledge was rarely exchanged and codified. Simple tools to help in globalising local knowledge are bulletin boards and rich meeting protocols. Globalisation is only likely to be accepted if the local value is high, which was often not achieved. More advanced structured knowledge databases, combined with a knowledge pull mechanism (cf. Sveiby, 1996) that specifies a knowledge deficit in the form of a request or a database query, such as many global consulting companies like Accenture use (cf. Von Krogh et al., 2000), were not applied. Dialogue and knowledge exchange can be facilitated using these technical infrastructures (see Von Krogh et al., 2000).

Figure Appendix G-35 summarises the fifth knowledge enabler.

<table>
<thead>
<tr>
<th>Properties</th>
<th>Dimensions</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross-levelling local knowledge &amp; globalise</td>
<td>Spread knowledge</td>
<td>None - actively pursued organisationwide</td>
</tr>
<tr>
<td></td>
<td>Set incentives to use knowledge</td>
<td>None - organisation wide established</td>
</tr>
<tr>
<td></td>
<td>Technical infrastructure</td>
<td>None - protocols - databases and interactive computer supported meetings</td>
</tr>
</tbody>
</table>

Figure Appendix G-35: Dimension of cross-levelling and globalising of knowledge
Appendix H: Measures for E-service Success and an Example of Their Application

H.1. Measures for IS Systems

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>System Quality</td>
<td>Information Quality</td>
<td>Perceived Service Performance</td>
<td>User Expectation</td>
<td>User Awareness</td>
<td>User</td>
<td>User Satisfaction</td>
<td>Individual Impact</td>
<td>Organizational Impact</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>Data accuracy</td>
<td>Importance</td>
<td>Service availability</td>
<td>Time</td>
<td>knowledge of service</td>
<td>Number of uses</td>
<td>Satisfaction</td>
<td>Learning</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Data currency</td>
<td>Relevance</td>
<td>Reliability</td>
<td>Quality</td>
<td>knowledge of service</td>
<td>amount of time span</td>
<td>Single/Multi-item measure</td>
<td>Accurate interpretation</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Ease of use</td>
<td>Usability</td>
<td>Responsiveness</td>
<td>Flexibility</td>
<td>knowledge of service</td>
<td>Application</td>
<td>Number of functions used</td>
<td>Enjoyment</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Ease of learning</td>
<td>Clarity</td>
<td>Assurance</td>
<td>Perfect delivery</td>
<td>Capability to use service</td>
<td>Frequency of use</td>
<td>Software satisfaction</td>
<td>Decision effectiveness</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Realization of user requirements</td>
<td>Format</td>
<td>Empathy</td>
<td>Word-of-mouth</td>
<td>Degree of ease of access</td>
<td>Pull or Push</td>
<td>Decision making satisfaction</td>
<td>Task performance</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Usefulness of system features and functions</td>
<td>Content</td>
<td>Tangibles</td>
<td>Personal needs</td>
<td>Future intentions</td>
<td>Outcome measures</td>
<td>Individual power change</td>
<td>Product quality</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>System accuracy</td>
<td>Accuracy</td>
<td>Past experience</td>
<td>Perceived usefulness</td>
<td>Willingness to pay</td>
<td>Knowledge sharing</td>
<td>Enhanced customer support &amp; service</td>
<td>Communication effectiveness</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>System flexibility</td>
<td>Consciousness</td>
<td>Perceived usefulness</td>
<td>Willingness to pay</td>
<td>Improved customer support &amp; service</td>
<td>Communication effectiveness</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>System reliability (MTBF)</td>
<td>Currency</td>
<td>Failure rate</td>
<td>Improved customer knowledge</td>
<td>Customer lock-in</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>Integration of systems</td>
<td>Timeliness</td>
<td>Friendliness</td>
<td>Reduced information search time</td>
<td>Competitive advantage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>Resource utilization</td>
<td>Understandability</td>
<td>Number of available alternatives</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>Response time</td>
<td>Completeness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure Appendix H-1: Traditional IS Research Measures
### H.2. E-commerce Specific Success Measures

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Quality</td>
<td>Information Quality</td>
<td>Perceived Service Performance</td>
<td>User Experience</td>
<td>User Awareness</td>
<td>Use</td>
<td>User Satisfaction</td>
<td>Individual Impact</td>
<td>Organisational Impact</td>
<td>Economic Impact</td>
</tr>
<tr>
<td>1</td>
<td>Customisation</td>
<td>Content personalisation</td>
<td>User support</td>
<td>Failure rate</td>
<td>Visibility of e-service</td>
<td>Number of site visits</td>
<td>e-loyalty</td>
<td>Faster task fulfillment</td>
<td>Selling team coordination</td>
</tr>
<tr>
<td>2</td>
<td>Ease of navigation</td>
<td>Dynamic content</td>
<td>Online-support</td>
<td>Compensating transactions</td>
<td>Access rights</td>
<td>Length of stay</td>
<td>Return Rate</td>
<td>Improved customer experience</td>
<td>Global reach</td>
</tr>
<tr>
<td>3</td>
<td>Privacy</td>
<td>Variety of information</td>
<td>Ease of Use</td>
<td>Perceived ease of use</td>
<td>Transaction (Send purchase Orders, Receive orders, pay, accept payment)</td>
<td>Number of purchases completed</td>
<td>Entertainment</td>
<td>Customer loyalty</td>
<td>E-service project risks</td>
</tr>
<tr>
<td>4</td>
<td>Security</td>
<td>Completeness of content</td>
<td>Customised site intelligence (Reporting)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>5</td>
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</tbody>
</table>

**Figure Appendix H-2: E-commerce specific measures**

### H.3. Example of Applying Utilisation Monitoring to an EMarket

A cybernetic feedback control mechanism using the parametric model of Beer is proposed. Beer's model aims to identify disturbances of systems based on key performance indicators (cf. Beer, 1981, 206; Malik, 1992, 117; Schwaninger, 2000a). He proposes potentiality, capability, and reality as measures, along with the relative performance indicators of productivity, latency, and total performance. Capability is the maximum that can be achieved within the given focus. Productivity is reality divided by capability, which quantifies the optimum within the current context conditions. Assuming a transaction-based business model, this definition of productivity is quantifiable and easy to measure. Latency is capability divided by potentiality, which quantifies the achievement gap between future potentiality and current capabilities. Potentiality is defined as the scope that is achievable if all barriers are removed and the system is developed to meet customer's demands in functionality and organisational reach (e.g. used by all possible users or extension of the service scope).
Appendix H: Measures for E-service Success and an Example of Their Application

The example presents a hypothetical case on utilisation monitoring for a catalogue-based e-procurement service. Based on past data for the first unit that uses an e-service in phase one, an ASP procurement e-service could transact 600 purchases per month. In reality, only 400 transactions are achieved (phase 1). This implies that the hybrid e-service is used in only two thirds of the possible incidents (see Figure Appendix H-3). The potentiality of 1000 transactions could be achieved if a further category is procured via the ASP procurement e-service, but this category was not yet available. The productivity is 66% and the latency computes to 60% of the achievement. The total performance of the e-service in phase one comes to 40%.

Phase 2 implies the achievable numbers if the roll-out is made to two similar units. Figure Appendix H-3 further indicates the actions that provider and customer agreed upon should utilisation fall below certain thresholds.

<table>
<thead>
<tr>
<th>Monitoring Measure Category</th>
<th>Specification of Monitoring Measures</th>
<th>Values in phase 1</th>
<th>Values in phase 2</th>
<th>Pre-defined actions by e-service provider</th>
<th>Pre-defined actions by e-service customer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reality</td>
<td>Purchases via e-service</td>
<td>400</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capability</td>
<td>Total purchases of last year</td>
<td>600</td>
<td>1800</td>
<td>If &lt; 70%, then analyse operations and send warning to customer or offer additional training</td>
<td>If &lt; 80%, start problem report. Enforce usage by setting incentives.</td>
</tr>
<tr>
<td>Productivity</td>
<td>Relative utilisation</td>
<td>0.66</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potentiality</td>
<td>Total purchases of category A</td>
<td>1000</td>
<td>3000</td>
<td>Develop usability and extend scope</td>
<td></td>
</tr>
<tr>
<td>Latency</td>
<td>Relative potential utilisation</td>
<td>0.6</td>
<td></td>
<td>If &lt; 60% arrange customer meeting</td>
<td>If &lt; 50% change e-service provider</td>
</tr>
<tr>
<td>Total Performance</td>
<td>Utilisation level</td>
<td>0.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benefit (e.g. time saved)</td>
<td></td>
<td>400x0.5h = 200 h</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure Appendix H-3: Cybernetic control measures to monitor e-service utilisation (single customer)

Pro-active measures can be taken by aligning the goals of the users of the e-service with the use of the e-service, by creating incentives to use e-services, or by sanctioning the use of the former process (e.g. purchases from a traditional supplier involved in the e-procurement process). In addition, the provider and customer of the e-service define means whereby utilisation can be increased to shorten the time to act, thus securing the success of the e-service.

Next to training and adaptation of the incentive systems, reports on the usability of the e-service contain valuable information for the e-service provider and the e-service customer. This information can help them learn about and act on problems of e-service quality, information quality, system quality.
Appendix H: Measures for E-service Success and an Example of Their Application

The proposed measures proposed be implemented building a single-loop and a double-loop learning mechanisms based on cybernetic principles (see Schwaninger, 2000a). The operative level represents single-loop learning and adaptation (see Figure Appendix H-4). Utilisation of the e-service system under control is monitored by the first regulator (R1). The proposed basic control variables are the absolute and relative numbers of electronic orders and the total number of orders. If utilisation falls below the expected level, the regulator can influence the system with predefined measures (e.g. informing the managers of the unit with lower-than-expected utilisation or asking users for reasons why utilisation is so low). On the operative level, the e-service productivity measure and its predefined actions are applied.

The second level represents double-loop learning. This learning changes the goal system, actions and the operative system itself. It focuses on the improvement of value potentials on a strategic management level by setting the general conditions for the operative level and enabling it to increase the use of e-services, thereby raising liquidity and profit. The consequences could be modifications to the e-services, offering new e-services or a substitution of the provider or solution. The second level uses the latency performance indicator. The regulated variables are the feedback control loop of KPIs from the system under control. The system under control is for level 1 the e-service in focus and on level 2 the design and scope of the e-service. Each of the systems has a regulator (R1 and R2) that influences the system with steering activities. External influences, such as competitor activities, system failures or lack of use, influence the e-service through disturbances and are reported back to the respective management. E1 and E2 represent deviations between the goals and the values of regulated variables. In the example above, this could be utilisation below 50%. Level 2 can directly influence the operative system through the defining of new parameters or actions (v1) to redesign the system under control. The interaction channel is an information exchange mechanism between the different levels of regulators and systems.

The third level represents the normative level of e-service management is not depicted. It defines the conduct and may change the whole system if the goals are not compatible anymore. The structure is similar to the other levels but the control variables are potentiality and purpose of the e-service.
Appendix H: Measures for E-service Success and an Example of Their Application

**Goals:**

Value Potentials

Assistant: Value Potential

Profit, Liquidity

Utilisation Management

Levels:

Strategic Management

Operative Management

**Code:**
y: Regulated variables
v: Parameters
w: Goals
u: Control Variables (examples)
R: Regulator
z: Disturbance
e: Deviation
*: Connection with next higher level

**Figure Appendix H-4:** Cybernetic model to manage e-services and utilisation

The model above highlights a minimum level of information exchange and regulation systems enabling an e-service provider to react in time to disturbances and learn from specific internal and environmental events. Changes can have effects on the theory of the business, customers, type of sources of revenue, and the ICT architecture. Figure Appendix H-4 shows the embeddedness of utilisation monitoring and e-service management within its customers’ organisations. The key performance indicators, thresholds, and actions to be taken are ideally agreed upon before the service is used. The customers are then provided with information on utilisation through access to a business intelligence service at the e-service provider or through an exchange of files or regular messages on the status. The e-service provider and its customers then have the minimum amount of information they need to manage the utilisation and can then learn and act upon the information on the acceptance of the e-service by the users (see Figure Appendix H-5).

**Figure Appendix H-5:** Example of e-service utilisation monitoring interaction with customers
Appendix H: Measures for E-service Success and an Example of Their Application

This will strengthen a coordinated management of e-services to the benefit of the e-service provider and the users. All participants are forced to think about performance measurement systems and actions during the use phase of an e-service.

The definition of the metrics is part of the learning and change management process and has been reported as beneficial in a hotel service setting (see Schwaninger and Haff, 1991, 22). The establishment of an utilisation management system may also support the exchange of information on actual performance and ways of improvement. The management of utilisation therefore necessitates a stronger relationship between the e-service provider and its customers, thereby establishing a rich exchange of information (cf. Semlinger, 1993) that can foster a closer partnership and offers lock-in effects for the e-service provider.
Appendix I: Extension of the Process Focus of Online-Ordering

I.1. Theoretical Considerations on Intermediation and Disintermediation

The power relationship is an important element to explain the intermediation and disintermediation in business networks (see Harrington and Reed, 1996; Wirtz, 2000; Picot et al., 2001, 377). Intermediation describes the entry of a new actor in an existing supply chain, who is neither buyer nor supplier. Intermediaries facilitate or enable the seamless functioning of the market based on financial compensation (e.g. access fees) (cf. Picot et al., 2001, 377). Intermediation is the activity of establishing such a position by supporting the CRLC of the trading partners with information, performing market functions, organising the distribution of goods and services, building trust into the market and providing secondary services like payment, financing, or insurance. Virtual intermediaries like e-markets focus on the virtual value chain (see ch. 2.2). Their value proposition lies in purely optimising the information management by aggregating information, integrating systems and coordinating the information flow.

An example for disintermediation is a manufacturer who directly accesses customers and thereby circumvents previously used distribution partners. To achieve this, the producer must take on the value adding tasks of the trader like distribution, storage, consulting, aggregating and assembling of products and services (see Benjamin and Wigand, 1995, 68). This is possible by using on-demand distribution and storage concepts enabled by Internet technologies and/or by working together with logistics providers. Disintermediation leads to the effects displayed in Figure Appendix I-1.

![Figure Appendix I-1: Effects of disintermediation by a manufacturer (cf. Wirtz, 2000, 117)](image)

There are proponents that believe disintermediation (cf. Hagel and Armstrong, 1997, Wirtz, 2000) through e-business will dominate, and others that endorse re-intermediation caused by the broader worldwide reach to suppliers (Tapscott et al., 2000). Currently hybrid solutions are common where the traditional and virtual channels are combined (Wirtz, 2000, 48). Only
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a few companies, like Dell, have managed to rely only on a direct sales channel. It depends on the nature of the inputs, the power relationships between parties, the dynamics and technology savyness of the industry, which configuration emerges. Figure Appendix I-2 shows conditions where an intermediary increases efficiencies and effectiveness (cf. Barratt and Rosdahl, 2002; Zerdick et al., 2001; Weill and Vitale, 2001; Hofmann, 2001). The efficiencies are increased due to a potential to reduce transaction costs and enable more efficient markets by enabling faster and better decisions (effectiveness).

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Positive effects generated by Electronic Intermediaries</th>
<th>Offering by Intermediaries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fragmented market with many participants and a lack of information transparency</td>
<td>Reduction of information search and settlement costs</td>
<td>Access to information or to a closed community; be able to make transactions</td>
</tr>
<tr>
<td>Expensive infrastructure for high-end B2B integration software</td>
<td>Cost sharing via one central installation</td>
<td>Offer the infrastructure to integrate customers</td>
</tr>
<tr>
<td>Lack of knowledge</td>
<td>Leverage intermediary’s knowledge</td>
<td>Offer complementary services</td>
</tr>
<tr>
<td>Complex bargaining required</td>
<td>Reduced contracting costs</td>
<td>Offer standard bundles (e.g. commodities)</td>
</tr>
<tr>
<td>High manual processes and media mismatches during settling</td>
<td>Automate to save time, increase responsiveness and quality</td>
<td>E-service integration to support settling</td>
</tr>
<tr>
<td>Little relationship intensity and frequent changes</td>
<td>Decouple technical integration and offer assessment tools</td>
<td>Provide trust service and rating information</td>
</tr>
<tr>
<td>Little differentiation, existing brands and industry monopolies</td>
<td>Enable network effects</td>
<td>Trust and high quality information and easier transactions</td>
</tr>
<tr>
<td>High information search costs</td>
<td>Reduced time spend for search</td>
<td>Offer transparent information</td>
</tr>
<tr>
<td>High ordering and settlement costs</td>
<td>Reduce time, resources and failures</td>
<td>Offer seamless contracting, trans-action and settlement functions</td>
</tr>
<tr>
<td>Strong position power of a few actors</td>
<td>Mitigate power differential</td>
<td>Advocate to form communities of shared interest</td>
</tr>
<tr>
<td>Sporadic purchases</td>
<td>Market overview provided (information function); Bundling of services and products</td>
<td>Facilitation and time savings</td>
</tr>
</tbody>
</table>

*Figure Appendix I-2: Intermediaries value proposition matrix*

Malone and Rockart (1991) identified three effects ICT usage has on organisations:

The first order effect of falling transaction costs fosters disintermediation. It becomes easier for trading partners to procure directly from the manufacturers and to thus disintermediate trade or wholesale organisations.

With second order effects, the availability of offers in electronic form rise above the information processing capabilities of the individual or enterprises. This gives rise to new electronic intermediaries (re-intermediation).
Kollmann (2001) explains the evolution of both effects by depicting the units of information (y-axis) and the number of potential business partners (x-axis) in a market (see Figure Appendix I-3), where efficiency gains are possible through a higher transparency (e.g. commodities). Sector 1 describes the situation where a market overview is possible by an individual buying organisation with traditional means. If the number of potential partners rises the traditional relationship management mechanisms are not sufficient (sector 2). The buyer can either use a traditional intermediary or use an electronic intermediary like search agents or e-services to overcome the real coordination gap. If the availability of information in the Internet rises further the information processing capacity of the virtual individual solution or the traditional intermediary will not suffice. One form to close this virtual coordination gap is to use e-markets (sector 3). They increase the information transparency and visibility in the supply market by providing structured and qualified information. Further, they can digitalize traditional transaction phases or complement their offering with classical trade functions like storage or transport to become a hybrid (electronic and real) intermediary.

![Figure Appendix I-3: Transaction cost based justification for re-intermediation](image)

Examples are Commerce One software-based e-markets (www.globaltradingweb.net). The value proposition of these electronic trade enablers lies in reducing the virtual coordination gap of the individual or the single enterprise by offering an improved identification and matching of supply and demand. Furthermore, they act as agents for electronic transactions by providing the ICS infrastructure and run the service.

The third order effects describe organisational changes of the whole system towards new coordination-intensive structures. Malone and Rockart (1991) hypothesize that this effect requires decentralized decisions and information supply for inter-organisational processes. This
effect is synchronization with the offering of e-services as they have the potential to become the Business Collaboration Infrastructure for coordination intensive structures.

The current configurations drive the emergence and stability of intermediaries. Shaping factors are the interdependence, exit costs of existing trade relationships and systems to manage transactions. The following patterns and trends emerge (see Picot et al., 2001, 381):

Disintermediation tends to be used and is accepted by customers for information products like software or media products and information-based services like payment settlement or invoicing. We will explore what effect e-services might have on this tendency and if the range of inputs can be expanded via the use of e-services (see ch. 3.2).

Transintermediation is currently happening where virtual actors substitute traditional actors ones in supporting the information phase of transactions. Infomediaries (Hagel and Armstrong, 1997), brokers (cf. Gemünden and Walter 1995) and search agents help to identify partners or provide information or online-training.

Reintermediation is a new form to intermediate trade. One can find them in the form of content providers, search engines, portals, community providers and e-markets.

To avoid risks it is crucial to be able to assess the business model of a Market Maker and the e-market he’s organising, if there is considerable investment related to the participation in e-markets (see Klueber et al., 2001a). Gigalis et al. summarise that a likely outcome is a dynamic mix-mode structure that includes traditional channels, dis-, re- and cybermediation. They elaborated that depending on the market structures, products, services and relationships between market participants differing models seem favourable but more research is required (see Giaglis et al., 2002, 243).

I.2. Upstream Processes Opportunity for E-markets: E-contracting

As a new or an existing intermediary positioning itself in the electronic world, E-markets like CXT continuously strive to provide value to their customers. One way to differentiate themselves from alternative approaches like point-to-point connections is to leverage the competitive advantage of the n:1:m architecture, which other architectural and institutional solutions are unable to provide.

The secure management of contracts and bargaining process is a potential, which e-procurement application vendors only recently addressed (cf. Ariba Sourcing or C1 Sourcing Solutions). The availability of electronic contracts would leverage the potential to offer successive services like the management of Service Level Agreements (SLAs). Figure Appendix I-4 shows relevant types of contractual relations within e-procurement (cf. Angelov and Grefen, 2001).
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**Figure Appendix I-4: Types of contracts**

E-markets can address all scenarios. Multiparty contracting has the lowest barrier of entry, where there is an existing business relationship between trading partners, e-service providers and e-market already exists. In this scenario the e-market would increase its services to its trading community. With the current status of availability of contracts in electronic form as well as in terms of their legal acceptance, it is not achieved, but companies and standardization bodies address this subject. E-markets can potentially offer many (semi-) automated services in the contracting and related process areas. Figure Appendix I-5 displays the full-scale scenario of potential electronic contracting support services (cf. Runge et al., 1999).

**Figure Appendix I-5: Positioning of the contracting phase within the current CXT services**

The semi-automated contracting process opens a further opportunity to increase efficiencies in the procurement process to improve a process which to date is mostly paper-based. This is another contribution towards dynamic networking without having to rely on trust only (cf. Hoffer et al., 2001). In implementing a full-scale scenario the security, exception handling, monitoring, and control mechanisms established for traditional business can be enhanced in the virtual world and could lead to more dynamic network forming practices.

**Figure Appendix I-6: Development path of e-contracting capabilities**

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A further potential for third party e-services is to offer electronically supported contract arbitrating and enforcement services. Electronic access to the history of transactions can facilitate and accelerate this, enabling the comparison of the actual performance with the contractual agreements and commitments.

1.3. Transaction-based Information E-services for SLA Management

Service level agreement management regarding transactions of traded goods was one promising candidate in the search for new e-services for customers of MRO e-markets. The main criteria were (latent) customer demand, extension of the transaction depth, and leveraging the unique value proposition originating from the neutral position between trading parties. It is valuable if either they do not have the technical infrastructure or political hurdles prevent end-to-end processes monitoring via the Internet on their own. The e-market can provide the SLA information about the traded goods and services over its infrastructure.

Service levels are defined as 'a contract between IT and its clients that specify the parameters of system capacity, network performance, and overall response time required to meet business objectives' (see Sturm et al., 2000, 13). We extend this definition by including business rules and regulations on a semantic level. An example is monitoring if the suppliers system fails as well as if he responds that he cannot deliver in time. Based on the content of the messages exchanged an SLA Management solution can monitor and record and may also take compensating actions. Service Level Management (SLM) includes the disciplined, proactive methodology and procedures used to ensure that adequate levels of service are delivered to all IT users in accordance with business priorities and at acceptable cost (see Sturm et al., 2000, 13). SLA Management supplements contract management that covers the electronic representation of contracts and contract lifetime management. Its focus is to extract information and actively monitor the transactions specified in the SLAs and may have direct links to the SLA object.

Currently contracts are not managed in electronic form in the MRO environment. An e-market could leverage its neutral position by offering SLA monitoring services to buyers, suppliers and integrated e-service providers (e.g. transportation provider with e-service enabled coordination). The requirement to seize this opportunity, is a legal units spanning, transaction and document specific SLA management tool, which allows data capture, and monitors, and reports the actual performance of suppliers, buyers and third party e-service providers. These tools can identify the performance delivered by the parties concerned and compare this to the commitments defined in the SLA.

Available monitoring tools for SLAs on for network, server and workstation, database, and application monitoring exist (see Sturm et al., 2000, 110). Examples of providers and products of these solutions are HP OpenView or Tivoli NetView. Their limitation is that they are not designed to cover end-to-end business transactions.
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With the appropriate infrastructure e-markets can leverage their neutral position and use a B2B workflow management system to codify the SLAs in workflow and monitoring rules. The workflow component serves as an execution, monitoring and reporting tool.

If the workflow application can provide this structured information to the buying organisation, buyers are better able to implement their procurement strategy and form their supplier relationship. An example would be a superior bargaining position for new frame contracts, if the proposed solution offers an improved and undisputable basis for information. For the supplier, the advantage is the visibility of his own performance. This enables the supplier to improve and proactively act before a dissatisfied buyer considers stopping the business relationship and contracting a new supplier. This scenario is valuable for service operators, who need information about their internal and their partners’ performance to be able to meet the SLAs (e.g. IT outsourcing services). The information shared with the trading partners is defined by them and offered by the e-market with agreed upon security and privacy standards.

Figure Appendix 1-7 shows a potential solution for the implementation of an SLA modelled in workflow rules and subsequent monitoring. Next to the neutrality an e-market can have the advantage that trading partner data and integration to backend-systems is already available. Furthermore, the existing connection reduces set-up costs. Depending on the SLAs content the monitoring can trigger real-time responses if violations occur or simply produce monthly or weekly reports that can be accessed by the buyer or supplier in ASP mode.

A service level should be attainable, measurable, understandable, mutually acceptable, meaningful, controllable, and affordable (see Sturm et al., 2000, 64). The metrics can encompass logistics, financial, and/or quality aspects.
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In contrast to the traditional service level management covering network performance (esp. routers) or data base and application response times (see Sturm et al., 2000, 110), service levels on the process level between businesses require a more business-oriented level of measurement criteria. A closer business-orientation signifies the coverage of business terms instead of database access times or network downtime for example. To facilitate the definition of workflow rules, application process or at minimum document-based measurement criteria are recommendable in order to be meaningful for the business users, which have financial, procurement and sales competencies. Examples are order-to-delivery time or quality level of the delivered product and/or shipment.

Another challenge posed to e-markets is that they rely on a network and application components, which they cannot fully control. In the case of CXT it is possible to control the document flow from buyer to supplier with little control over the network due to two Internet connection points. This challenge holds true for all e-services that build on other Collaboration Infrastructure e-services or network and application hosting services. A solution would be vertical SLAs with these service providers to be able to offer end-to-end guarantees to the business customers of the e-market.

Figure Appendix I-8 depicts this situation of the challenges in establishing SLAs and corresponding metrics for business process and interorganisational transactions and further mapping between the infrastructure and business SLAs.

<table>
<thead>
<tr>
<th>IT Infrastructure SLAs</th>
<th>Business Level SLAs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability (% of available time)</td>
<td>Document specific response time</td>
</tr>
<tr>
<td>Performance (response time)</td>
<td>Trading partner specific or third party specific metrics</td>
</tr>
<tr>
<td>Reliability (downtime)</td>
<td>Document content specific actions</td>
</tr>
<tr>
<td>Recoverability (time to recover)</td>
<td>Standard process SLAs</td>
</tr>
<tr>
<td>Delivery time &amp; quality conformance</td>
<td>Delivery time &amp; quality conformance</td>
</tr>
</tbody>
</table>

Figure Appendix I-8: Metrics for infrastructure vs. business level SLAs

Future developments of the presented case would require the support of online negotiation services and electronic contracts that would be stored at the e-market in dedicated repositories and the workflow rules would be generated from XML-based standard contract terms (see Figure Appendix I-6). Further services would include security, auditing, and enforcement services. The requested integration would not require much additional effort since in the chosen scenario the integration need (see Hoffer et al., 2001, 119) and the business relationship already exist.

I.4. Downstream Processes: Logistics

1.4.1 Motivation to Integrate Logistics E-services in E-procurement

The large proportion of the total process costs of MRO transactions attributable to logistic processes provides one reason to analyze the logistic processes. Logistic related costs accu-
mulate to 56% of the total process costs\(^1\). So far MRO e-procurement systems only cover the ordering and cataloguing part, which consumes 18% of the total process costs (see Figure Appendix I-9).

![Figure Appendix I-9: Costs addressed by e-procurement solutions limited to ordering](image)

For direct production goods e-services can help to increase the service levels for logistic services defined by the quality of delivery, delivery time, availability, flexibility to respond, total costs and information (see Frey et al., 2000, 228; Bowersox and Closs, 1996, 9). This is of high importance for international trade and business critical direct goods. A higher electronic integration of information flows and coordination is a prerequisite to achieve this. When companies convert paper documents to digital documents, EDI documents to XML documents, they can meet higher requirements on timeliness, quality, and flexibility. If e-markets can comply with these higher demands on reliability the benefit through increased automation, more information about status and quality of delivery, and coordination and integration could be offered to their trading partners. Since this relates to the core business of companies, the willingness to pay for better information on critical supplies (e.g. for just-in-time production or CPFR) is likely to be higher than for MRO goods.

Secondly, the co-evolution of logistics and e-commerce due to the same underlying focus on coordination (cf. Alt and Schmid, 2000) and the forecasted extension of goods in B2C and B2B e-commerce (cf. Klaus, 2000) raises the importance of logistics for successful e-business activities (cf. Tapscott, 1998).

A third high-level motivation is that the logistics process is the next logical downstream process to integrate electronically after the ordering process (see Figure Appendix I-10 for an example of a typical CXT customer). If the business network uses appropriate B2B EAI, it shortens the integration time and increases the choice of potential providers.

\(^1\) The numbers are from the US for the year 1997 before companies used e-procurement systems. In total the costs consumed $175 billion (see Barry, J. (1999)).
Finally, e-services are touted to be highly relevant (cf. Runyan, 2000; Homs et al., 2001, 3) to build more complete logistics e-markets and for general e-markets to enhance their service portfolio. Based on interviews with more than 30 logistic managers Forrester predicts that 37% will use e-logistics to outsource their logistics to 3rd and 4th party logistics providers in 2004 (see Homs et al., 2001, 4). By 2004 the percentage of electronic logistics ordering and fulfilment will be around 44% according to Forrester. Many services can be electronically integrated to better support international trade in addition to handling transportation documents, provided the involved actors can interoperate seamlessly. Depending on the type of good and capabilities of the logistics e-service provider they are offered directly or via an e-service integration service like the CXT BDX platform (see Figure Appendix I-11):
1.4.2 Challenges for Logistics in eBusiness

Despite of the tendency of digitalization of products and services (see chapter 3.2) physical logistics will not dwindle away. In some areas like direct delivery to the business or private consumer the traffic will even increase with smaller order sizes and higher quality. Just-in-time delivery and centralized production reduce the logistics need for storage and handling with the total effect being yet unclear (see Klaus, 2000, 144). The main challenge of logistics management is to manage the trade-off between cost and service quality. Paradox and multi-attribute goals are common. To meet these challenges an integrated approach is required that build on holistic thinking and acting (cf. Gomez and Probst, 1995), process and flow orientation (cf. Fleisch, 2000), time efficiency (cf. Stalk and Hout, 1990), and customer and competitor orientation (cf. Hadamitzky, 1994). E-business systems help to redesign logistic systems containing the following elements:

The logistics market is complex, heterogeneous, and fragmented. This stems from a multi-dimensional solution space, which at minimum contains the six dimensions of (1) type of good, (2) logistical requirements of the physical goods, (3) the transportation mode, (4) number of relations defined by the destinations (geographical scope), (5) the depth of logistical functions performed, and (6) the kind of logistics provider chosen. By focusing on the transportation - leaving out the type of provider - three key dimensions remain:

- The modes of transportation are air, road, pipeline, railroad, and water, with road covering 56% of all transportation in Europe (Homs et al., 2001, 8).

- Different types of logistical networks for road transportation. The standard segmentation is to differentiate between courier and express services, packet services, full truckload (FTL) or groupage/less-than-truckload (LTL), liquidity and specialty transports. Examples for specialty transports are transportation of hazardous goods, vehicles, or refrigerated or frozen goods.

- The geographic scope defines possible routes and combination of logistic providers.

These three dimensions build a dice that defines the possible scenarios for transportation. To complete the picture a warehousing and a inventory management dice can be added to complete the goods logistic solution space. The design of a logistic system to meet requirements
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allows different combinations. Two extreme forms are only direct transports or via distribution centres (hub-and-spoke system) that bundle sender specific orders and rebundle them to compose recipient specific bundles (n:1:m-Principle).

With more demanding strategies like just-in-time (JIT) delivery, continuous planning, forecasting and replenishment (CPFR), continuous replenishment (CR), quick-response (QR), efficient customer response (ECR), advance planning and scheduling (APS), e-procurement solutions or vendor managed inventory (VMI), excellence in the logistic function becomes critical to a company’s competitiveness (see Hadamitzky, 1994, 1; Bowersox and Closs, 1996, 13), - irrespectively if performed by internal or external resources. Companies can efficiently reach the goal of global visibility throughout the supply chain (cf. Dawe et al., 2000, 176; Grünauer 2001), if they integrate external e-services or build their own. This supports the trend of many organisations to focus on their core competencies and outsource the logistics functions to world-class providers (cf. Dawe et al., 2000; Homs et al., 2001). The heterogeneity of requirements prevented a standardization of IS which further complicates the selection of service providers. Many international companies still use several hundred logistic providers to secure their efficient and reliable operations. This complexity is mapped to the logistics actors, described by their degree of closeness to the physical moving activity as x-party logistics provider (xPL) as shown in Figure Appendix I-13:

| 2PL | Carrier performing the actual movement of goods (e.g. transportation, warehouse, and goods handling services). |
| 3PL | Freight forwarder who integrate logistic services (and 2PL) |
| 4PL | Supply chain integrator who assembles and manages the resources, capabilities, and technology of its organisation with those of complementary service providers to deliver a comprehensive supply chain solution (see Dawe et al., 2000, 176). They specialize in logistic planning, consulting and additional services like landed cost calculations. |
| 5PL | Describe a meta logistics provider who aggregates several 4PLs. |

These parties coordinate the needs of potential shippers, which can be buyers, suppliers or e-markets themselves to organize the physical transportation and additional information to provide a global visibility. The distribution of capabilities combined with the number of providers builds a pyramid. 4PLs form the top with only a few offering global operations, 3PLs there are about 500, and 2PLs 150 000 alone in Germany, with a total in Europe of more than 300 000 logistic providers.

The complexity of different types of providers, the amount of providers, the fragmented market, different package sizes (e.g. Euro pallet, industry pallet or logistic provider specific pallet), combined with the fact that most e-procurement initiatives started with the ordering process, are reasons why activities of logistics in e-business are still and in their early trial phases (cf. Homs et al., 2001). Danzas for example, has used the early phases to build their own com-
Appendix I: Extension of the Process Focus of Online-Ordering

petencies with dot-com ventures and are now ready for the private e-markets, which pose more challenging integration problems.

Logistics is the process of (market oriented, integrated) planning, (design,) implementing and controlling the efficient, effective flow and storage of goods, services and related information from the point of origin to the point of consumption for the purpose of conforming to customer requirements (see Council of Logistics Management, 1991). It involves the integration of information, transportation, inventory, warehousing, material handling, and packaging (see Bowersox and Closs, 1996, 4). Logistical management includes the design and administration of systems to control the flow of material, work-in-process, and finished inventory to support business unit strategies (see Bowersox and Closs, 1996, 5).

Here e-logistics is understood as the design and management of electronic support for physical transport via enhanced coordination mechanisms and information services to increase the information transparency. This can include virtual intermediaries like e-markets (n:1:m) or standards based e-services performing parts of the processes in a logistics supply chain (n:m). The process coverage starts with network design and contract management and ends with payment and after sales services.

In working together with logistics and software providers few standards exceeding EDI standards of ISO or EDIFACT (EDIFOR) are currently in use. The challenges of logistics in e-commerce are to overcome the last mile to deliver to the end customer, which has similar characteristics for business and private customers, when considering MRO goods. There are multiple delivery points (e.g. desk, hotel bed, building site) (cf. Klaus, 2000). A consolidated delivery for MRO goods is a hurdle for large-scale acceptance of this form of e-procurement. Increase of inter-modal transportation is a challenge for international trade due to a higher informational integration to avoid the current inefficiencies of free capacities, media mismatches, coordination, and control problems (see Alt and Schmid, 2000, 79).

1.4.3 Forms of Integration of Logistic Providers

Procurement, manufacturing support and distribution logistics form the major functional parts of logistics, which are extended to more than one legal entity with supply and demand chain strategies and implementations. Additional functions are recycling logistics, returns logistics, spare parts logistics (cf. Hadamitzky, 1994).

Logistic providers can be integrated in various ways:

- Fixed providers or dynamic allocation of provider via a logistics exchange
- Multiple providers or one preferred carrier

A requirement for being able to offer logistics integration is the standardization of transportation documents and requirements. Currently, the electronic forms used are ANSI X12 in the
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US or EDIFACT in Europe. ANSI X12 covers approximately ten freight documents ranging from pick-up appointments, Bill of Landing (BOL), and delivery status to freight invoicing. This could provide an opportunity for xCBL.org to bring these standards to xCBL. However, they have only started with one document yet.

The different types of providers and their integration into e-marketplaces can be summarized in the following Figure Appendix I-14:

![Figure Appendix I-14: Options to integrate logistics services with e-markets](image)

All integration types offer different advantages and disadvantages that have to require a thorough analysis which one fits best for a specific context situation. The recent closure of some of the transportation exchanges (e.g. escate.com) reflects the consolidation of the surplus of 63 e-logistics exchanges and 878 industry-specific ones in 2000 according to Berlecon Research.

1.4.4 Summary on Logistic Services

If one depicts the different logistics requirements in a matrix of procurement needs and logistical transportation services, MRO e-markets have different requirements than planned, direct goods exchanges (see Figure Appendix I-15). MRO are often regional and require small parcel or express logistic providers, planned direct goods are more likely to be procured globally and involve specialty transports and LTL or FTL transports (see Figure Appendix I-15). For the latter the need to manage inter-modal and global logistic chains increases the complexity to manage the relationship since multiple parties have to collaborate. The MRO logistic needs are often only local and global providers like UPS or DHL can handle exceptional express deliveries.
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<table>
<thead>
<tr>
<th>Procurement Need</th>
<th>High complexity</th>
<th>Low relevance</th>
<th>High relevance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planned direct goods MRO</td>
<td>CEP (local and global)</td>
<td>FTL (local and global)</td>
<td>Groupage, LTL (local and global)</td>
</tr>
<tr>
<td>MRO</td>
<td>CEP (local)</td>
<td>FTL (local)</td>
<td>LTL (local)</td>
</tr>
<tr>
<td>Courier, Express and Parcel (CEP)</td>
<td>Less Truck Load (LTL)</td>
<td>Full Truck Load (FTL)</td>
<td>High network management complexity</td>
</tr>
</tbody>
</table>

Logistics Service Spectrum

*Figure Appendix I-15: Procurement and logistics match*

Horizontal MRO e-markets tend to require only simple logistical solutions on a national basis except for the challenge to solve the delivery to a variety of destinations (e.g. desk). The need for e-services is considerably lower if the business relationships are fixed and transportation is standardized.

For direct goods other logistic networks like international FTL or inter-modal transportation need to be covered. For this area more e-services apply to cover the international trade aspects. Examples are landed cost calculations, insurances, import/export documents (I/E documents), customs, escrow.

The trend in logistics outsourcing is moving towards outsourcing the information flow between trading partners (cf. Ploetz and Teuscher, 2001). These transport related services like planning, transport order management, tracking or invoicing have ideal properties to offer them as e-services. Further the logistics market is fragmented and major efficiencies can be gained by optimizing the information flow to increase the use of assets and improve service quality and cost simultaneously (cf. Klaus, 2000). We assume that the potential in logistics is large, if the networkability of providers is increasing and the willingness to collaborate on the basis of common standards can be achieved. E-services for information logistics could become a major facilitator for global trade. Combinations of logistics and financial e-service may form complex e-services like escrow (see Possekel, 2001, 222), if the service providers can interoperate. Another critical success factor will be the seamless integration with the trading partner’s processes and the coordination with other e-services to meet the trading partner’s needs in such a heterogeneous field like logistics. The failure and difficulties of early attempts proves that too simple solutions cannot offer the required richness a convincing value proposition requires. An opportunity for 4PLs exists to offer the collaboration platform e-services and some business process outsourcing e-services to 2PLs in ASP mode. This would increase the information transparency and save costs throughout the logistics chain. This approach would lower the barrier of the atomistic 2PLs to change their processes and ICS systems.
Logistic e-markets currently offer simple blackboard functions in the transport exchange area or auction-based e-markets to unilaterally optimize the carrier or shipper side (see Ploetz and Teuscher, 2001, 26). Typical intermediary positions take on exchanges that match in real-time supply and demand. Prerequisites are a standardized offering and a critical mass of customers to secure the liquidity. Exchanges need seamless settlement mechanisms to manage the efficient exchange of financial and goods flows. The highest level are collaboration oriented e-markets which can contain the previous functions and adds pre or post transactions (see Figure Appendix I-16).
Appendix J: E-Service Strategies

J.1. E-Business Aware Strategy Literature Synopsis

The resource-based view focuses on the internal roots of competitive advantage, which require time to build. Sources with a high competitive advantage can be immaterial resources like software patents or brands and capabilities (cf. Hall, 1995). Grant (1995, 121) identifies tangible resources like physical and financial resources, intangible resources like technologies, reputation and dynamic process culture, and human resources like specific capabilities, learning, knowledge, communication capabilities and motivation. These can form the basis for combinations that can be leveraged to achieve temporary or permanent competitive advantage.

Applied to ICT the competitive advantage is based on asset specificity and core capabilities. Jayatilaka et al. (2003) used the resource-based view to explain choice of customers for ASP solutions (see Figure Appendix J-1). Application Service Provisioning (ASP) can be defined as hosting of multiple applications on centrally located data-centres that are accessible on demand via the Internet and other networks (see Kern and Willcocks, 2002, 513).

Using the resource based view helps to identify resource and capability gaps, which can be closed by contracting ASP solutions. A similar logic can be applied to e-services if the scope is opened to the general strategy and performance provided that process outsourcing or information and knowledge e-services are taken into consideration.

Applying the resource based view may limit the scope of e-services to non-core business processes and ICS collaboration platform services since the competitive advantage is not sustainable, if competitors can be customers of the same e-service. An implication is that e-services need to be customisable if an e-services customer does not want to lose its competi-
tive advantages. The resource-based theory can further help to explain choice criteria of customers if resources are scarce and little conflict with strategy is expected. Further it aids the design of the customer segmentation for an e-service provider.

From a provider perspective it is critical to understand which capabilities are required to offer a successful e-service (cf. McFarlan and Nolan, 1995, Quinn, 1999b). The general reasoning is that focused companies can attract better skills from the labour market, can use better suited procedures and learn faster from a wider customer base (cf. Quinn, 1999b; Quinn, 1999a; McFarlan and Nolan, 1995). As a starting point insights from the better-researched ASP field are used to identify required capabilities. Swinarski et al. (2002) have identified critical technical and process capabilities for ASP vendors to be able to offer a high product and service quality. In their interpretation the ASP vendor performs development and hosting of the ASP solution.

![Figure Appendix J-2: Provider internal view of ASP capabilities](image)

The proposal depicted in Figure Appendix J-2 relies on the Capability Maturity Model of software engineering and extend it to the ASP context. The ASP vendor needs process capabilities consisting of management, quality and engineering processes. Further the ASP technical capabilities are required to achieve a high ASP product and service quality (see Figure Appendix J-3).
Appendix J: E-Service Strategies

<table>
<thead>
<tr>
<th>ASP Performance</th>
<th>ASP Service Quality</th>
<th>‘vendor’s ability to reliably and efficiently perform development and maintenance activities’ (Swinarski et al., 2002, 501)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ASP Product Quality</td>
<td>‘customer’s satisfaction with the application infrastructure and the information generated’ (Swinarski et al., 2002, 501)</td>
</tr>
<tr>
<td>ASP Technical Personnel Capabilities</td>
<td>Engineering Process Capabilities</td>
<td>Requirements Management, Software Product Engineering</td>
</tr>
<tr>
<td></td>
<td>Management Process Capabilities</td>
<td>Software Project Planning, Software Project Tracking and Oversight, Inter-group Coordination</td>
</tr>
</tbody>
</table>

Figure Appendix J-4: Example of capabilities of an ASP provider

This work provides some insights on which capabilities are required to offer an ASP service, which can be extended to identify requirements to offer e-services. It might require additional categories to integrate the specifics of e-services such as integration or responsibility for the business content, which will be elaborated in chapter 8.

A further perspective on strategy is the *relational view* of cooperative strategy (cf. Dyer and Singh, 1998). The scope of the analysis is not the organisation but the business network. Dyer and Singh (1998, 662) define relational or cooperative competitive advantage if network organisations exchange material and immaterial resources or invest in inter-organisational resource relations and/or governance and control mechanisms, which reduce transaction costs and/or realize added value through a synergetic combination of material and immaterial resources. They define four relational barriers of imitation: (1) mutual connection of interorganisational resources, (2) scarcity of network partners, (3) mutual coevolution of capabilities, and (4) institutional framework. The benefit is that relational rents and core competencies are embedded in the network in the creation, maintenance and evolution of sustainable competitive advantage.

The *resource dependency theory* (Pfeffer and Salancik, 1978) focuses on obtaining and control critical resources from external organisations and simultaneously trying to avoid or decrease the dependency from other organisations to maximise their autonomy (see Sydow, 1992, 197). In vertical exchange relationships symbiotic or transactional dependencies occur which can be mutual or unilateral. Aldrich notes that most interorganisational networks are bound together by dependence rather than pure exchange relations (see Aldrich, 1979, 273), which is less the case for MRO goods with many comparable suppliers. The strategy decision is influenced by the task environment and the resource dimensions (see Cheon et al., 1995). The first is defined by the power distribution between the company and the environment (concentration), the availability of resources (munificence) and the linkages to the environment (interconnectedness). The resource dimension that defines a make–or-buy decision con-
sists of the importance of the application or process, the degree of discretion about the use of the application or process, and the number of alternatives. The resource dependency theory provides decision criteria to identify the need to use an external service to complement a company’s competencies. Jayatilaka et al. (2003) summarise the determinants and relationships of customer choice according to resource-dependency theory (see Figure Appendix J-5).

The limitation of the resource-dependency theory is that it does not cover non-rational decisions and politics (see Sydow, 1992, 199). Jayatilaka et al. (2003) maintain that knowledge-specific requirements, direct costs and implications on competitiveness are not sufficiently covered. Figure 10-5 summarises the interdependencies of meta-capabilities (e.g. organisational learning, knowledge management) as well as core competencies and capabilities to form the basis for market-based strategies.
Hayes and Wheelwright (1979b) and add service-process types of service project, service shop, service batch, service line and service flow in one content continuum. Another dimension is to consider in the service design is time in juxtaposition to space.

The degree of international offering has an impact on the potential users of the service offered. Cook (2002) provides a classification for strategies for new services. Depending on the degree of content change and the delivery change four types of new services can be identified. Minor changes in both dimension (‘window dressing’), only extending the offering (‘breath of offering’), only changing the delivery (‘channel development’) or changing both dimensions (‘revolution’). This classification has implications on the development of actions and the marketing of the new service.

![Figure 10-6: Classification of new services according to their impact](image)

### J.2. Strategy Implications for E-Service Providers

This section summarises the insights from CXT and other cases as to the purpose and content of strategies for e-service providers or syndicators and customers. Finally, the implications for the organisational structure are derived.

The assumption underlying this analysis is that the provider believes that a service-based business is more appropriate than a product-oriented business (see Cusumano, 2003, 15). After a short summary of the experience gained with CXT, the general literature on strategy, and strategy literature for services form the basis for a proposal for a strategic grid for e-services.

The conditions under which CXT offered its services were the uncertainty as to customer acceptance and its own capability to deliver. Dyer et al. (2004, 113) define uncertainty as situation in which it is impossible to assess future payoffs. Since CXT had no guaranteed customer base the adoption of its offering by customers was uncertain. A member of the management team of CXT stated that ‘in our business a strategy is impossible’. This statement can be regarded as a muddling through strategy which might include some elements of Quinn’s (1978) logical incrementalism. However, perceived dysfunctionalities, such as a lack of orientation, demotivated employees and disparate sub-cultures, as well as parallel development in many directions, suggest that adopting a strategy which incorporated uncertainty and fast changing
environments could have improved the situation. Eisenhardt and Brown (1999) propose patching and Hamel (2000, 110) proposes principles for achieving a high degree of strategic flexibility (see ch. 4). The lack of a clearly communicated strategy could have been substituted by an umbrella strategy that defines the guidelines and allows for actions specific to e-services.

Analysed using Trapscott et al.'s (2000, 28) general classification, CXT combined elements of agora and aggregation types in the period from 2001 to 2002. If the contingency assumptions of Trapscott's model can adequately map real-life situations (cf. Jayatilaka et al., 2003, 222), the possible conclusions are that CXT's strategy was not well defined or that the strategy was aimed at pursuing multiple business models all at the same time. Non-financial goals and the mission at CXT were not focused and did not therefore lead to coordinated action. Swisscom e-trade solution, the successor company, learned from these initial difficulties. It scaled back development activities, focused on customers and the delivery of required functionality.

Following on from the strategy and e-business literature presented in chapter 2, it is argued that e-service strategy supplements common business strategy by adding specific elements. These elements are the (1) e-service type, (2) characteristics of the e-service level, (3) e-service relation/application area, and (4) e-service specificity offered.

To overcome the strategy formulation inertia experienced in the above-mentioned cases the proposal is that e-service providers should divide their strategy formulation into a general and a specific part, transferring the distinction between the corporate and business unit strategies of general strategy literature (cf. Steinmann and Schreyögg, 1997, 153) to the field of e-services. The differentiation between corporate and business strategy sets the framework for the definition of the specific e-service offerings. General strategy questions focus on 'what' to offer and to 'which customer groups'. The corresponding e-service specific questions are summarised in Figure Appendix J-6 and specify the general strategy formulation process (cf. Porter, 1980; 1996; Ansoff, 1979). A low value signifies a simpler and a high value a more complex solution. The e-service questions relevant to the specific strategy focus on 'how' to offer the e-services instead. They can define focus areas within the e-service offering features. Techniques such as conjoint measurement may help identify customer preferences so as to be able to define the strategic directions that customers may request. The business concept can be a means for implementing the corporate strategy or only a part of the business strategy if multiple business models are pursued.
Appendix J: E-Service Strategies

<table>
<thead>
<tr>
<th>E-service Specific Focus Area</th>
<th>Low Value</th>
<th>High Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Which type of e-service?</td>
<td>Hybrid (human-to-machine e-service with content, delivery or coordination human based)</td>
<td>Full (automated machine-to-machine e-service)</td>
</tr>
<tr>
<td>2 Which application area?</td>
<td>Intra-organisational</td>
<td>Inter-organisational</td>
</tr>
<tr>
<td>3 Which e-service level?</td>
<td>Business collaboration infrastructure</td>
<td>Information &amp; knowledge</td>
</tr>
<tr>
<td>4 Which e-service content specificity?</td>
<td>Generic</td>
<td>Specific</td>
</tr>
</tbody>
</table>

*Figure Appendix J-6: General strategy questions relating specifically e-services*

The questions of Figure Appendix J-6 can be answered for a single or for multiple e-services depending on the e-service provider's situation. If a company pursues a focusing strategy some values such as the e-service level, application area or e-service content can be predefined for new e-services. They restrict the innovation area for each new e-service to be developed but help to focus the organisation. This forms the link between the new service development process for strategy implementation and the general strategy of a multiple e-service company.

Firstly, the type of e-services depends on the readiness of customers and the degree of digitalisation that is achievable (see ch. 7.2). *Hybrid e-services* tend to require a different strategy implementation (e.g. management of utilisation) than *full e-services* (e.g. high degree of networkability). A central question during the process of strategy definition is to evaluate if a move towards digital output and coordination is more favourable in terms of the cost and quality of service. The reasoning can be based on increased flexibility at no extra costs, 24x7 hours availability and increased quality of electronic delivery (see ch. 7.2). The risks are trust, difficulties in achieving a successful service encounter, integration with customers and the management of the transformation towards using e-services affecting the IS, business and social world. The barrier to change was a hurdle at SeetalSchaller, along with the uncertainty of the return-on-investment. The data showed that a number of these elements needed to be resolved in order to win and keep e-service customers.

Secondly, the application area defines elements relevant to the strategy such as the customer groups and customer encounter. The positioning in the e-service classification matrix (see Figure Appendix J-7), with the type of e-service and delivery, has major implications for the type of ICT tools and competencies as well as the standards required. The different actors and different organisational targets shape the requirements.
The degree of inter-organisational partnering (application area) can range from a purely internal application via supply chain partnerships to provisioning as a third party to hitherto unknown e-service customers or 3rd party providers.

Thirdly, answering the question of the business value defines the focus of the service and influences the customer target group. The business value of e-services can be broadly categorised according to the e-service framework (see ch. 2). The lowest direct business value for customers are e-services on business collaboration infrastructure service level, as they only ensure the technical operation of the electronic infrastructure. They have an only indirect effect on the business of customers, except for times when the services fail and alternative communications means are required. Business process outsourcing e-services and information and knowledge e-services generate a higher business value since they contribute directly to the core business processes and output of the customers. A generic strategy decision can be to offer services only on the BCI level, the BPO or the I&K e-service level. The underlying logic can be to have a wider customer group (e.g. for BCI level), to be more specific (e.g. BPO), or to focus on information and learning processes (e.g. I&K).

Finally, the definition of the content specificity of e-service developments influences the general strategy. Future e-services can be developed for any customer target group or for specific industries and processes.

The decisions on the generic strategy questions listed above influence the customer target groups, the customer encounter process, and the resources and capabilities required. The outcome of strategy formulation is the basis for the grid with which the e-service invention and engineering have to comply in order to develop coordinated e-services which will fulfil the strategic objectives. Adopting this method of action should help to avoid mismatches and chaos.

E-service-specific business strategies involve answers to the questions of the 'how' to compete and offer e-services to the corresponding customer segments. The questions focus the e-service initiatives on a more detailed level (see Figure Appendix J-8). The decisions can be made either on corporate, business strategy level or on e-service engineering project level.
Appendix J: E-Service Strategies

<table>
<thead>
<tr>
<th>Focus area</th>
<th>Low Value</th>
<th>High Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Which level of customisation?</td>
<td>None</td>
<td>Full customisation</td>
</tr>
<tr>
<td>2 Which level of integration?</td>
<td>None</td>
<td>Full integration with ERP</td>
</tr>
<tr>
<td>3 Use of standards?</td>
<td>None</td>
<td>Only standards based offering</td>
</tr>
<tr>
<td>4 Which complexity?</td>
<td>Single</td>
<td>Composite</td>
</tr>
<tr>
<td>5 Which partners?</td>
<td>None</td>
<td>Many</td>
</tr>
</tbody>
</table>

Figure Appendix J-8: Implementation oriented e-service questions

Core questions are the level of customisation and the level of integration. The level of customisation depends on the business centrality, impact on competitive advantage for the customers and standardisation (cf. Cusumano, 2003). It is not a simple design element since the customer encounter, the value proposition and the resources and capabilities required may deviate from the standard e-service approach. The better the e-services can be adapted to the customer's processes and needs the higher the adoption and utilisation potential will be. This must be balanced against the costs incurred in order to achieve the appropriate level of customising and the reduced potential of achieving economies of scale. The level of customisation viewed from an organisational and long term perspective can be seen as the degree of co-evolution required (Gupta et al., 2004; Hackney et al., 2004).

The cases have shown that, within the environment analysed, the level of integration requires greater risk taking since it incurs costs that are difficult to assess against future benefits if these benefits transform existing business only. Furthermore, the technological skills required need to be available or must be set in place (e.g. XML based data exchange). The decision is taken with high degrees of uncertainty (see ch. 8.4.3.).

The standardisation dimension can range from no standards (e.g. custom development) through de-facto standards (e.g. using standard software) to official Web service standards such as SOAP 1.2 (see www.w3c.com). The standardisation decision can be a trade off between reach of many customers that are capable of applying the standard and a faster and unique custom developed solution.

The complexity of the e-service design and the need for partnering can be part of emergent strategic choice during the e-service engineering process. The level of complexity is defined by the number of providers involved, the characteristics of their relationships and their dynamic configuration. The latter can be a composite e-service together with e-service partners or a modular e-service that dynamically requires other e-services to be saleable (e.g. a look-up e-service requires e-service content providers). The level of interaction with other e-services, customers or applications defines the requisite integration and influences the standardisation, need for partnering and the complexity of the e-service.
Appendix J: E-Service Strategies

The e-service life cycle interfaces with the service engineering process, corporate and business strategy as shown in Figure Appendix J-9. The business concept and the e-service engineering process are ideally part of a business or corporate strategy.

<table>
<thead>
<tr>
<th>Strategy</th>
<th>e-service Provider</th>
<th>Service Provider</th>
<th>Product Provider</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Corporate and business e-service strategy</td>
<td>Corporate and service business strategy</td>
<td>Corporate and business strategy</td>
</tr>
<tr>
<td>Innovation</td>
<td>E-service innovation</td>
<td>Service innovation</td>
<td>Product innovation</td>
</tr>
<tr>
<td>Engineering</td>
<td>E-service engineering from business model to pilot e-service offering</td>
<td>Service engineering</td>
<td>Product engineering</td>
</tr>
<tr>
<td>Operative Implementation</td>
<td>E-service offering</td>
<td>Service offering</td>
<td>Production of goods</td>
</tr>
<tr>
<td>Management of Operations</td>
<td>Management of utilisation, SLAs, e-service portfolio management</td>
<td>SLA management, yield management, SLAs</td>
<td>TQM, Sixth Sigma</td>
</tr>
<tr>
<td>Retirement</td>
<td>E-service retirement and customer retention</td>
<td>Service retirement and customer retention</td>
<td>Product phase out and customer retention</td>
</tr>
</tbody>
</table>

*Figure Appendix J-9: Comparison of e-service strategy and its embedment in e-service life cycle*

These findings can be combined with the service strategy literature to cautiously define norm strategies that might be applied to other e-service contexts. The strategic grid has been developed on the basis of the service process matrix (cf. Schmenner, 1986) which has been modified due to economies of scale and economies of integration for e-services. In contrast to traditional services, full e-services share the characteristics of information and have reproduction costs close to zero. Operating strategies require e-service strategy and e-service development to be linked. If an e-service provider offers multiple e-services or an aggregator of e-services (e.g. an e-market), the e-service offering and development needs to be managed simultaneously. The portfolio below (see Figure Appendix J-9) can aid in the strategic control and management of parallel e-service maintenance and development projects, as well as in the development or integration of new e-services.

*Figure Appendix J-10: Example of an e-service management portfolio*
The portfolio was triggered by the problem at CXT and developed to cope with multiple e-service developments and a separation of the maintenance activity. If both categories rely on the same technology and technical resources the consumption of resources and the timing in the e-service development should be integrated to ensure that sound decisions can be made.

In summary: with some support from the cases e-service strategies require to answer the elaborated generic and specific questions in order to increase the success potential. E-services strategies lead to offer service shops or service factories depending on their nature and purpose. E-service strategies are supported by e-service invention, business concept development and e-service engineering concepts and processes that address the transformation and implementation. Strategic control along with customer interaction assures the strategy alignment. One strategic control tool is the e-service management portfolio on an aggregated e-service level and the management of utilisation on strategic and operative level for single e-services.

**J.3. Strategy Implications for E-Service Customers**

Attracting the customer’s attention was critical to the customer sales process at CXT. It required to convince them to make a contract and use the offered e-services. This section summarises the elements influencing a customer’s decision to use e-services in the future. It confirms and supplements the ASP choice model of Jayatilaka et al. (2003, 222) by elaborating key determinants of a customer’s general willingness to accept an e-service. The e-service choice model is a proposal designed to facilitate an understanding of the decision-making process of potential customers prior to using the *e-service success model*. It aims for analysing and improve the success of such a decision making process from a customer standpoint.

A prerequisite is that customers should be strategically open to allowing e-services to be procured. The four steps of the ASP choice model are supplemented by adding a socio-political perspective. It maintains a similarly functionalist view and a descriptive purpose.

The knowledge perspective is the logical starting point which must be analysed in order to deduce the resource requirements. Process domain knowledge has been described in chapter 8.4.2 as a relevant and new influencing element that expands the ASP model. In contrast to ASP, BPO and I&K e-services can be of greater strategic importance and have implications for departments other than IT, especially if non-IT processes such as procurement processes are outsourced. This requires profound domain knowledge or the ability to build it. Process domain knowledge was perceived as key differentiator at Siemens. If business process outsourcing services are offered successful examples of inet-logistics (see ch. 6) or Siemens (see ch. 6) underscore the fact that business process knowledge contributes to success. Inet-logistics is a spin-off of one of the largest Austrian logistics providers, and Siemens Click2Procure is a spin-off of the procurement department of Siemens. In both cases, key
employees had profound process domain knowledge. This knowledge is required for full e-
services and hybrid e-services, if customers judge human and electronic performance by the
quality of the support for their processes in alignment with their strategies. The knowledge
can be embedded in the application but fall-back into traditional processes may be required.

ICT-Application know-how can be confirmed, as discussed in ch. 8.4.3.1, as relevant and in-
fluencing factor. Similarly, knowledge integration know-how (see ch. 8.4.3.4 and the SIG and
Brütsch-Rüegger case) is ultimately required in order to source e-services if the service builds
on knowledge specific to the firm. The knowledge risk became an issue for Brüetsch-Rüegger
as from the point when they questioned the customer knowledge and competence of CXT at
an early stage in development phases 1-3.

From a resource perspective, if a company is convinced that it needs to own all ICT activities
external e-service offerings cannot succeed. Non-political reasons might include that external
providers are not able to offer the required responsiveness and reaction time and/or the
knowledge of internal processes is not meeting expectations. Brütsch-Rüegger did not rely on
CXT’s capabilities to connect to business partners who were not its customers to sell their
products via electronic means. With Brütsch-Rüegger, the mismatch of its own and Cone tra-
de’s vision, functionality gaps and trust in the capabilities and flexibility of the e-services pre-
vented a wider e-services use. At SIG, the reasons were price, responsiveness, lack of IT-
knowledge, technology knowledge and customer-specific knowledge requirements which
prevented the outsourcing of parts of the integration challenge in their supply chain. This data
stresses that the competitiveness risk needs to be solved through contracts or other regulations
if e-services are aimed at core processes.

The business case and ICT architecture must be in line with customers’ e-service readiness. A
component of e-service readiness is the customer’s willingness to cooperate with the e-service
provider. With supply chain e-services, the complexity is greater as several partners have to
be convinced of the benefits of using one e-service provider. The transaction costs perspective
is an important factor since it influences the willingness to contract by weighing the costs of
an option. Finally, the socio-political perspective adds subjective elements such as trust and
power shifts within a supply chain caused by the use of e-services.

If a company is open to evaluating a make-or-cooperate-or-buy decision then the extended
customer choice model might be a help in making a profound decision on whether to use an
e-service for a specific task or process (see ch. 9.3.4).

Based on a combination of knowledge, resource-based and resource-dependency perspectives
the decision on an e-service is determined by the degree of control that it is required and pos-
sible over the e-service provider. For standard non core goods and services (e.g. MRO) the
control is not required. Comparable suppliers, little switching costs and minor effects on the
Appendix J: E-Service Strategies

Competitiveness can be expected. If competitiveness is affected due to core products and services, high risk, small number of suppliers and high switching costs the e-service relationship should be different. If e-services are used to procure core products and services and/or perform company specific processes an intense exchange of information can then facilitate the operations (Semlinger, 1993). The customer can increase the dependence of the e-service provider without exposing a high risk. Furthermore, the knowledge risk and competitiveness can be controlled through cooperation contracts of relational contract nature (cf. Baker et al., 2002).

The customer data from the cases leads to the conclusion that, in the context analysed, the model of Jayatilaka et al. (2003) undervalues the socio-political dimension. The authors indirectly mention this dimension as a potential extension as the dimension on resource dependency theory includes only rational power aspects (see Sydow, 1992, 199). From a socio-political perspective, trust in the provider and power shifts are issues needing to be addressed. The more critical the tasks performed by an e-service, the greater the risks and need for trust (Petrovic et al., 2003). Two interview partners mentioned that they did not trust CXT to deliver the full functionality promised in the required service quality they needed. Furthermore, the power dimension has been added as the data showed that a purely rational decision-making process is not sufficient. The data suggests that social influences such as trust and changes in the power base are important factors in the decision as to whether and to what extent e-services will be used. One example is evidence of the fact that an e-service was not sourced due to a loss of power in the supply chain resulting from an expected reduction of the flexibility of the company. Another company was sceptical about the loss of control and the capability of the e-service provider.

To summarise: the customer's e-service sourcing decision process, as described above, must be aligned with the provider's strategy and offering. This addresses the innovation and business, process and outsourcing and socio-political lenses. The extended integrated e-service choice model highlights the complexity of the process, with many areas needing to be incorporated. This complexity, combined with the relative novelty of the providers and the form of offering, may be one explanation for customers' reluctance to adopt e-services. The ASP choice model can be confirmed and extended by three elements to describe the situation discovered in the context of the case data. The extended model can be helpful for future research in e-services as well as for practitioners needing to assess the implications of contracting e-services. It is not a prescriptive model but suggests that these perspectives and elements should be considered in practice for an informed decision-making process. Political hurdles or time constraints may, however, often make a full analysis impossible. From a provider perspective the integrated e-service choice model can help to structure the customer acquisition process by improving the understanding the sales employees should have of the questions
customers might potentially have about their e-service offering. The data suggests that e-services choices are complex and require a multi-faceted analysis to establish whether the e-service fits into the processes landscape as well as socio-political and competitive environment, performs a specific task, uses adequate resources, socio-political setting and meets knowledge requirements.
Appendix K: Techniques to Develop and Use of E-services

K.1. Introduction to Method Engineering and Techniques

The overview of the cornerstones of the method covers the core components (cf. Gutzwiller, 1994), namely the procedure model, the techniques and result documents, as well as the meta model. The section presenting the techniques in Appendix 2 adhere to a similar structure: 1) Motivation and Background, 2) Goals and Benefits, 3) Input and Required Roles, 4) Content and Procedure, and 5) Output.

The main objective of a method is to ‘decompose a project into manageable activities, determine techniques, tools, and roles as well as defining results’ (see Österle 1995). Results document the design and serve as input for other design activities and techniques which, in turn, generate or modify results themselves. They can take a variety of forms, such as process charts, a selection of potential e-service providers, or a specific architecture. To structure the results the method engineering principles defined by Gutzwiller (1994) are applied. These principles have successfully supported the definition of several methods of business engineering (IMG, 1999a). The responsibility for defining the goals and the outcome of a method lies with the stakeholders. The procedure model reflects an ideal sequence of top-level activities. Activities describe the transformation and progress on an aggregate level, bundled into techniques, and the sequence of results. Techniques describe the achievement and facilitation of one or more results. They may use specific tools (e.g. the cost savings analysis tool to assess the savings potential in ch. 4.6). Tools offer conceptual and/or structural support in producing the result documents with appropriate semantics. For example, the SCOR model facilitates the categorisation, modelling and measuring of supply chain processes by providing common semantics for inter-organisational supply chain projects. An example for a computer-assisted tool is ARIS Easy-SCOR. Finally, roles describe the know-how and competencies needed to complete the required result documents.

The benefits of using a method are not limited to structuring a project. Methods also facilitate training and (self-) learning by example. One major advantage is that they aid coordination and understanding by providing a common language for people with heterogeneous skills, knowledge and backgrounds. In addition, a method provides specimen result documents that can apply to similar projects. These benefits should lead to improvements in terms of hard (time, cost, quality) and soft (flexibility and knowledge) factors (cf. Fleisch et al., 1999).

The complexity and novelty of e-services in business networking projects was the motivation for designing several techniques. Complexity is measurable by a function of the number of partners involved, their heterogeneity and the multiple strategies of business networking (e.g.
Appendix K: Techniques to Develop and Use of E-services

EC, SCM, customer or supplier RM). Novelty is created through new approaches towards partnering and processes, supported by new software solutions and infrastructures such as the Internet (cf. Rockart, 1998). The method attempts to handle these issues and to avoid pitfalls and fallacies by offering an ideal but still flexible and customisable way of how to decide on and implement an e-service, or on how to integrate an e-service into an e-market. Klueber and Alt (2000) describe the linkage between methods and knowledge management in relation to an earlier version of the method.

Change management elements can support these core components of the method so as to secure both a successful implementation and a high level of commitment. Using specific techniques, they focus on obtaining the required commitment from the key stakeholders and treat them appropriately to achieve the project goals. There is a myriad of literature on change management available, and some methods (cf. IMG, 1999a; Senge et al., 1999; Blessing, 2001). The key to success is to identify the right people to lead and implement the change and to provide an appropriate environment which includes overall goals, freedom on how to achieve these, as well as the tools and commitment to make the change happen (see Senge et al., 1999, 50). Applying these generic insights and tools to e-services requires taking particular inter-organisational settings into account. However, one should not consider change management in a positivistic and mechanistic way. The focus is on increasing the readiness to change and raising the possibility of capitalising upon it or creating a new change process (Clemmer, 1995). Similarly, methods offer guidelines that provide structure and content but will need critical reasoning and adaptations for successful application.

One approach worth noting is described in the work of Senge (1999). Based on systems theory, he defined a sound and practice-tested notation and procedure for facilitating change management and the often-intended organisational learning. This approach combines the reinforcing processes of enhancing personal results and learning, of developing (inter-organisational) networks of committed people, and of improving business results (see Senge et al., 1999, 43). All three reinforcing loops are connected, foster personal results (R1), form and sustain networks of committed people (R2), and ensure the achieving of business results (R3). Figure Appendix K-1 shows the three cycles defining the growth process which leads to profound change.
Senge (1999) claims that successful changes are not 'rolled-out' by management but require a high level of commitment by the people implementing the changes. Not top management 'dictation', but an enabling environment leads to successful change in business and non-profit organisations. This confirms the need for establishing knowledge enablers (see ch. 6.4), for diligent management of socio-political issues like power and trust, for the design of a favourable structure and the facilitation of a healthy culture. Senge et al. (1999) define learning capabilities as skills and proficiencies that, among individuals, teams, and larger communities, enable people to consistently enhance their capacity to produce results that are truly important to them.

The project management elements cover the portfolio management process, which accounts for the correct positioning and monitoring of the project. Project portfolio refers not only to the management of development and transformation projects, but also to customer projects, pure IT projects, and to the strategic alignment. It also covers the steering of the project by the project owners. Furthermore, this element proves to be critical in dynamic service oriented organisations (cf. Blessing, 2001, Alt et al., 2000a; IMG, 1999b).

K.2. Excerpt of Techniques for E-services

K.2.1 Background of the Techniques

Techniques offer practical guidelines to help companies solve specific problems. Before starting with the short outline of techniques, we present a brief summary of the main companies:

Triaton is a systems integrator, and was initially an internal department of the former Hoechst AG – 7th biggest chemical company worldwide in 1997. Due to the Hoechst’s focus
on core competencies, the internal IT department became a profit company named HiServ. In early 2000 TKIS bought HiServ and merged to form a new company under the name Triaton. We worked together with that company from August 1998 to July 2000 on the set-up of a logistics EDI-service, business modelling and business case definition, e-procurement consulting concepts, integration services for e-markets and the e-markets role model.

**Deutsche Telekom** is the major telecom operator in Germany. We worked together with the central procurement, product marketing for multi-media and e-commerce offerings, and SAP Management department in a project designed to define an e-procurement solution and to identify the potential to generate new revenue. In a second project, we provided support in defining a global architecture for the future that encompasses not only ERP and legacy systems but also new business networking applications.

**CXT** is a spin-off of Swisscom AG, which, like Deutsche Telekom, runs an e-market on Commerce One software. Following the convergence of interviews with analysts from leading market researchers to forecast that transaction costs would not be a major stream of future revenue. CXT is concentrating on identifying, developing (with partners) and implementing e-services as its main value stream for future profitability. E-services are a vital element for this focused company. CXT benefits from a structured procedure to develop or integrate e-services and concerted efforts concerning software providers, e-service providers, and partners. The results of two market studies on e-markets and e-services conducted by CXT and its partners in Germany and Switzerland provided input to this work. Before describing the elements of the techniques in detail, we will provide a brief overview of their content and interdependencies.

**K.2.2 Procedure Model and Overview on the Techniques**

Before we will describe in detail the elements of the techniques, we will provide a brief overview of their content and interdependencies. We will highlight the main characteristics of the techniques in the table below. The roles as well as the motivation and research background are not included in the overview on the interdependencies between techniques:

<table>
<thead>
<tr>
<th>Technique \ Role</th>
<th>eS Provider</th>
<th>e-market</th>
<th>Buyer</th>
<th>Supplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1 : e-service Innovation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T2 : Business Concept</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>T3 : Service Engineering</td>
<td></td>
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<tr>
<td>T4 : IS Collaboration Architecture</td>
<td></td>
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<td></td>
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<tr>
<td>T5 : Procurement Redesign</td>
<td></td>
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</tr>
</tbody>
</table>

*Figure Appendix K-2: Overview on the techniques, main result documents and relevant actors*

In a technique and document flow chart the procedure model can be depicted as shown in Figure Appendix K-2. The classification only represents the main design emphasis. The levels
are not treated isolated and already in the first techniques IS implications are reflected upon. Figure Appendix K-3 shows the interdependencies between the techniques. Here only the T1 will be presented to provide an impression of the other techniques to increase the probability of successful implementations of e-services in procurement processes.

**K.3. T1: Identification of E-service Potentials**

**K.3.1 Background and Goals**

The following practical cases helped shape the content of the technique:

*Case I: CXT as an e-market Maker concluded it must supplement the transaction revenue streams by adding new revenue streams. To achieve this the search for an extension of the value proposition of online ordering and catalogue management services e-services were one promising option. To meet both goals we developed a workshop to identify and prioritise e-services matching certain criteria.*

*Case II: The GTW Sub-Committee for Business Services had the challenge of identifying e-services that would be attractive for all the e-market Makers of the GTW.*

*Case III: Expert interviews with three analysts from Gartner, Giga, Yankee Group*

*Case IV: Two projects on the value of e-services for CXT together with research students from EAP (Paris) and MCM-HSG (St. Gallen).*

*Case V: CXT needed to develop a Collaboration Infrastructure e-service to meet the market demands for an automated integration of trading partners and to be able to integrate own or third party business process services.*

The goal of the technique is to identify e-service(s) that are attractive to be developed or integrated depending on corporate goals. The main user segments are potential e-service providers or intermediaries who want to offer e-services to their customers\(^2\). The generic procedure

\(^2\) With some changes the procedure can be modified to satisfy the needs of potential users of e-services, who want to identify the areas where they would benefit most from e-services.
is similar for all users with varying objectives and information requirements for the specific applications of the technique.

K.3.2 Overview and Benefits

| Pre-requisites | Corporate need to improve one process area or the definition of an e-service landscape for multiple process areas and e-service levels. |
| Clarity on corporate goals and role the company assumes in respect to e-services for the chosen area |
| Selection of creative people and creation of a supportive environment |

| Resources | The first workshop lasts 4-8 hours depending on the scope and number of participants; the second workshop takes about 2-3 hours |
| Effort: 1-2 days of internal preparation and presentation |

| Procedure | Step 1: Introduce to the challenges |
| Step 2: Conduct e-service brainstorming session |
| Step 3: Order and categorise results |
| Step 4: Increase benefits |
| Step 5: Align e-services to customer processes |
| Step 6: Compile prioritisation |
| Step 7: Present Results |

| Result | List of e-services be evaluated or specific e-service to be integrated or consumed |

| Documents | Figure Appendix K-4: Overview on technique |

| Role | Required Contribution | Required competencies for this technique |
| Moderator | External consultant with domain expertise acting as a facilitator. He/She takes on the coordination of all participants. Especially required for bigger groups. | External facilitator or internal employee. |
| Decision Maker | People that have the authority to make decisions on resources and direction for the presentation of results. | Head of unit (e.g. business development, e-services) |
| Owner | Responsible for the timely achievement of results. In this case the responsible person can perform the moderator role as well. | Project Manager for e-services, Business Development, ICT |
| Supporter | Knowledge workers with deep domain expertise to deliver input. | IT Architects, Sales, Marketing, Service/Business Development |

| Role | Figure Appendix K-5: Required roles |

The technique provides a structured and tested procedure to identify e-service ideas and enhances them by innovating holistic procurement and correlated processes.

K.3.3 Procedure

We strongly recommend clarifying the corporate goals before the workshop, the role the company wants to assume in relation to e-services, and to carefully select creative people that will actively participate.
Step 1: Introduce to the challenge

After a general exchange on the motivation of the participants, the moderator introduces the workshop participants to the key challenges. This may contain current offerings and announcements of competitors, a new strategic orientation, or new opportunities provided by new technologies.

To focus the discussion, the following map may help to identify the area where e-services are most desirable (see Figure Appendix K-6). The vertical axis shows the different e-service categories, and the horizontal their application to all or industry-specific processes.

<table>
<thead>
<tr>
<th>Information &amp; Knowledge</th>
<th>Generic</th>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process name</td>
<td>Logistics</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Provider</td>
<td>Information</td>
<td></td>
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<tr>
<td></td>
<td>Landed Cost Calculation</td>
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<td></td>
<td>Quote</td>
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<table>
<thead>
<tr>
<th>Business Process</th>
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<tbody>
<tr>
<td>Process name</td>
<td>Transportation</td>
<td></td>
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<tr>
<td>Provider</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Business Collaboration Infrastructure</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Process name</td>
<td>Document Exchange</td>
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<tr>
<td>Provider</td>
<td>EDI Service</td>
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<td></td>
<td>Consolidate</td>
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Figure Appendix K-6: Structure of the innovation potential matrix with some examples

Step 2: Conduct e-service brainstorming session

The brainstorming session with up to six participants starts with an unstructured decentralized idea-gathering phase with note cards. The participants have between 15 and 20 minutes to write their ideas on the note cards. They should classify their input according to the e-service level and industry specificity.

If the subject-matter knowledge of the participants is too low and group dynamics do not develop, the moderator should switch to a more formalized approach. Examples are discursive techniques like scenario analysis, functional analysis, morphological box, or intuitive creativity techniques. Examples for the latter are brain writing (e.g. 653) or synetics (Laakmann, 1995, 113).

Alternative approaches involve direct customer contact like psychological procedures or quality measurements (see Laakmann, 1995, 107). This would require stopping the workshop and arranging one with a customer. Another approach is to use resource and capability-oriented or competition-oriented procedures (see Laakmann, 1995, 157) to initiate the e-service idea generation. The moderator can ask the participants to take on one perspective.

Relevant innovation ideas were presented in chapter 3.2. Sources of ideas are innovating an existing service offering towards e-services or information products, the innovation of the
Appendix K: Techniques to Develop and Use of E-services

procurement, R&D, production, delivery processes as well as the coordination processes. The customer process life-cycle perspective as a source of innovations is part of step 4.

Step 3: Order and categorize results

After the input time, the moderator explains the classification grid. The participants position their e-service idea in the matrix and comment why they believe this is a relevant e-service and why it fits in their chosen place. The matrix defines six fields. The dimensions are attractiveness of the e-service solution and the effort to integrate this service. Attractiveness is the external variable composed of the value to customers and the value to the company relative to possible competitors. Effort to integrate is the internal variable composed of the technical integration, internal process, and sales process integration. It discerns integration via links, standard protocols and interfaces, and automated integration with other processes on a pragmatic level (see ch. 9.2.1.1), which requires intensive information exchange and mature coordination mechanisms.

The placement is open to discussion and the group agrees on the preliminary positioning. After all participants have positioned their ideas, the moderator starts a discussion about the relative positioning of the different e-service ideas. If the group has targeted all e-service categories, different colours or different maps help to maintain the structure. Figure Appendix K-7 provides example results of a workshop performed in November 2000 with six participants from business development, marketing, and IT.

![Figure Appendix K-7: Results of the brainstorming session at CXT](image-url)
Step 4: Increase benefits

In a further step, the high potential items are analysed to extend their benefits by leveraging a full e-service potential. The goal is to identify the potential to further digitalize and automate the output, process and coordination dimension (see ch. 7.2 and Appendix G.1). The first workshop day may end at this step.

Step 5: Align e-services to customer processes

This step assigns the identified e-services to customer processes. This helps to align them with the current or future process the company intents to pursue. An example is the integration of sourcing and settlement e-services for an e-market that focused on catalogue buying to widen its service spectrum and value proposition to purchasing professionals. Figure Appendix K-8 shows the example of the e-procurement processes of the CXT and the allocated e-services to sub-processes. This activity helps to prioritise the e-service potentials further. The most promising e-services have a high position resulting from the brainstorming (see attached number) and are close to the existing CXT service offering. These indicators help to identify e-services, which have a high up-selling potential.

Step 6: Compile prioritisation

The moderator presents the allocation to processes and initiates a discussion about the allocation to processes. The e-services are rated according to a criteria list (see Figure Appendix K-9).
Appendix K: Techniques to Develop and Use of E-services

<table>
<thead>
<tr>
<th>Qualitative elements</th>
<th>Quantitative Elements</th>
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<tbody>
<tr>
<td>Closeness to current core processes</td>
<td>Turnover potential</td>
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<tr>
<td>Contribution to boost current business</td>
<td>Number of (latent) requests</td>
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<tr>
<td>Alignment with strategy</td>
<td>Estimated effort to integrate</td>
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<td>Building of customer stickiness</td>
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<td>Networkability of provider</td>
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<td>Level of expected legal barriers</td>
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*Figure Appendix K-9: Examples for rating criteria*

The moderator asks if the list of criteria is relevant, and if accepted by the group, the weighting process is initiated. The information is gathered in a scoring model. Figure Appendix K-10 shows the result of the rating of the output of CXT’s brainstorming workshop.

<table>
<thead>
<tr>
<th>Provider</th>
<th>Weight</th>
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*Figure Appendix K-10: Result document of CXT’s e-service brainstorming (November 2000)*

**Step 7: Present Results**

The presentation to the decision-maker or board should contain the results of the brainstorming and the recommendation of the group. Based on the feedback the next steps can be the start of one or several business concepts for one of the identified (e)Services. Whether or not accepted, documentation of the results are archived as a portfolio of possible future development directions. If the results are not satisfying, a further round can be initiated which details or widens the scope of the search. Depending on the company culture and practices, this presentation may only require the workshop participants, if they yield power to start developing business concepts on their own.

**K.3.4 Summary of Results**

The result is a compiled list of prioritised potential e-services and a decision which one(s) to explore in more detail. The subsequent step of the business concept design elaborates the ideas generated in the service idea creation phase.
Appendix L: History Synopsis of Application Integration Architectures and E-service Implications

L.1. Theories on ICS Architecture Design for E-services

Architecture is a term widely used to describe the result and the activity of designing buildings (cf. Alexander, 1977), business strategies (cf. Hamel and Prahalad, 1994), and various aspects in information systems, such as database, application and networking architectures (see Alt et al., 2001). By abstraction, architectures are a salient tool to avoid too much immersion in details. They can form the basis for planning and structuring activities, and can provide a holistic view of information systems (cf. Wall, 1996). The focus lies on application architectures, their linkage to business processes, and required communication standards and infrastructures within business networks.

To meet the challenges of business networking, the demand for the flexibility of ICS solutions increases. Several authors argue that the flexibility of business network architectures will be an essential determinant of whether a business networking strategy is viable (see Barua et al., 1996; Kalakota and Robinson, 1999; Legorreta et al., 2001). Legorreta et al. (2001, 542) define e-business flexibility as 'the ability to adapt the architectural implementation (components and structure) to changes in the value chain, in a manner that supports the internal needs of the business and the compatibility needs of the e-business partner, with minimal penalty'. They further define universal access, modularity and change acceptance as criteria to measure this flexibility.

The approaches towards architectural design and use range from centralized top-down (e.g. IBM's Business System Planning (Martiny and Klotz, 1989, 97)), decentralized top-down (e.g. Total Information Systems Management of Österle et al. 1993, 20) or hybrid multi-directional (Henderson and Venkatraman, 1989) to pure bottom-up and reactive approaches (e.g. Galliers, 1994, 194)). The position of purely emergent approaches is questionable for the reason that they only seemingly provide business units with maximum freedom. The real costs of integration and the second order effects of flexibility (see ch. 2.1.4.1) often outweigh the benefits. Further, the critics of strategic architectures rarely take coordination and relationship costs into account (cf. Tapscott et al., 2000, 194). One reason for a strategic architectural design is that the myriad of possible decisions build trajectories that are unlikely to converge to an architecture facilitating B2B integration, if the stream of decisions does not pursue this goal.

The difference of a strategic architecture from a specific architecture on implementation level is its higher-level abstraction (cf. Legorreta et al., 2001). This abstraction from the design details allows a strategic pre-control in the sense of Gälweiler (1987), and facilitates the de-
sired alignment of business and ICS strategies (cf. Henderson and Venkatraman, 1992) by reducing the semantic gap between ICS and business language.

Recently service oriented architectures (SOA) are discussed as paradigm shift 'from product to service-oriented information systems and infrastructure [that] is currently shaking the markets both from an economic and technical point of view' (see Huendling and Weske, 2003, 108). Architectures following the SOA use an infrastructure for a service requestor to (dynamically) look-up a service provider in a service repository and use a selected service. The goal is to increase the reusability (cf. Leymann et al., 2002) and flexibility of ICT architectures by increasing the service character in the fulfillment of ICT tasks using Web service standards.

L.2. History Synopsis of Application Integration Architectures and E-service Implications

Integration is not the goal but a means to achieve other goals like responsiveness, flexibility, transparency and cost efficiency. The degree and the type of integration define the degree of coordination required. A brief synopsis of the developments of the last 15 years will help to understand the challenges ICS architectures have solved and where the new challenges are.

Integration of different functional systems has been a key challenge of IT systems in the 90s (cf. Mertens, 1990). The focus of the integration was to be able to align organisations and semantically standardize information and data within an organisation. The pursued goals were to avoid data redundancies and semantic and operational integrity of the data (see Ferstl and Sinz, 1993, 198). The underlying solution elements were relational databases and transaction processing principles like two-phase commits or the ACID-principle (cf. Gray and Reuter, 1993). Achieved benefits were better availability of information and standardized processes.

Organisations in this context can be multi-national enterprises, which were easier financially controllable when relying on a sound information systems basis. This era was dominated by ERP systems like SAP, Oracle or Peoplesoft. These systems are integrated packages to automate core corporate activities such as finance, human resources, manufacturing and supply and distribution (Gibson et al., 1999). However, they were still not able to cover all the data processing needs of organisations even if the whole solution is bought from one vendor. Depending on the industry and IT architectural rigour studies on the degree of automation vary from 30% to 70-80% of coverage of automating needs (Holland et al., 1999; Holland and Light, 1999). Additional reasons for low usage are the use of legacy systems, organisational, cost, and time for implementation (see Stefanou, 2000, 990). ERP systems were not designed to collaborate with existing or new systems (Loos, 2000) and therefore posses limited integration functionality for 3rd party software.
Appendix L: History Synopsis of Application Integration Architectures and E-service Implications

In the late 90s and beginning of 2000s the need to integrate with buyers and suppliers has risen due to cost and time competition. On the software solution side supply chain planning solutions, e-procurement, and just-in-time concepts were forcing organisations to integrate internally and externally with business partners. The standardisation of data and processes was a challenge partially solved via EAI solutions which complemented traditional middleware solutions with enhanced functionality on the semantic integration.

The third form of evolution can be formed by e-services and service oriented architectures, which can be implemented internally or provided by third parties. Figure Appendix L-1 depicts the evolution in three stages from integrating different departments via ERP systems to integrating different enterprises of one corporation via EAI solutions to integrating third party solutions via e-services.

Figure Appendix L-1: Evolution of integration solutions

Figure Appendix L-2 depicts different deployment areas for EAs and indicates with category 4 the next stage integration. This is formed by e-services, which can be implemented internally or provided by third parties.

Category 1
- Intra-organisational Application Integration
  - Packaged Systems
  - Custom Applications
  - ERP Systems
  - Legacy Systems

Category 2
- Inter-organisational Application Integration
  - Business to Consumer
  - Extended Enterprises
  - Virtual Enterprises
  - e-services (e.g. payment)
  - e-stores
  - Loosely Coupled Supply Chain
  - Real-time Supply Chain

Category 3
- Hybrid Application Integration
  - Enterprise Application Integration
  - Business to Consumer
  - Extended Enterprises
  - Virtual Enterprises
  - e-services (e.g. payment)
  - e-stores
  - Loosely Coupled Supply Chain
  - Real-time Supply Chain

Category 4
- e-service Integration
  - Business to Business
  - Internal e-service
  - 3rd Party e-service
L.3. Integration Mechanisms for B2B Environments

A brief discussion about integration mechanisms provides the basis for evaluating integration needs and architecture design. Technical integration is a relative to the business requirements, own resources and capabilities. These define the requisite integration. Three layers of integration that correspond with the semiotic layers can be discerned. The transportation layer secures the syntactical correct exchange whereas the object layer includes semantic correctness. If automated integration is achieved on the process layer a pragmatic coordination must be dynamically guaranteed or must have been achieved in advance.

The types of technical integration are:

1. Front-end integration via portals (cf. PricewaterhouseCoopers and SAP, 2001)
2. Back-end integration of data and functions on-time, consistent and up-to-date.
3. Workflows integrating both front-ends and back-ends.

There are different ways of integrating applications. The integration relationship forms range from loose coupling (e.g. application-to-application messaging via interfaces) via hybrid forms (e.g. several proprietary and shared data elements) to tight coupling (via a shared database or synchronous APIs) (cf. Riehm, 1997). The underlying criterion is the autonomy of the data. Loosely coupled integration can rely on integration servers bought from software vendors or on outsourcing of most of the infrastructure to an e-service provider. In a systems theory analogy the flexibility of loosely coupled systems is higher than that of tightly coupled ones (cf. Wall, 1996). An integration server suits best for asynchronous transactions combined with the goal to buy and integrate other solutions (e.g. webMethods B2Bi). Application servers tend to require a tightly coupled integration, which necessitates internal know-how and resources in order to offer the functionality and offers less flexibility. They are favourable if a company prefers to build its own internal applications or e-services (see Gilpin, 1999), which do not rely on standards or require considerable development (e.g. Bea WebLogic).

Brodie and Stonebraker (1995, 128) differentiate three levels of integration relationships between applications.

- **Communication**: applications can exchange and process data on a technical layer
- **Interoperability**: applications invoke methods of other applications. This requires that the applications use common syntax and semantics to process information.
- **Cooperation**: happens if an application requires another application to collaborate, in order to fulfil the needs of the business process.

Figure Appendix L-3 of Themistocleous (2002) builds on a similar classification like Brodie and Stonebraker's (1995,128).
Appendix L: History Synopsis of Application Integration Architectures and E-service Implications

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The levels transportation and transformation match the syntactic and semantic changes (see BCI level of ch. 4.2.4) whereas the process automation level requires pragmatic coordination (see BPO e-services level e-services framework in ch. 4.2.4). The transformation elements maps data coupling, event coupling (objects) and semantic coupling (processes). The integration mechanism to achieve one or all of the three layers can be classified. This classification is the basis for an evaluation framework to assess the suitability of different modes of integration. The order presented follows the historical development and the level of integration from data, via application or object to processes.

1) Integration through shared data on the database level
2) Interface-oriented integration via APIs on application level
3) Method-oriented integration via RPC on application level
4) Messaging and event-oriented integration on application level
5) Event oriented integration
6) Portal-oriented integration
7) Process integration-oriented B2Bi

The benefit of application oriented integration (numbers 3-7) is that it delivers added value by offering the potential to put the business logic into the applications network and thereby create a more dynamic IT infrastructure that can evolve flexibly with the business changes of a company (cf. Linthicum, 1999).

1) Integration through shared data on the database level

Low set-up costs are the main advantage of this approach, as it can rely on an inexpensive technology basis (e.g. for replicating catalogue items). The solutions range from Simple Query Language (SQL) queries to API-based middleware like Open Database Connectivity (ODBC) or Java Database Connectivity (JDBC). The latter supports access mechanisms to distributed databases (see Themistocleous, 2002, 58). The main drawback is its need for manual adaptations, should data structures change. This can lead to complex, human-intensive
maintenance tasks if changes are frequent and necessitate the modification of access to several databases. Further, it requires the implementation of controls on the business logic that integrity rules do not duplicate in the database itself (cf. Peyret, 2001). Finally, the ODBC and JDBC drivers are often limited to relational databases. Riehm (1997) discerns the three subtypes of shared data, direct access and data exchange.

2) Interface-Oriented Integration via APIs on Application Level

Application interface oriented integration reuses application programming interfaces (APIs) and the business logic of the application, which allows for a higher independence of structural changes. The limitation is that no new functionality or modification of data is possible, and it is less efficient for large volumes of data. This form of integration is often the most suitable for synchronous calls between applications. Typical applications that offer rich APIs are ERP solutions like from Peoplesoft or SAP (for details Riehm, 1997). Realization of the exchange of data occurs on application level in different forms with different levels of success (see Goldfarb and Prescod, 1999, 122). For the intra-computer system exchange between applications, examples are Microsoft’s OLE and DDE. Examples of inter-computer system data exchange are CORBA, Java RMI, COM and COM+. If one only requires a data exchange format, then EDI supports the exchange of data to support business processes.

3) Method-Oriented Integration via RPC on Application Level

It describes the sharing of business logic via distributed objects, application servers or transaction processing monitors (see Linthicum, 2001, 28). The advantage lies in reusing the methods programmed to modify specific objects by addressing them through other applications. The disadvantages are the direct access and little control on the consequences (Riehm, 1997, 74), which require much knowledge about the called program. This information is for heterogeneous B2B scenarios unlikely. An example of this form of integration is the remote-procedure-call (RPC). A vendor specific implementation is SAP’s Remote Function Call (RFC).

4) Messaging and Event-oriented Integration on Application Level

Message oriented integration describes a predefined semantic message or document type which can be interpreted by the sending and receiving methods. Examples for this form of integration are EDI or vendor specific SAP IDOCs. The problem areas are multiple changes to adapt to heterogeneous syntactic and semantic requirements of applications (see Riehm, 1997, 79). The coordination of lost or faulty message is a major challenge.

5) Event oriented Integration

In contrast to messages do event based applications wait for events to happen. The key advantage is the ease of integration for new elements since it relies on a publish-and-subscribe mechanism based on reactive integration and selective broadcast.
Appendix L: History Synopsis of Application Integration Architectures and E-service Implications

6) Portal-Oriented Integration
Due to its powerful tools and Web browser based GUI, this form of integration is widely used to design individual or minimum role-based GUIs. The tools allow the integration of heterogeneous internal systems; like ERP, with Internet applications. An example of a provider is SAP Portals (see PricewaterhouseCoopers and SAP, 2001). Portals imply a semi-automated scenario, where a user accesses an application via a portal. It is possible to use HTTP screen scraping technologies to enable application-to-application interaction. The limitation is that the meta data is not accessible, and the consistency and integrity of the data will remain questionable until all portals employ one single XML standard. For the procurement process Ariba’s ‘Puch-out’ and Commerce One’s ‘RoundTrip’ fall into that category by providing a GUI based access to a supplier’s catalogue fully integrated in the messaging infrastructure provided by Ariba or Commerce One.

7) Process Integration-Oriented B2Bi
This represents the highest-level form of integration. It builds on lower level integration forms (most often APIs). Process integration-oriented B2Bi is more abstract and handles business documents on a collaborative process layer, which does not require technical details. The advantage of this integration form is that it allows a higher level of ‘agreement’, which allows the managing of long-running transactions, and the semantic gap between business and IT people decreases. Environments like BizTalk or Vitria allow the application to register a compensation call-back if a compensating recovery is required. One current limitation is that there is no exchange between meta data of different workflow management systems, and the APIs of the Workflow Management Coalition (WFMC) are not implemented in the workflow systems (see Peyret, 2001). The highest level of integration can be based on a combination of ebXML standards (CPA, BPPS, Core Components).

L.4. Integration Need Assessment
An analysis of the integration need is a first step in evaluating the appropriate form for using e-services. E-services can enable greater flexibility if the standards extend to a semantic and pragmatic level. If standards like BEPEL4WS mature and are accepted by many users the integration challenge many companies currently face will become easier, less expensive and more able to promote the implementation of new processes and better information provision. Nevertheless, the integration of human reasoning and decision-making will still be required, either prior to the successful implementation of a full e-service or during the process necessitated by hybrid e-services, or for the monitoring of both e-service alternatives.

Based on the experience, the following assessment model can be proposed to define a strategic and/or operative application architecture to increase the e-service readiness:
There are many stakeholders who define technical integration objectives. The originator's objective can be technical (e.g. design recommendations from existing architectural guidelines) or of a business nature for the particular process (e.g. a reduction of delays and reordering processes). In addition, supply chain partner objectives (e.g. real-time inventory information exchange with e-market for availability information), or regulatory requirements (e.g. ability to track producer information of nutrition) must be considered.

A second relevant factor is the expected benefit of further integration. It may be defined in terms of qualitative (e.g. improved flexibility aimed at satisfying changing customer demands or reducing the effort involved in master data maintenance) or quantitative (e.g. reduction of order entry people or ICT systems) results designed to meet objectives.

A third influencing factor is the socio-political situation in the business network characterised by power concentration, culture, trust and learning that play a part in the likelihood of achieving integration.

These three factors define the need for integration which leads to the assessment of appropriate and available integration options. Solution elements are the available integration mechanisms, such as protocols (SOAP), documents (xCBL) or process standards like (BEPEL4WS).

A second area requiring assessment is the current and planned ICT infrastructure and capabilities concerning the relevant process. The integration complexity is then defined by the semantic and technical heterogeneity of the ICT landscape for the process (see Schissler et al. 2002, 460) and the availability of standards or integration mechanisms.

Finally, the constraints influencing choice were time, cost, risk. The resulting integration options can be the basis for changes to the strategic or operative architecture design of the partners and e-services involved. The outcome is a series of implementation projects.