RESILIENT SUSTAINABLE AUTOMOTIVE STRATEGY
Eighteen Month Report

Executive Summary

This report covers the first five months of the second year of the doctoral project, from October 2011 to February 2012. Data on the strategic decision process within Ford has been collected, and some early results analysed. Gaps identified by interviewees concern a lack of a formal mechanism to incorporate risks, and include different external scenarios. Non-economic metrics especially for sustainability or resilience are used less than economic ones, including those from the Ford sustainability tool (PSI). Any new approaches must either be easy to understand (even self-explanatory) or accompanied by training.

The company uses its management and specialists' human “database” of expertise for decision making, and strategy arises both from top-down planning and bottom-up issue or opportunity discovery. The decision process appears flexible, iterative, and consensus-driven whilst decisional power is concentrated at the top of the organisation. The company does not use many formal methods to compare, rank (or generate) options and so it may be difficult to “import” a new approach from theory or another organisation. Top-down support, and co-operative work with company officers will be needed to create a culturally acceptable solution, and increase the level of ownership and likely use of the research results.

Pujari and Williams’ work suggests some possible new metrics for organisational resilience and sustainability innovation. The embedded CSR approach by Porter and Kramer called Creating Shared Value offers one application method; as does Krumdieck’s Transition Engineering. Both could encompass both sustainability and resilience. Krumdieck’s work also highlights the need for translating polarising “issues” into risks and opportunities which companies are better equipped to digest and deal with.

The next step will be to conduct a gap analysis to find the most suitable metrics and methods for application within Ford. A pilot study to assess their utility and effectiveness will be conducted in Year 3, or earlier if possible. The confirmed lack of metrics and methods for handling strategic sustainability and resilience established so far, indicates that this research should deliver useful results for the company throughout its duration.

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<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>BEV</td>
<td>Battery Electric Vehicle</td>
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<tr>
<td>CES</td>
<td>Centre for Environmental Strategy (University of Surrey)</td>
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<td>COO</td>
<td>Cost of Ownership</td>
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<td>EC</td>
<td>European Commission</td>
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<td>EPSRC</td>
<td>Engineering and Physical Sciences Research Council</td>
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<td>EU</td>
<td>European Union</td>
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<td>EV</td>
<td>Electric Vehicle</td>
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<td>FMEA</td>
<td>Failure Mode and Effects Analysis</td>
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<td>FMC</td>
<td>Ford Motor Company</td>
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<td>GHGs</td>
<td>Greenhouse Gases</td>
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<td>GPDS</td>
<td>Global Product Development System (Ford)</td>
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<td>GTDS</td>
<td>Global Technology Development System (Ford)</td>
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<td>GUC</td>
<td>Government and Universities Collaboration (Ford)</td>
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<td>HEV</td>
<td>Hybrid Electric Vehicle</td>
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<td>ICE</td>
<td>Internal Combustion Engine</td>
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<td>IPCC</td>
<td>International Panel on Climate Change (UN)</td>
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<td>LCA</td>
<td>Life Cycle Analysis</td>
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<td>LCC</td>
<td>Life Cycle Costing</td>
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<tr>
<td>LowCVP</td>
<td>Low Carbon Vehicle Project</td>
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<tr>
<td>LDV</td>
<td>Light Duty Vehicle (passenger car or light truck)</td>
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<td>NPV</td>
<td>Net Present Value</td>
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<tr>
<td>OEM</td>
<td>Original Equipment Manufacturer (usually a maker of LDVs)</td>
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<td>PD</td>
<td>Product Development</td>
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<td>PHEV</td>
<td>Plug-in Hybrid Electric Vehicle</td>
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<td>PSI</td>
<td>Product Sustainability Index (Ford)</td>
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<td>PSS</td>
<td>Product and/or Service System</td>
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<td>PT</td>
<td>Powertrain</td>
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<td>PTPD</td>
<td>Powertrain Product Development</td>
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<td>QFD</td>
<td>Quality Function Deployment</td>
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<tr>
<td>SPSD</td>
<td>Sustainable Product and Services Development</td>
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<tr>
<td>TARR</td>
<td>Total Annualised Rate of Return</td>
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1 Introduction

This report covers the period from 1st Oct 2011 to 28th Feb 2012. The period is shorter than usual as the submission dates have now been adjusted in agreement with, and at the request of, the supervisors to stagger their workload.

Actions identified at the 12 month point were, summarised:

- Communicating the research results so far
- Learning and using qualitative data analysis techniques
- Discovering sustainability and resilience metrics (ideally strategic ones) currently in use in Ford, plus any unmet needs already identified by the staff
- Followed later by searching for both current Ford decision-making and strategy-forming methods
- A set of searches for and developments of possible extra metrics from theory and the field (industry)
- With a corresponding search for suitable decision methods outside the company
- Culminating in both a gap and feasibility analysis comparing current practice and suggested options, to select the best candidate metrics and methods for further development and testing (second half of year 2).

Each of these is dealt with in turn in the following sections. All are currently in progress apart from the last, which requires the output from the earlier activities before it can be done.

2 Communicating The Research Results Within The Company

A summary of the research so far (Year 1) was presented to the ultimate sponsor of the project, the Executive Director of European Powertrain, in October. The main points presented were the findings on available sustainable engineering tools – including that Ford has a best-practice tool in the Product Sustainability Index. A key recommendation was to adapt and adopt this in new silos such as powertrain to extend its use, as summarised in the 12 Month Report. Also covered was the work done on relating resilience and sustainability, and the need for a new approach based in business resilience metrics to address strategic questions. The example of peak oil risk curves from Krumdieck et al.’s paper (2010) was shown as an example of dealing with new kinds of risk such as resource scarcity issues; and a plan for Year 2’s work discussed , again also as contained in the 12 Month Report. The Executive Director expressed strong support for continuing the research and showed a lot of
interest in seeing some example metrics, and in specific data for use in informing strategy formation (mainly as part of the annual strategy review which has a data-gathering phase for external trends early each calendar year). The review did not result in specific additional research tasks and no specific date was set for feeding back any new metrics.

The intention was to arrange a meeting with the Executive Director once some clear results were available for discussion, likely between Easter and September of 2012. An obvious mechanism for feeding scenario-related data from the research into the annual process was lacking; plus this year the process has been run about 3 months earlier than previously, so that the data gathering and study-selection finishes by the end of March, with the proposals/ studies then reporting back in the autumn, not towards the end of the calendar year as before. This has meant that the research time-plan did not fit well with the company’s process as results were not available early enough. However there will be future opportunities to discuss both the detailed decision support side of the research, and scenario-related information discovered during it, as inputs to specific studies throughout the year. These studies will be selected by the end of March, as the list of which projects will be worked on this year is clarified, and a more detailed plan for this interaction will be devised at that time.

3 Qualitative Data Collection Within Ford and Analysis

This section covers both the task to develop qualitative data research skills, and the ones concerning collection of information on strategic decision support metrics and methods in use within Ford, where these skills have been deployed.

Although some initial background reading was done on qualitative research, the original reference chosen quickly became very detailed regarding the theories of social science research, and it became apparent that it would be easier to apply and understand the theory and methods once there was some data to apply them to. According to Mason this fits into an action-research type approach and allows inductive analysis, developing the theoretical model as the data is collected, then testing the model with later data. This approach is preferable here because the Research Engineer lacks expertise in social science research, and their previous experience in strategy formation within Ford is limited, meaning there is little pre-existing information and expertise to base an initial theory around.

Two main approaches have been chosen for gathering data in this phase; semi-structured interviews and observation of meetings. This is mainly a pragmatic choice; historical and full meeting minutes recording the reasoning process within decision-making are not always available, and available documents containing the final decision are not
always possible to interpret after the event, except in terms of the Ford process they are meant to facilitate. Information on decisions taken within highly structured delivery processes such as the Global Product Development system (GPDS) is kept in more detail but much information being developed before an important gateway is usually classed as “transient”, meaning that information packs are updated for each review, non-critical records may not be kept for more than 12 months, and therefore a complete record over time may not be available, especially of older decisions. The annual strategy review process also creates formal records but these are sometimes not generally available; for example if their content is secret they will be tightly controlled on a need-to-know basis. As a result many employees may not be aware of their existence or able to access them. All of this makes it harder to trace the history of any one project from internal stored records. Interviewing to capture the historical arc of example projects is being considered but in the meantime a wider and more generic approach was chosen to investigate the decision process.

Interviewing was felt to offer a good first look at strategy decision-making as most Ford managers have been with the company for over 15 years and have had some contact with this process; plus an interview can allow a manager to summarise many years of experience in different situations, providing an overview not possible from company records. Finally, the Research Engineer was already aware that more strategic decisions tend to happen outside of the structured daily project delivery processes visible from the working level of the company, so some initial interviews were needed to identify where exactly these processes occur, to then allow the research to become more targeted.

Meeting observation was chosen alongside interviews to see if what was observed in real meetings produced the same kind of data. Many “meetings” within Ford are in fact audio or web conferences spanning several global locations, so it was recognised that access to these might be limited, and they might offer limited data without face-to-face interaction. The most useful aspect here is that some meetings associated with the annual strategic review could be accessed to gain more information on this process; which does not seem to have a detailed description and changes from year to year. Again this might then allow a more targeted approach for subsequent work.

3.1 Semi-structured interviews

A set of interview questions was developed covering basic organisational data for the interviewee (job title, grade, time served with Ford), and their general experience of Ford decision-making processes, then a more focused set of questions about how they believe
strategic decisions are made, and lastly whether sustainability or resilience criteria are encountered by them during this process. The aim was to elicit personal descriptions of the interviewee’s experiences and reflections on the topic, to then sift for information on both the process and criteria used in it. The questions were designed to be as open as possible to avoid introducing any bias by the interviewer. Due to the unfamiliarity of Ford employees with some of the terms needed, especially “sustainability” and “resilience” it was found within the first 2 interviews that a certain amount of explanation and interaction was needed, sometimes including an example. Simple explanation lines were added to the question set; these are included only within the last few focussed questions on particular metric types, so that consistency would be maintained in the interviews in the way the questions were asked. The questions have still been kept as open as possible; the current question set is included in Appendix 1.

The Ford staff seem relatively unused to being asked about their experiences of processes, leading to quite a lot of clarification questions by interviewees. (This request for more information may also be a trait of a technical environments where precision is vital when responding to information requests). When more interaction was required within an interview to explain a question, this should be apparent from the audio transcript or notes; the question is asked first without explanation, and further interaction then happens to try and elicit a response, in as open a style as possible. This is not ideal but in some cases with no explanation or example, it was found the interviewee may either not respond, give an uninformative null response such as “I don’t know”, or provide a different kind of unrelated answer altogether; which would be a waste of opportunity and time. Genuine null responses can still occur and be recorded using this approach.

As interviewees sometimes jump about the topic area, it can be easier to follow up one particular strand whilst they are thinking about it than interrupt their thought process and come back to it later; hence a semi-structured approach was most appropriate. More specifically it became obvious that interviewees would talk about both decision making methods and metrics together, and so it was decided to collect this information simultaneously to avoid both repeat visits and inserting an unnatural divide into the interview flow.

The question set was created based initially on open questions aimed at extracting both general observations on decision making and anything specific about strategic decision-making, as there may or may not be differences between these two. It also contained open questions about the most important or useful metrics, and any formal methods used for decisions, both in practice and ones they felt were missing, and specific
additional questions about metrics based on the work done in Year 1 on sustainability as a Triple Bottom Line concept (covering economic, environmental and social impacts), and on resilience as an organisational quality (the ability to absorb shocks, keep functioning and adapt simultaneously). These last were because these criteria might not come up spontaneously within the interview, so it was felt important enough to include more directive questions to check for and extract any relevant information.

The question set then evolved initially from pilot interviewees and supervisor input; and generally after that every couple of interviews, as omitted topics became apparent and redundant or unclear questions were refined by the Research Engineer. In general the questions did not change (changes mostly removed time-wasting redundant questions or added simple explanations) and so far the information from the interviews all covers the same topics so can be used together as a set. The sole exception was the addition in version 4 of a question on how far ahead the time horizon was in the strategy decisions being described, once it was realised that different timespans might be involved in different strategy-forming processes. As the earlier interviewees are talking about the same processes as later ones this information could be either be assumed to be the same (if all interviewees have a consistent view of the process in question), or it could be directly checked by following up with the interviewees later. If a question was missed or unanswered it was (so far) possible to return to the interviewee to add that question; in this case follow-up notes were added to the interview notes file and clearly marked. A note was made of which question set was used for each interview in case this is needed later during analysis.

The interviews were recorded digitally, and a few notes made during the session, to give data for later analysis. Initially summarising notes of key points were made and the files digitally tagged so that these key points and specific question responses could be re-found. Fuller notes of the question responses and other key comments were then made. The interviewees were sent the notes (or transcripts if made) for approval before use- as an accuracy check, but also so that any sensitive information could be redacted or anonymised before sharing the data with supervisors or using it for the research. Once this was done the data could begin to be analysed. So far the impact of redaction has not seemingly removed any data critical to the research, mainly concerning the removal or anonymising of recent specific examples which contain commercially sensitive information.

3.1.1 Initial simple analysis of interview data

Some initial analysis has been done on the first three interviews. First any metrics or methods which occurred in the interviews were identified and listed, their relative importance
established (as attributed by the interviewee from their experience), and the key features of the Ford processes for general and strategy decisions summarised. This is discussed further below in section 3.3. The intention in the immediate future is to select a couple of good quality interviews for full transcription to allow the use of qualitative analysis software, to cross check for any emerging themes within each interview (and the set of interviews) which the author may have missed, thus further refining the questions and the model of the strategic decision processes being developed.

The kind of information being collected in these interviews is, according to Speech-Act Theory and Searle’s taxonomy (Searle, 1969), mainly *representative* in that it shows what the interviewee believes occurs in the company when responding to a given question, as most of the questions focus on the interviewee’s experiences. This is also the case when interviewees infer the intentions or beliefs of others in the examples they give, or explain their own intentions (ibid.). As some questions also ask for an opinion on what is good or bad, or how improvements could be made, some of the information is also *expressive* (of the interviewee’s feelings about the situation) (ibid.). These aspects need to be borne in mind when interpreting and analysing the data. Although there is some factual information present, the beliefs involved mean that some of the information is also tangled up in values, unconscious or conscious assumptions and so on, and so one should be careful of drawing conclusions without taking account of these. More work is needed to establish how, according to these theories and social science practice, robust conclusions can be drawn from the data; this will happen in the next few weeks as the first data sample is completed. Finally, note that the process of collecting and analysing the interview data is incomplete at the time of writing, so this report can only reflect initial impressions from a few data samples. Further data may provide a different interpretation.

### 3.1.2 Choice of interviewees

It can be difficult due to the pressures of daily roles to get access to Ford staff for interviewing purposes, so it was decided to start data collection as soon as possible rather than waiting until after a theory search; plus as previously mentioned in section 3 this fits with an action-research approach. The interviews started within the lower management levels, working upwards; to both enable introductions upwards along the management chain, and let the interview questions be refined before they were used with more senior company officers with more limited availability. The author’s own personal networks from previous jobs are concentrated in the bottom layers of the product development organisation so the first few interviewees were chosen as people with whom either the author or their industrial supervisor already had a good relationship, and who were known to have some involvement
in strategic decision-making. Also an attempt was made to cover several different company functional “silos” to see if organisational factors had an effect on the responses.

The project is hosted within European Powertrain Product Development (PTPD), which is one of several subdivisions of the company, some based on areas of vehicle architecture, some on specialist functions and so on. The company is large and the product complex so there are also organisational subgroups based on vehicle platform and type, regional manufacturing or R&D, key commodities like engines, specialist functions such as Marketing, and so on. This is a very complex and constantly-changing matrix structure with each group inter-related to many others.

At the time of writing 6 interviews have been conducted and 3 fully processed, covering global powertrain product development planning, global powertrain development management, corporate sustainability/external relationships management, product development process support, cross-vehicle regional marketing, and advanced small vehicle concept development (the last three are the most recent and only partially processed). All of these roles are based either at the host site Dunton or the UK corporate HQ in nearby Warley. It is planned in the immediate future to also remote-interview colleagues in other vehicle and sustainability functions, in locations such as the US and Germany, as it has quickly become apparent that strategic activity often tends to be carried out by globally-oriented and -located teams.

Another planned action is to contact and interview a vehicle team which has used - and discarded - the previous sustainability metrics of PSI, as part of a wider piece of work to understand why this happened; probably both using the question set already developed, and also additionally a focussed interview around these issues. This may illuminate attitudes to and beliefs about sustainability within the company, and influence the approach chosen eventually to adding any metrics or methods to company processes. It is finally planned to contact some “support” functions outside of the engineering and management functions of Product Development (PD) such as Finance, Purchase and HR who may have a bearing on how certain types of PD strategic decision get made, and may also be involved in other types of strategic decision, for example around different kinds of resource (money, raw materials and supply chain goods, and people respectively).

All of the interviewees thus far were Ford employees, as contractors are concentrated in the engineer grades and therefore are low-level participants in collating studies for strategic decisions, if at all. The degree of diversity in background and experience between interviewees is lower than might be otherwise expected from the general
professional engineering population in the UK, as Ford usually only hire in from outside at graduate or early-career level to engineer or other professional grades, and managers must therefore work their way up from this level (executive level external hires exist but are rare). As this career progression involves fulfilling a certain minimum number and type of roles before each promotion, managers at lower levels tend to be similar in terms of age as well as educational background; for example all the interviewees so far have spent their entire graduate careers within Ford. This also means that whilst they tend to have longitudinal experience of working processes within Ford and a knowledge of recent or historical changes, they also may have little experience of other sector or company cultures and practices for comparison. This leads to a deeper company, technical and sectoral expertise within the management, but also arguably less diversity of approach, the flip-side of what is in theory a desirable consistency of approach.

Additionally all are white British males which is slightly more unusual within the company itself as there is some ethnic and nationality diversity present in PD; although some interviewees have worked in different functional areas or “silos” previously and some have worked overseas, most notably in Ford Japan. An effort will be made to better reflect the background diversity in future choices where possible. In some cases the available diversity is low anyway- women engineering managers are very rare for example so may be hard to include- but the non-manager moderately senior technical specialists (such as sustainability experts) come from very diverse backgrounds and tend to have more experience outside the company. In the end the choice will also be steered by who is willing and available to be interviewed. The choice of future interviewees, as already mentioned earlier in this section, aims to cover a wider range of both organisational roles (“silos”) and managerial levels to address this issue.

With only 3 interviews fully processed it is difficult to do much more than show initial simple patterns in the data; the subsequent data collected may completely change any conclusions drawn. Please see section 3.3 for an initial overview of the data so far.

3.2 Observing meetings

In parallel with starting to interview Ford employees, a number of meetings (some physical, some audio) were attended and observed. The purpose of this was mainly to directly observe the decision-making process in action within decision-making groups, to supplement information gained from individual interviewees. In theory this offers more factual information; although it is still filtered by the observer and is somewhat open to interpretation. As the Ford decision process (judging by the data collected so far; see section
3.3) is long and iterative and varies in detail by forum, each meeting can only provide a snapshot of part of the process; multiple observations would be needed across potentially a great length of time and number of meetings to arrive at a clear picture and so both direct observation and interviewing are needed.

Additionally some strategic processes only run at certain times of year, so observing these is specific to certain months. In particular the annual strategic review process usually only runs in the first few months of the calendar year; this year it has been planned to happen earlier and in shorter period than before, from January to March. This generates unique meetings in itself but also affects the content of standard meetings which happen throughout the year.

3.2.1 Choice of meetings

The meetings were selected for their strategic content, so that there would be an opportunity to observe the discussion and decision processes in action, as opposed to more structured and detailed tactical work which forms the majority of the company’s development activity. There was also an attempt to pick different kinds of proposal/project and ones at different stages of the decision process to try to provide insight to any differences and similarities between them. As many internal meetings are not easily visible to all employees or even managers, the choice of observation samples also depended upon the awareness of the industrial supervisor and his contacts, of both the meetings themselves and their content.

Permission was sought in advance from the meeting chair or senior attendees for the Research Engineer to attend and observe, and in order to minimise intrusion and avoid creating any confidentiality issues, no recordings were made. The process of note-taking and the use of the notes in the research was explained to the person or persons with whom permission was discussed; the notes were not sent to the meeting chair and attendees afterwards as they would have insufficient time (or indeed interest) to review them. Instead it was explained that data would be aggregated and anonymised to maintain confidentiality, and reviewed and edited by Ford Public Affairs before any publication, when obtaining permission to observe. As only 3 meetings have been observed so far it is not clear whether this will present later issues in using any data; some other arrangement or permission may become necessary.

Unstructured notes were taken during each meeting of any apparent metrics in use, whether explicitly mentioned in presentations, or evident from discussions and questions. So far 3 meetings have been observed, one global telephone-based vehicle-level strategy one (with local participants in a meeting room), one global divisional (powertrain) strategy one
(by telephone), and one annual strategic review preparation meeting for the powertrain division (mainly onsite with a few experts joining by audio from other countries). The last two are actually feeding into the same annual process but deal with different types of information, the first covering existing projects and the second generating external trend input information for use in analysis.

3.2.2 Initial simple analysis of meetings data

In the main any decision method was less apparent than from interviews (probably as this tends to happen over a number of meetings); but some patterns were evident such as the primacy of economic metrics especially cost and affordability, and resource availability, which appear to correlate well with the interview data. The meeting data are more varied possibly because the meeting purposes differ, especially which phase of strategy formation they may be related to (collecting and analysing information happens earlier than decision-making on proposals for example, and could be expected to use some different metrics). Again these results are discussed in more detail in section 3.3 below.

3.3 Results so far of data collection

The original aim of the work was to discover whether metrics related to sustainability or resilience were already in use, and what metrics are the most dominant. Therefore the metric data from each of the interviews and meetings was manually listed simply in two identical tables (one for each source type, interview or observation) and sorted against six metric “type” columns; economic, social, environmental and moral/ethical plus organisational resilience and “other”.

The choice of the first four of the six metric columns was based on Turner’s four “capitals” concept of sustainability as summarised in Ewert et al. (2005, p160). Ford typically use a similar three-capitals definition (omitting the ethical component) for example in their sustainability reports (FMC, 2009b), so most of this has the advantage of potentially being somewhat familiar to interviewees. The choice of Turner’s four-component model was made as the three capitals version is concerned mainly with (in theory) measurable impacts by the company on its context, and the ethical content of its activities is not very explicitly considered. It was thought that sorting the data with this column present might check whether ethical metrics of any kind were present or desirable, according to the interviewees.

The last two metrics are simpler- in the work so far, key sub-aspects of resilience have not yet been identified. so one column was selected to capture any data which might be considered as relating to organisational resilience; any activity indicating the reflection upon or planning of organisational development with medium-to-long term resilience (as
opposed to short term survival) in mind. The last column “other” was added in recognition that there would be metrics which would not easily fit into any of the other five categories, in this initial manual sorting.

Metrics were assigned to the group they most strongly represented where possible; some metrics seem to cover more than one so were listed under all relevant groups; and some such as those related to “brand” or internal politics or motivations were initially difficult to classify and left in “other” for further consideration. This initial grouping was used as the questionnaire does contain explicit questions on these kinds of metrics and so it was hoped that much of the data should naturally fall into these groups.

The metrics were also assigned one of three importance levels- very high, high, or general according to the emphasis given to them by the interviewers or within the meeting. The choice of these three levels reflects the interview question design which asked for the most important or useful factors considered in decisions -very important ones tend to be obvious as they are mentioned frequently and emphasised in meetings and interviews, important ones will be elicited by the questions as well, as will general ones which are more usually mentioned in passing, or as “other factors” for decisions by the interviewees (see Appendix 1 for the question set). The questions do not specifically ask for unimportant factors although they do ask for “unhelpful” ones. This phrasing was deliberate as the Research Engineer was already aware that hundreds of pieces of information can be considered in some decisions, so an attempt to capture all of them sorted by priority would be very time consuming at this stage, and not necessarily informative. In practice the most important and useful pieces of information seem to be the ones which are used in early decisions concerning strategy (although this has yet to be confirmed by reviewing a full set of data collected). Each column for each data source was assessed simply to see if metrics were present across the samples and types, and to see which metric types or specific metrics were dominant. This work will be refined in future when more data is available and the metrics may be sorted in other ways to see which reveals the most useful information.

3.3.1 Metrics used within Ford

With the metrics from the interviews and meetings tabulated and rated roughly for importance, simply casting an eye over the data from each activity is beginning to show some trends even after 3 data samples. For example, the interviews indicate thus far that financial aspects are by far and away the most important, within this the focus being on costs, future revenues, and affordability of proposals against any yearly spending plans, trailed more weakly by timing and resource issues, strategic benefits, some market position
factors and organisational questions such as decision ownership and politics, on a roughly equal footing. The meetings data so far also reflects the primacy of financial factors, with again cost, revenues, and affordability of R&D spend, taking first place then followed by timing issues, strategic fit and process questions, although the important metrics vary a little more here. Overall the economic category is well-covered, as to some extent is organisational resilience, whilst social, environmental and especially ethical categories get scant coverage. This may partly be an artefact of the initial crude sorting of data and will of course be changed by the collection of more data at different levels. The most mentioned metrics from both data sources are summarised in tables 1 below under the three importance categories.

It is important to note that so far there is a complete absence of the metrics which are the output of the Product Sustainability Index (except where, as in the case of drive-by noise, they are duplicates of existing criteria). Whilst this tool has never been used within subdivisions such as powertrain, and was not designed to be used outside the structured project delivery systems of GPDS or GTDS, it could be expected to appear in some vehicle-level decisions. Evidently this tool may have fallen out of use except within specialist teams or not been adopted in some areas; this has implications for this research as originally it was assumed the PSI approach and its output metrics would be available within the organisation.

The least well populated column is the ethical/moral one. This may be a reflection of this area being the least well developed, in terms of structured approaches and impact measurement, within industry and sustainability research; arguably this aspect could be subsumed into all of the other 3 main areas. However a few metrics stand out as particular to this area- the public opinion of the brand or company’s integrity, for example.

The most difficult data to categorise so far has been that related to branding, because this is a complex mixture of internal and external beliefs and opinions, tangible and intangible benefits (or risks) etc., and does not fit particularly well to the sustainability and resilience areas chosen. Finally there are a number of process or internal politics-related “metrics” which can be very important, which for now have been categorised as “other”; arguably some of these might indicate a degree of resilience-planning, such as considering the strategic fit or benefits of a proposal. A more thorough analysis with more data will hopefully shed more light in these areas.

The use of the word “metric” in interviews tended to elicit information about specific, mainly technical or financial metrics, used in proposal presentations; generally with either numerical values or red-yellow-green statuses against some goal or strategy. More general phrasing elicits a more varied mix of explicit metrics seen on paperwork, implicit metrics
encountered in the process, value judgments and inferred motivations. It may be important
to be able to separate these in the future analysis. There appears to be a belief by some
respondents that estimates of future metric values are factual information, although some
recognise the risks and uncertainties inherent in them, and the subjectivity of some numbers.

Lastly the metrics used, even within the same kind of meeting, tend to vary according
to the type of proposal being reviewed and the phase it is in. Most respondents believe a
customised and minimised approach is taken where only useful information is added. Some
teams appear to use moderately standardised forms (perhaps for ease of preparation) but
the information is still heavily customised, often as directed by the questions and feedback
from senior management.

<table>
<thead>
<tr>
<th>Economic metrics</th>
<th>Social metrics</th>
<th>Environment metrics</th>
<th>Ethical/moral metrics</th>
<th>Resilience metrics</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Very high importance</strong></td>
<td>Proposal total cost; Revenue effect; Cost per unit; Investment cost; Available budget this year;</td>
<td>Brand position; Brand differentiation; External opinion of brand;</td>
<td>Effect on (green) reputation;</td>
<td>Which internal functions are stakeholders?</td>
<td>Can I delay the decision? Who owns the decision? Do they support the proposal? Strategic benefit of proposal;</td>
</tr>
<tr>
<td><strong>High importance</strong></td>
<td>Volume effects; Profit effect; Formal finance metrics; Is the net effect positive? Growth %;</td>
<td></td>
<td>Brand reputation; Integrity of brand;</td>
<td>Time needed vs available; Resource need vs available; What is the strategy? Strategic fit of proposal;</td>
<td>Size of risks; Size of opportunities; Time horizon; Which option is recommended? Relevance of information; Competitor intelligence;</td>
</tr>
<tr>
<td><strong>General (examples only)</strong></td>
<td>Spend vs plan; Cost of ownership; Cost vs performance tradeoff;</td>
<td>Local social impacts eg. Jobs; Stakeholder consensus (internal); Credibility of company; Customer satisfaction;</td>
<td>Specific legislation; Tailpipe emissions; Noise;</td>
<td>Which scenarios to consider; Growth constraints;</td>
<td>Impact on strategy; Impacts on plan; Specific performance benefits;</td>
</tr>
</tbody>
</table>

Table 2- Ford metrics from interviews and meetings so far

These preoccupations in part reflect that the meetings so far are all within R&D
functions, and that an annual strategic review process is underway which is reflected in
many other meetings. The metrics which are dominant may of course alter as the
management level of the interviewees and the meetings changes; so far the data covers mainly people who either feed information into decision forums or attend to present proposals, but not the actual decision-makers. The R&D bias of the meetings and interviews matches the scope and location of the project which is strategy and product-focussed; as the organisational level of meetings rises it is forecast that more business-wide issue will be considered and so more general organisational aspects may become the focus. The possibility of extending the scope of meeting observations to other functional “silos” will also be investigated in the next few weeks.

3.3.2 Methods for strategy decision-making at Ford

Most of the method data has emerged in the interviews rather than meetings as they give a long-term view of the process rather than brief snapshots. This initial overview is a synthesis from all the interviews and meetings so far. The "method" part of the data falls into two areas so far. Rather than a search for a formal method (a written process for example) it is worth stating that this is the search for how Ford currently makes decisions in practice. One initial outcome concerns the generic way that non-tactical decisions tend to be made at Ford (addressed here), and the other concerns where within the company strategic proposals tend to arise (addressed in the next section). For the first, most PD decisions are tactical and fairly well defined, concerning delivery of product development programmes, and occur at relatively low level within structured processes set out within the established technology or product development systems. Those decisions which concern strategy do not appear to fit this process or at least not in the interviewee’s experience, requiring higher levels of management or specialist to be involved, and generally by their nature have wider-ranging implications and vaguer scopes. They are typically unstructured in that there is no set process and set of metrics for handling them.

It is readily apparent from interviews in consistent information volunteered by the interviewees, that this Ford decision process is iterative, flexible and that the only fixed points seem to be the management level required for sign-off of projects to a certain financial value with the use of their corresponding forums, and the practice of including all areas affected by a decision as stakeholders within it (although not necessarily always reliably). Although this leads to a rich collection of information it also seems to enable a form of democracy; for example if the received wisdom is that a particular proposal or project is not good, lower levels can impose their will to some extent over higher managers by failing to reach consensus, exaggerating the downside of the proposal, or (if overloaded especially) by not working on it at all until it is either enforced by senior management or the project
expires from lack of support. Conversely a project considered good by most teams will make it further into the decision-process and faster.

The group of managers involved in reviewing and recommending responses to proposals varies, and changes over time—usually the group becoming larger as new questions are raised or issues identified. Proposals are generally first reviewed by the level above where they are generated, and often must win consensus in each relevant forum at that level before being passed up to the next manager. This person may add new questions or demands, and add new stakeholders. They may also hold a different view and any differences between stakeholders can often only be resolved by persuasion, negotiation and discussion (and sometimes not). Whilst interview respondents believe that this enables thorough collection of information they do also state that this makes for a slow process. New stakeholders also tend to raise new questions which have to be researched, and meanwhile the surrounding circumstances can change, meaning the data and arguments have to be reworked. The proposal can run up and down the management levels several times being refined, updated, re-focussed and so on; and the larger, more unclear or controversial the implications, the more this happens.

According to the interviewees and the meetings observed so far, the decision process is hierarchical with the final, most senior manager having the ultimate say, although generally they will elicit advice and buy-in from their direct reports and other stakeholders before making the final call. The interviews also give a strong impression that one purpose of this approach is to delay any decisions until the last possible moment, to get the most recent data and avoid spending resources early then having to react to change and change or redo work. The advantage of this according to the interviewees is a Just-in-Time type approach which does not waste resources, but the downside is that decisions can be delayed too far causing other issues such as realised risks (which could have been avoided) and missed opportunities (which cannot be recovered). The impression of iteration and consensus-building from the meetings is less strong, but this is partly probably due to them being each a single snapshot within a long process which (say the interviewees) can take months or even years, depending on the size and time horizon of a proposal or study.

One final and very important observation is that although many pieces of qualitative and quantitative data may be collected during a proposal review process, the process of balancing options is completely driven by discussion, negotiation and ideally, consensus. This relies on the collective expertise and knowledge of the reviewing managers and experts, the accuracy of their input information, and their ability to balance often conflicting requirements and reach agreement. There is for example typically no use of algorithms or
even simple calculations to rank different attributes or metrics and seek to optimise their combination. A form of matrix listing approximate strengths of pros and cons is sometimes used to weed out obviously weak options (for example those which fail to deliver some fundamental requirement), which often happens earlier in the review process when refining proposals so that more senior managers are only presented with the more thorny decisions. Where options are similar or show a similar mix of pros and cons, the decision will usually quickly be passed up to the next level.

There is very little previous published research, if any, which includes an interior view of how specifically Ford makes decisions in detail, so it is not possible to compare these findings on that basis. The main example is Schmidt’s original paper on the creation of the Product Sustainability Index within Ford (Schmidt and Taylor, 2006); however this covers product design choices, not strategic decisions, and does not contain analysis of the decision processes themselves. Ford managers may have been surveyed as part of previous work but it has not yet been possible to find any papers where this is clearly noted. Studies do exist which cover the industry or similar large companies from an external perspective using publicly available data, but these naturally lack details of internal processes, and concentrate on declared or delivered strategies. Other companies may also have been studied in detail from within as part of business strategy research, although an initial literature search indicates there are again few with an “inside” view of these processes. There are many papers published by Ford concerning their technical developments or discussing engineering analysis or design tools, but it seems that this may be the first research to look at their strategic decision-making from the inside.

A brief discussion of these findings versus the work of strategy theorists, on the other hand, is covered in section 4.5.1.

3.3.3 Organisational origins of strategic proposals within Ford

Both sources of data seem to indicate that strategy or strategic proposals arise in two main ways (at least in the lower and middle management levels). One is the annual strategic review, a process which formally goes through three phases of information-gathering and analysis (both external and internal), idea generation and prioritisation, and detailed studies which eventually generate proposals (for products, strategies, operational changes and so forth) which result in resource commitment of various kinds. The most urgent proposal items receive immediate attention whilst others are kept and returned to each year for reconsideration (and generally updated). This is a form of planned strategy approach but also can be viewed as process-led (Mintzberg et al., 2009). A schematic of this process is
shown in Figure 1. Interviewees agreed that this process currently looks between 5 and 10 years into the future when considering trends and company responses.

The second way strategic proposals arise is by emerging from the daily (tactical) work of the business’ divisional “silos”. In theory this can be from anywhere that the employees of any level come across a risk or opportunity during their normal work; they may refer it along to another more relevant function or up into management, or develop their own proposal for responding to it which starts the reviewing and decision-making process. In practice such strategic proposals tend to emerge more frequently from teams whose functions whose job is to look ahead in time and respond to emerging trends in the market or general business environment, such as those in planning functions, working on technical or marketing innovations, or more senior managers who tend to have a more strategic remit. These “bottom-up” proposals often change significantly as they develop, as the effects of issues or strategies from other relevant areas are added. This is a kind of emergent strategy both in how it generates ideas and in responding to both changes and flaws in existing strategies.

Figure 1 - schematic of annual strategic review within Ford
Finally some proposals fall into both categories or migrate from one kind to the other. Standard workflows may create ideas which are spun off into strategic studies which remain linked to them, and vice versa. Again more ways of generating strategy may emerge as the interviews and meetings begin to take in other functions and decision levels. It would seem likely, for example, that the executive level managers could generate their own top-down strategy proposals or directives.

3.3.4 Practitioner observations on missing factors or methods

One other noticeable similarity in the data is that all interviewees to some extent mention either that some types of risk information are missing or that they try to incorporate them; such as the relative riskiness of different options, or the impact of making or delaying decisions. They also mostly mention that business cases are assessed against one economic (or other) scenario only, which can be an issue particularly for proposals with a long time horizon, where the future situation is difficult to forecast. One respondent mentions that this may be due to the industry generally experiencing low levels of change until recently and the company therefore not seeing any necessity for alternative scenario studies. Another respondent who has worked long-term on sustainability also mentioned the lack of use of sustainability metrics in decision making; and that when they were occasionally used he felt they were post the fact of the project delivery, so measuring outcomes but not driving them.

Lastly, one respondent expressed concern about how to integrate new kinds of important information, particularly on future trends and potential large paradigm shifts, into decisions as they become nearer in time and more relevant to the medium term strategic decisions. These needs which the interviewees have already identified should show both areas where metrics are most able to assist with improving decision-making quality, and also types of metric (or indeed method) that may be welcomed rather than resisted because the motivation to use them is already present.

Having discussed the current approach to strategic decision making within Ford, let us now review the continuing task of reviewing the field for suitable metrics and methods.

4 The Search For Metrics and Methods from Theory And The Field

In parallel with internal data collection, the search for suitable metrics or decision methods from external sources was continued. Specific avenues of short term research identified in the last report were, approximately in time order:

1. development of possible radical PSS level metrics for sustainability starting from Williams’ work (Williams, 2007)
2. search for and development of strategic-level sustainability metrics

3. development of resilience metrics from business risk theory and published data on other companies

4. development of resilience metrics from robustness and natural hazard theory

5. development of resilience metrics at an organisational and strategic level starting from Pujari's work (Pujari et al., 2003)

6. identification of missing or unutilised resilience (risk) and sustainability metrics from Ford internal processes and needs, or other issues

7. if possible seek suitable metrics from organisations outside Ford

As mentioned previously it was in fact decided to start number 6 by interviewing and observing, early, due to the time-dependent and intensive nature of the work and the initial results have already been described above in section 3.3. Some contacts have been made with other companies, networks and other organisations (no. 7) but none have yet resulted in an exchange of information; this will not be discussed further here. The following sections cover the outcomes of the other tasks.

4.1 Williams’ PSS level metrics and sustainability

Williams (2007) published a paper focussing specifically on assessing the level of system innovation possible from an automotive product-service-system (PSS). Although not explicit in the title, the underlying premise is that long-term (and full-scope) sustainability of the industry can only be arrived at through innovative developments such as PSSs, which rethink how the whole system (including product, services, infrastructure, behaviour and so on) delivers the function (personal mobility for example). This fits with the UNEP approach to Design for Sustainability (UNEP and TUDelft, 2009). Williams derives from previous theories a set of five criteria for measuring the “contribution” towards this system innovation by which different PSSs can be judged, going on to show examples. He also notes that many initiatives do not deliver their full potential because the focus has been mostly in one area (business model or technology alone for example) and the whole system has therefore not been fully thought out, so some enabling elements are missing (such as infrastructure changes), or barriers to change are left in place (such as ingrained behaviours). This he believes is partly because often the initiatives come from one organisation which has a
limited remit, and he suggests some ways forward from this position of partial delivery (Williams, 2007).

This suggests to the author that a consortium approach by several companies together, at least, may be needed to manage the delivery of this wider kind of PSS. As a result of the partial delivery of the innovations, the metrics Williams derives can also be considered as measuring the potential contribution to sustainability of the PSS in question; provided that the outcome of the innovation is indeed more sustainable. The criteria are:

- Change in vehicle ownership structure
- Change in device concept and life cycle management
- Change in infrastructure/institutional context
- Change in stakeholder learning
- Change in modes of producer/user interaction

(Williams, 2007)

Stakeholder learning includes behaviour change by all parties (ibid.). As these criteria intend to measure innovations which could drastically disrupt the industry’s current mainstream business model, they also incidentally provide a system-level measure of potential disruptiveness which might be more useful for strategic decisions than the previous more product-specific metrics suggested by Ganguly et al. (2010) or even Christensen (1997). The criteria also recognise that although as might be expected function-level rethinks could deliver great changes, other elements in combination or alone could also deliver a great deal of innovation and change (Williams, 2007).

The fact that potential and actual delivery differ implies that perhaps there is yet another element missing; maybe whether all of the criteria are being addressed together to overcome system inertia, or some other metric capturing the ability of the solution to be fully implemented; level of stakeholder buy-in, perhaps. These ideas will be further developed in the next few months of the research.

4.2 Other strategic sustainability (and resilience) approaches- CSR

This covers both items 2 and 3 on the list of tasks as in the published research at least, sustainability is usually linked to its theoretical business benefits, and so the two topics tend to appear together. During this period some relevant business research on achieving
resilience through embedding sustainability came to light as a result of working on a Corporate Social (and environmental) Responsibility (CSR) essay. It centres primarily around the ideas of re-engineering capitalism and the widening or integration of CSR into Creating Shared Value (CSV), as discussed for example in the Harvard Business Review journal (Porter and Kramer, 2006) (Porter and Kramer, 2011). An overview of relevant highlights follows.

4.2.1 Current forms of CSR

Dahlsrud (2008), identifies five main dimensions of CSR:

- environmental
- social
- economic
- stakeholder
- voluntariness

He also mentions that CSR approaches and performance differ widely, being heavily dependent on their context (2008). Kolstad (2007) adds that despite ambiguous links between CSR and profits, CSR is ethically necessary, delivering the moral, non-economic responsibilities of a company.

Porter and Kramer (2006), also cite moral duty, sustainability (stewardship of environment and community), license to operate (both explicit and tacit) and reputation management (both positive enhancements and negative impacts) as justifications for CSR. They connect longer-term economic success with “avoiding short-term behaviour that is socially detrimental or environmentally wasteful” (Porter and Kramer, 2006) i.e. via sustainability. Together with the isolation of CSR from “normal” business functions, they believe the implied trade-offs between the company and society create problems in identifying and prioritising CSR needs, and therefore in producing real results.

Godfrey et al. showed from market data that CSR activity preserves profits during a crisis for publicly-traded firms (instead of creating them), by building up “moral capital” with key stakeholders beforehand, through “character evidence” for its honesty and good behaviour. This lessens sanctions inflicted on the company by stakeholders, even when its integrity is under question (Godfrey et al., 2009). This insurance-type effect is stakeholder-
type, firm, and event specific; and CSR projects must clearly signal a balance of altruism and profit-motive, be publicly visible and be substantial enough to be credible, for this to work (Godfrey et al., 2009) (Kolstad, 2007).

CSR acts as insurance for institutional investors by mitigating risk, and enhancing access to market opportunities, which affect the attitudes of investors (Petersen and Vredenburg, 2009); Carroll and Shabana’s conclusions are similar on the motivations for investment choices (2010).

It is worth noting that so far these elements of CSR closely resemble the metric subsets used earlier in analysing the Ford data (economic, social, environmental, moral/ethical, and resilience); presumably as they spring from the same theoretical backgrounds. As always it is harder to measure real impacts than develop theories, but the evidence above points to long-term benefits of CSR for raising capital and supporting share value, plus delivering value for a wider range of stakeholders. These benefits in effect contribute to the resilience of a firm by making it more robust to possible risks and more able to exploit opportunities.

4.2.2 Current CSR within Ford

Projects within the UK are mostly about social impacts within the local community, and conducted through channels such as educational outreach, workplace diversity projects, volunteering and charitable projects (Winnard, 2011a). These form “institutional” CSR (ICSR) to satisfy “secondary stakeholders” who interact indirectly with the company unlike customers or shareholders (who are “primary stakeholders”) (Godfrey et al., 2009). Stakeholder concerns on a more global scale similarly translate as “technical” CSR (TSCR) through product and operations initiatives, for example reducing pollution from cars or factories; this usually also has a direct benefit in saved costs or increased sales, to the company. ICSR has the strongest “insurance” effect of the two types (ibid.), as it appears more altruistic and is less directly linked to such benefits for the company.

The Ford approach seems to be on an issue-by-issue basis and as with most companies, CSR is not embedded with other organisational functions (Winnard, 2011a). Considering the data already collected by this research and presented within the Annual Report (FMC, 2010), it is also apparent that metrics for social impacts (other than possibly product performance and branding) also are not used much in most strategic decisions and are less important than economic considerations.
4.2.3 Strategic CSR or CSV

Porter and Kramer have recently developed the idea of “strategic CSR”. Shared value for companies and society is delivered within this using the strategic strengths of organisations. Social issues are approached proactively via fewer but more focused and high-impact projects, unlike the current scattergun “responsive CSR” (Porter and Kramer, 2006). The social issues should be chosen which are key for the firm’s competitive context or strongly affected by its operations and value chain. In this way the work builds the company’s resilience by removing problems which limit its competitiveness, and improves society’s resilience at the same time. This kind of CSR needs large resources possibly from groups of organisations, to deliver and maximise the business benefits and positive social impacts. Measurement of the real world effects would be extremely important (ibid.)- as in any activity considered critical to a business’ success.

Fuel-efficient vehicles, offering pollution and cost benefits to customers and society (FMC, 2009a) are a simple example of this kind of CSR from Ford which also fits their strategic aim to be “market-leading in fuel economy” (FMC, 2011b). The UK division’s strategy to support science and technology teaching at all school ages, more indirectly improves their future supply of engineers but also enables an increased level of educational achievement locally (Winnard, 2011a). However these have not arisen from an embedded approach to social issues, and there appears to be no co-ordinated effort to maximise the organisational benefits of any CSR undertaken.

By integrating CSR into the organisation so that for example social impacts appear in management performance metrics, as Porter and Kramer suggest, it ceases to be a separately identifiable function. They coin the term “Corporate Social Integration” or CSI (Porter and Kramer, 2006) and later, “Creating Shared Value” or CSV (Porter and Kramer, 2011) for this approach. This embedding of metrics and work streams is needed if an organisation is to really deliver social improvements and shared value, and really reap the benefits.

In terms of approaches to delivering this, Design for Sustainability cites the highest potential improvements as coming from making changes to society and infrastructures as well as products (UNEP and TUDelft, 2009). Christensen also encourages this “disruptive innovation for social change” and suggests firms seek “catalytic ideas” to deliver the social and business benefits (Christensen et al., 2006). These both indicate that methods or metrics associated with D4S could be used in practice, particularly in design tasks. There is evidence of thought-experiments and experimental partnerships at the system level within
the automotive industry e.g. BMW-i (Reed, 2011), but real-world significant system-wide innovation within the industry’s offerings is still rare. Ford with its recently announced “Blueprint for Mobility” study (FMC, 2012) and exploratory partnership with the car-sharing firm Zipcar (FMC, 2011a) is no exception.

4.2.4 Applying Strategic CSR to Ford

As part of the annual strategy review, Ford collects data on trends in their external environment; the outside-in linkages of Porter and Kramer (Porter and Kramer, 2006) (see Figure 1). For example their analysis of how climate change poses risks and opportunities to their business, is well-developed in their Annual Reports (FMC, 2011b). Potential resource issues e.g. potential lithium shortages for batteries (Wells, 2010), or opportunities for strategic advantage from social solutions do not appear however in these reports; and impacts of any issues are given in terms of economic effects. As mentioned before this annual process typically looks 5 to 10 years ahead; but it can also trigger strategic studies which look further over the horizon and this is where strategic CSR could work best.

Not all external issues can be translated into money terms easily, plus some equivalencies are very controversial technically and morally, and important details can be lost (Schmidt and Taylor, 2006). If social and environmental aspects were directly (and separately) included in strategy inputs, these could more clearly highlight both risks previously identified by interviewees as omitted, and new opportunities for competitive advantage (or even reputational “insurance”). This would allow the company to respond to risks and opportunities better.

Judging by the relative absence of a complete set of environmental and social metrics observed so far, the company’s inside-out ability to assess its impacts on the external environment (Porter and Kramer, 2006) can also be improved, by including these sorts of metrics in strategy decisions. Although there is a best-practice Ford product design tool, the Product Sustainability Index, that attempts this, its use is neither universal nor mandatory (evident from the internal data collected so far). It is also less good according to its creators, for measuring social impacts, other than on customers, and has not been updated since its original launch in 2006. Other organisational functions are less well-served with tools, although environmental impacts are now considered in some decisions (FMC, 2011b). For strategic decisions simplified social and environmental impact metrics would again be needed to assist engineers and managers. This would enable them to deliver projects supporting related strategic CSR aims, and to record and manage internally
generated risks and opportunities, whilst offering the possibility of understanding more fully the external impacts of any alternative choices, and achieving a better balance of impacts.

Adding new metrics would require top-down support, to give non-economic considerations enough weighting to affect the outcomes. There would also need to be related metrics at all levels to ensure that when the proposals travel up and down the management levels, these extra aspects are not lost along the way. Otherwise you cannot control (or deliver) what you don’t measure, after all. It would be useful to include company resilience metrics alongside the social and environmental aspects, to try and capture overtly those subtle benefits which are, after all, the point of the exercise from the organisation’s view. This could also help drive buy-in and support for their use as a set. Strategic CSR can offer a way to differentiate corporate strategy positively and optimise resilience; lack of sufficient focus on these could damage long-term success. Embedded Strategic CSR and Sustainable Business seem, in the end, to be the same place arrived at by different routes.

4.2.5 Steps for Creating Shared Value

Porter and Kramer recently developed their ideas further and provide three main ways to create shared value (2011). This could offer an approach for applying the various metrics previously discussed. They suggest:

- Reconceiving products and markets
  - (is our product good for our customers? Can we serve neglected markets?)
- Redefining Productivity in the Value Chain
  - (where do societal issues create costs in our value chain?)
- Enabling Local Cluster Development
  - (creating synergy between related companies locally)

They mention the need for meaningful and appropriate metrics; such as for example being able to assess the detrimental effects of social issues on companies, or the societal impact of various products and services, and initiatives, so that the one offering the best total benefits per revenue can be chosen. They also suggest that this kind of utilisation of industry to address society’s needs, including energy and resource management, is one of the only ways to achieve large-scale sustainability, whilst enabling an organisation to best tackle its own limits to growth, thus enhancing its resilience (Porter and Kramer, 2011).
More work is needed to develop a method or approach based on this; probably by combining all of the metrics and methods together to select the best combination for a consistent approach. This will be done in the next couple of months.

4.3 Robustness and natural hazard approaches to resilience

The engineering-based robustness ideas have not been further developed this period; however in the latest interview it was noted that Ford business process engineers have also used a robustness engineering and system diagram approach similar to that independently arrived at by the Research Engineer. This argues for its utility when attempting a real-world process design task, and that this avenue should be explored further.

Some further work was carried out stemming from natural hazards and urban planning papers. During this period two further useful papers were published by Krumdieck on Transition Engineering which are relevant to organisational resilience and natural hazard theory. The first gives a more detailed overview of how resilience planning was introduced into an urban planning setting in various case studies and pilots, with particular reference to planning for resource availability risks (Peak Oil) (Krumdieck, 2011a). The methodological thinking behind this approach –transition engineering- was also outlined in another discussion paper (Krumdieck, 2011b). It was decided to deconstruct the resilience planning paper to see how the various steps of the activity might be relevant to Ford, and what similarities or differences might exist between the two settings. It was also decided to inspect the methodological approach to see if that might be helpful when generating an approach to application of resilience to the automotive industry.

4.3.1 Deconstructing Krumdieck’s approach to resource resilience

In November 2011 Krumdieck presented a paper at the ASME annual conference summarising the work of her team in New Zealand so far on urban transport resilience to Peak Oil risks. A number of separate projects are summarised, illustrating a suite of approaches or process steps within the overall approach of Transition Engineering, which has developed in parallel with this work (Krumdieck, 2011a). The work draws on urban planning and natural hazards assessment, and is of interest to the automotive industry because urban infrastructure and its associated investment has an even longer life than manufacturing assets or car platform designs, and so suffers from the problem of choosing resilient design that can cope with climate and resource changes at even further removed future dates. In addition these examples concern the transport activity within towns which is of direct relevance.
The projects develop an overview of future risks, look at vulnerability of current designs and activity, and also assesses the adaptive capacity of behaviours (trip and travel mode changes in this case) in proposed designs for various future scenarios. This combination allows planners to choose the most resilient design that protects the most important transport activities in their town, even though adaptive changes will still be necessary for, say, travellers. It also allows some discernment between different options on the basis of their own feasibility, risk and benefits, with multiple changes happening to behaviour and technology related to the design. Unsurprisingly town designs which do not force citizens to travel far (by having local amenities such as shops, jobs and schools reachable by non-car transport) and enable low-carbon transport modes better (by for example including bike and pedestrian paths, and integrating public transport into the planning) tend to score better for resilience and adaptive capacity (Krumdieck, 2011a).

The general relevance of this to traditional automotive companies is that it indicates in future a stronger shift away from dependence on their core product- oil-dependent, relatively large cars- likely when planning oil-resilience into towns and cities. Combined with the global tendency towards urbanisation in crowded cities, where cars are not necessarily the first choice for mobility (WBCSD, 2004), this adds up to a large paradigm shift in significant sections of the company’s global markets away from car-dominated cultures. Both the future automotive product /service and any system it is integrated into would have to deal with this shift to prosper in such a world. Ignoring this effect by not developing any kind of alternative product/service or strategy, even if the organisation is very efficient, could lead to reduced market access, and being very good at the wrong strategy, increasing the organisation’s riskiness, and decreasing its resilience, as pointed out by Taleb (2009).

Another key item of immediate interest to automotive companies like Ford, is the conversion of Peak Oil from an “issue” which tends to polarise responses, into a set of resource risk curves based on expert predictions of supply (and of the limited non-fossil replacements fuels available in New Zealand). This then turns Peak Oil into something that planners and engineers can deal with on a more business-as-usual basis. Assuming they have no issue with a selection of data from global experts, they are free to choose which future date they are planning for and select their own acceptable risk-level, which then provides a prediction of the possible reduction in supply for which they must plan. They can then assess the resilience of their design, and additionally assess various suggested adaptations on the basis of feasibility and risk (project, environmental, financial risks etc.) to allow the selection of the best candidates (Krumdieck, 2011a). The risk curves are shown in
Figure 3. This work feeds into the subsequent risk and resilience analysis projects by Krumdieck’s team.

![World Oil Supply Graph](image1)

Figure 2- Oil supply risk curves (Krumdieck, 2011a)

A quick consideration of the various project steps is illustrative for how an automotive company like Ford might tackle a similar task; for the purposes of illustration and comparison let us also consider the company’s strategic response to Peak Oil. As with most car OEMs, Ford’s range is currently very much based on internal combustion engines (ICEs) requiring oil-based fuels. If a new large-volume vehicle were being considered, for which there must be investment in new production line facilities and development, it would be important to both assure a saleable, profitable product and the ability of the production and logistic operations to continue despite any shortage of transport fuels. In a conservative industry with low profit margins one might wish to be 97% certain of continuing profit. So, taking for example the date 2020, and using Krumdieck’s graph, the 97% probability line shows a decline by about 8 billion barrels from the annual peak of 28 billion; an approximately 30% drop. Krumdieck’s team do not try to predict fuel price or details of regional availability but
assume the same relative scarcity globally and merely ask- what would this mean for your organisation’s activities? (Krumdieck, 2011a)

For Ford, assuming that global demand and supply are already about the same level now i.e. that Peak Oil is very near, as calculated by de Almeida and Silva (de Almeida and Silva, 2009) this could mean 3 things (one or all of them) in 2020. Assuming firstly that consumers in 2020 still are buying as many cars and wanting to make as many trips (i.e. demand is maintained at current levels), those cars would need to be 30% more fuel efficient to allow this. Second, if Ford’s logistics and production systems have not changed much, they too would need to be 30% more efficient wherever oil is required. (Oil also impacts the cost of supply-chain goods and services; this is more difficult to interpret however). Thirdly, planning with such a significant fall in supply it is likely that some behaviours and infrastructure changes will have already been accelerated, perhaps with legislative measures. This means that the undiminished demand of the first case for ICE cars is unlikely, and therefore their business model and product strategies would need to encompass a shift to other non-oil based powertrains, smaller vehicles potentially and other transport modes. This last is important because large OEMs are rather used to only considering themselves in competition with each other, not with niche suppliers or other transport solutions including walking. It is easy to see that the effects of oil unavailability are complex and recursive- even if some cars become all-electric this still means an increase in demand at power-stations; in reality if prices rise consumer behaviours will change in complicated ways, and so on.

But a non-priced risk approach does at least let organisations begin to interpret what a resource risk can mean in practical terms to their strategy; and this approach can be extended to other resources, or climate change effects on severe weather and this operations, for example to provide an overview of risk exposure and relative resilience associated with each issue (Porter and Kramer, 2006) (Lash and Wellington, 2007). In some of these cases a rich set of data and predictions already exists, created for fields such as natural hazard engineering. In many cases other fields are more advanced than the automotive industry in assessing risks. One example is civil engineering, particularly infrastructure work, where complex insurances are used to cover different types of risk including weather events, regulatory changes, and technical project risk. This extends to many “new” types of build such as renewable energy installations, although some risks are so new that even the least conservative end of the risk insurance industry has insufficient data yet to be able to handle them, for example the environmental impacts of unproven new technology, as discussed at a recent insurance and risk seminar (Winnard, 2011b). The
automotive industry could potentially use generic risk information already available for common factors such as climate change weather effects and resource scarcity, whenever it needs more detailed data. However at the level of strategic proposals, even a simple effort to capture and record the different impacts or risks and opportunities from each external factor, and the corresponding risk reduction, opportunity access (or otherwise) arising from each proposal would be helpful.

4.3.2 Krumdieck’s Transition Engineering approach

The second paper (Krumdieck, 2011b) supplies some background information on the Transition Engineering approach Krumdieck’s team seems to have developed and its roots in sustainability and safety engineering. In it she describes how she developed the concept of Transition Engineering from a need to both overcome the difficulties of defining “sustainability” and the need to develop useable approaches for practitioners. Krumdieck turns the definition issue on its head by suggesting that the topic should be approached similarly to safety or reliability; we cannot define perfect safety, but we know what is unsafe and can design “unsafeness”, or rather the risk of it, out. Similarly engineers can reduce the risks of un-sustainability. She suggests starting with the concept of survival (entities either survive or not), leading to a corollary that adaptation is how survival is achieved when responding to change. Combined with a view that sustainability is just the longer-term version of safety and security (lying on the same “continuum” as them with increasing timescales, location and relationship scopes), this leads to the assertion that survival long-term is achieved by adapting to become more sustainable. It also raises the notion that there are many possible adaptations, and all adaptive changes are a mix of benefit and risk. Transition Engineering is therefore the task of adapting existing (and even new) systems for survival, but includes behaviour, politics, economics etc. as well as purely technical considerations, due to the holistic nature of (un)sustainability and the systems it is applied to.

Krumdieck also suggests it should be a practitioner-led activity; based like safety engineering on the idea that “it is the right thing to do” and developed by the profession similarly, providing guidance, best practice and so forth. She provides a conceptual framework process with seven main steps, ideally to enable transitions away from unsustainability to be managed before any “trigger” events (i.e. disasters) occur (see Figure 3). She incidentally mentions that market signals (such as economic change or legislation) often only appear after trigger events; another reason for a proactive practitioner-led approach. Finally a few example projects are given, most of which are common to the previous paper (ibid.).
The simplified conceptual framework as shown in Figure 3 seems to provide a good starting point for any task considering adaptation by design, whether of a company, product or service; and whether in response to climate change or a specific resource issue. It is notable that the element of scenario analysis is included which has already been mentioned by Ford interviewees as something they feel may be missing from Ford strategic decision-making processes. The theme of risk assessment – the other missing aspect raised by Ford interviewees – also runs throughout both this paper and the detailed one discussed previously. In a challenging business environment it would seem wise not to wait for a “trigger” event (which might put you out of business) but to start engineering for resilience immediately, especially if you are aware of a number of large and looming challenges in the near future.

![Figure 3- Transition Engineering conceptual framework (Krumdieck, 2011b)](image)

The next research step should be to establish how many (if any) of these process steps Ford employs in any of its strategic decision processes, to allow a gap analysis. There is evidence that something similar in terms of transition or resilience thinking may have happened under the leadership of Alan Mullaly, with the start of the company’s restructuring efforts (mainly economic) just prior to the industry crisis in 2008. This was done under the ONE Ford plan which is designed to improve Ford’s profitability, growth and financial position through a number of different measures (FMC, 2008). This is discussed further under “Next Steps” at the end of Section 3.
4.4 Pujari et al.’s paper – organisational resilience metrics

This was originally selected for further in-depth reading as it seems to offer metrics for organisational and perhaps strategic resilience through embedding sustainability. Pujari’s paper concentrates on Environmental New Product Development (ENPD) (Pujari et al., 2003) so has a particular relevance for a PD-oriented project such as this. They identified then tested a set of eight factors believed to influence general market and eco-performance of products, by surveying a large number of environmental/ NPD managers within UK manufacturers, as to their opinion on what the influences are in reality. The paper initially seems to skip over the exact definition of “eco-performance”, but this can be found in the appendices as a combination of two things; “enhanced environmental image” and “reduced overall environmental impact” (ibid.). Although it is using surveyed opinion rather than measuring this performance directly in some independent way, the paper provides some useful insights which are mainly based in organisational factors, hence for the purposes of this project it potentially covers both resilience and sustainability aspects.

The factors which they did find correlated to performance were:

- “A higher degree of top management support for ENPD will positively influence the level of eco-performance of ENPD,”
- “A higher degree of integration of environmental coordinator in ENPD process positively influences the level of eco-performance of ENPD,”
- “A higher degree of supplier involvement positively influences eco-performance of ENPD,”
- “A higher degree of effective groundwork (seemingly market and behaviour research) positively influences market performance and eco-performance of ENPD,”
- “A high degree of integration of environmental impact databases in existing information systems positively influence the market performance and eco-performance of ENPD,”
- “A higher degree of cross-functional coordination positively influences market performance and eco-performance of ENPD,”

And
• “A higher level of environmental benchmarking positively influences market performance and eco-performance of ENPD,”

-was only correlated with market and not eco-performance (implying they are not necessarily automatically connected, in managerial opinion at least).

Whilst the following did not correlate:

• “An explicit environmental policy positively influences the level of eco-performance of ENPD,”

• “A higher degree of product testing and experimentation for environmental impact positively influences market performance and eco-performance of ENPD.”

(Pujari et al., 2003)

They believe these last reflect firstly the belief of a disconnection between overt policies and operational activity, and secondly the relative immaturity of tests for eco-performance (ibid.). In the author’s opinion the first conclusion seems valid- other researchers have noted the gap between having a policy and successful delivery of environmental improvements (Wehrmeyer, 2010). As for the second, it may merely reflect a poorly-designed premise in their research. From an industrial point of view one models and tests the attributes for which a product is designed (and especially those about which any claims are made) anyway; this item might be confusing therefore and imply “extra” testing for eco-performance which may have confused the respondents. It is admittedly difficult to establish the full environmental impact of a product, activity or company without many years of research, hence the frequent use of generic LCA data to establish an assessment; and the costs of additional tests might also weaken a company’s short-term economic performance. Both of these could have been reflected in the finding. The researchers were considering this eco-performance aspect as including both improved company image and reduced impacts (presumably from the ENPD process itself or the resulting products, or both- this is a little unclear) (Pujari et al., 2003). However there is not enough detail in the paper to establish how well the meaning of the question was communicated and there is no real discussion of this part of the result, which is in any case based on managerial opinions, so it is not possible to comment further on this finding.

This all nonetheless speaks to the importance for sustainability of integrating and supporting ENPD experts, information and practices both within the company and along the
value chain in both directions, to suppliers and customers; and implies that most of this assists with market performance as well. This tallies well with the social-impact oriented recommendations made by Porter and Kramer in their Creating Shared Values approach discussed earlier (Porter and Kramer, 2011).

The factors used by Pujari could be turned into some form of qualitative organisational metric; perhaps needing to be combined with others to cover the full range of metrics sought. They do not explicitly mention strategy, although the organisational approaches chosen as a result of using such metrics could be considered as internal strategies. This needs further development.

4.5 Search for external decision/strategy making methods

This is ongoing and happens in parallel with the more specific enquiries listed in in the sections above. As with the data collection inside Ford it was found that the metrics and methods information or theories tend to come mixed together. This is unsurprising as it is difficult to describe one without the other, although some sources tend to favour one or other more. As a result, the information gathered is mainly covered under earlier sections. In addition some reading on strategy theory was done to both assist with identifying Ford’s strategic style(s) and to see if this would lead to potential approaches for further investigation; the most useful results are in the following section.

4.5.1 Strategy theory- Whittington’s axes and motivation theory

The most useful strategy overview encountered so far is presented by Whittington in “What is Strategy: and does it matter?” (Whittington, 1993). He creates two axes of strategy types; the first axis has only a profit goal at one end and plural goals (for example personal power or reward for the owner, or improved societal impact, usually as well as profit) at the other. The second has planned strategy at one end and emergent strategy (which arises unplanned from activities) at the other. He thus creates four main “schools” of strategy approach:

- Classical (assumes planning and execution are separate, rational markets and actors, has a profit orientation)
- Processual (the processes drive the emergence of strategy which is usually only seen in retrospect; has a pluralist goals orientation)
- Systemic (strategy is planned but markets and companies are both imperfect, and all is affected by social and other contexts; goals are therefore pluralistic)
Evolutionary (the world is too fast and chaotic for strategies to really work; one can only react to events; profit-oriented)

These are summarised in Figure 4.

Figure 4 - Whittington's strategy perspectives (summarised from Whittington, 1993)

The last, the Evolutionary approach, does not feature much in strategy theory as it is almost the antithesis of planned strategy. The Classical type was the basis of most business-school theory until recently, and the other two are more recent developments springing from different views of how strategy is really carried out and made. Whittington comments that almost all organisations are expected to look Classical (by stakeholders such as shareholders and regulatory bodies) regardless of what they actually do in practice; witness the ritual of the annual report and strategy announcements. All four are valid styles used in the real world with differing degrees of success by organisations, whereas theorists tend to favour one school or other. He also points out that real firms are more of a complex mix and may sit more between these extremes. The “philosophical” school approach to strategy has implications for how a firm chooses to deal with it (ibid.).

The iterative strategic decision process at Ford, described earlier in the results of the interviews and meeting observations, shows signs of being both Processual (some strategy
emerges accidentally from smaller processes and considerations) and Systemic (strategy is planned but the system recognises its complex and constantly changing context, multiple goals and imperfect nature of its delivery). As a large and complex organisation with traded shares it does of course also appear Classical, especially in external communications and some strategic corporate level strategies such as “One Ford” – designed to restructure the company in recent years and deliver better costs, revenues and thus profits. Ford can even appear Evolutionary occasionally- such as when responding to the sudden recession effects in 2008 on the car market and to resulting regional scrappage schemes. It seems that different levels and types of decision will show different kinds of emphases between these factors. More work is needed to see whether strategic decision making in its various forms at Ford shows a definite preference for one “school” and to establish whether this can offer useful insights into how best to modify the process, to achieve sustainability and/or resilience amongst the outcomes.

Additionally Whittington (a Systemic writer) points out that the motivations of owners, including large shareholders (profit maximisation) and managers (maintenance of personal power) differ and affect strategy choices. Owner led-firms tend to go for profits above growth whereas manager-dominated firms will do the opposite. Ford is owned by a combination of the original family, plus large shareholdings by executives and other companies or banks, then smaller shareholders; but is also very large and complex with many managers. So it is not easy to see at first glance which end of the continuum it favours -even if one suspects that managerial priorities have been more dominant from the observation that it produces large amounts of revenue and product with relatively low profit (Wells, 2010). If there is a combination of factions this may promote conflict within the company for example, especially when attempting to change strategy.

Additionally Whittington observes that Anglo Saxon cultures such as the US and UK have more Classical cultures, whereas other regions have more overtly pluralist approaches (1993). Both strategy sustainability and resilience approaches automatically introduce multiple aims beyond profit maximisation, which leads to a Systemic or Processual approach. This also happens to match the initial impression of the internal culture of Ford strategy decisions. Again, more work might be done once more data is collected from the interviews and meeting observations to analyse the data according to Whittington’s theories. This task is discussed further under “Next Steps” in 6.2.
5 Gap and feasibility analysis

This is planned to take all the internal data and external information on theory and practice, and select the best combination of elements with which to proceed. It is planned for the second half of this research year so has not yet begun.

6 Longer Term Tasks and Next Steps

Four longer tasks were also identified at the end of Year 1:

1. Select and test best metrics
2. investigate suitability of QFD as a starting point for the method, from Ilgin and Gupta's survey (Ilgin and Gupta, 2010)
3. similarly for Pugh matrices (or a Ford equivalent if existing)
4. investigate which formal methods if any Ford currently uses when making strategic decisions, especially how radical ones are handled (method)

Item 1 cannot be started until the initial survey of existing metrics (and methods) and the search for external metrics are complete. This is planned to happen in the next six months, assuming the data collected are consistent and meaningful enough to draw clear conclusions. It is likely again that work on the metrics and the method in which they are used will have to proceed together as the two strands depend on each other for definition and useability. Initial testing is likely to be with a small group of sympathetic practitioners inside the firm to refine the suggested additional or replacement process elements, followed by a fuller trial.

As already noted, item 4 has been started when gathering data, as the method of decision making is inevitably covered in the same data-gathering activities as the metrics.

6.1 Formal methods

No in-depth work has yet been done on item 3 and very little on item 2, as these were planned for the second half of the year's work. However it appears from the initial interview data that, due to the reliance by Ford on discursive, consensus-seeking and unstructured methods of decision-making, that such formal methods may not be easy to introduce. Moreover the interview data from one respondent in particular indicates that many such formal methods such as QFD have been discarded previously after being introduced unsuccessfully when working with consultancies. The opinion of management at least seems to have been (at times) that “bad” strategies or decisions happened as a result of the tools;
and therefore a sort of allergy to formal tools has developed as they can lead to “box ticking” rather than true strategic thinking, and critical factors may thus be missed (Winnard, 2012). This is of course likely to be conflating the effects of the users and the tool, but nonetheless demonstrates what appears to be a deep cultural dislike for externally-derived tools and techniques; and an understandable reliance on specialist expertise and managerial intuition.

Therefore, understanding how different strategic cultures operate, using the theories of Whittington and others, will be key to identifying how best to develop a useful and culturally acceptable approach, and communicate and test it.

6.2 Next steps

A number of further research tasks have been identified throughout this report and are brought together and summarised in this section by theme. The theory and data need to be brought together to inform the task of selecting, testing and eventually introducing the new metrics and methods. This work must take place in the next few months so it can inform the gap and feasibility analysis planned for the second half of the year, allowing the development of a plan to test the selected approach(es).

Firstly, regarding communicating the research results into the company, and collecting data within it:

- Select strategic studies within Ford which can make best use of metric, method and scenario-related results so far; make contact and plan interaction (by end of March)
- Finish developing robust approach for analysing qualitative data (April)
- Finish processing remaining interviews; produce full transcript of at least one (by end of March) and use for analysis with Qualitative Research software, probably Nvivo (by end of April)
- Review which further interviews and meeting observations are needed and arrange; e.g. tracking PSI’s fate, interviewing Business Process, senior managers, or strategic study teams more generally (develop detailed plan by end of March)
- Further internal information gathering to be complete by June
- Identify a process design approach (probably based on robustness engineering and/or Transition Engineering) within which to use the research results (by June)

Next the analysis:
• Collate all initial internal data, and review against software analysis results to create full analysis (ideally by May).

• Create a synthesis of the best metrics and methods from theory and the field, filling any gaps here (May)

• Conduct a gap analysis to identify which useful metrics and methods are absent from Ford processes (May)

• Add a feasibility analysis (bearing in mind the cultures present) to identify the best candidates (May)

Then, the bringing together of all the strands:

• Add in any relevant results from further internal data to feasibility/ gap analysis (June)

• Review all metrics, methods (e.g. from PSI) to identify at least one complete set covering the desired areas and relevant decision levels for testing internally (July)

• Review whether some can be tested using public historical data e.g. organisational resilience

• Plan a pilot exercise, possibly with one of the strategic study teams already identified (July to be run in Year 3)

• Publish results so far in the Year 2 Dissertation (by end of August)

• Preparation may also be needed in July/ August for the Transfer Viva in October

The development of the metrics and methods, and the interaction with strategic study teams is to be informed throughout by the background work on strategy and culture, and best communication practices.

A simplified summary of these tasks across the year is shown in Figure 5. The timing of some tasks has been altered; mainly because originally the metrics and methods were going to be worked on sequentially, but have turned out to be closely connected. This means that assessing their current use within the company, and the best practice from elsewhere, will take up more time before any developing of a solution and testing can be conducted. This means that the first testing phase moves into Year 3 of the research; on the other hand the development of methods is happening earlier than originally planned.

The ongoing underlying task of setting the boundaries of the research will be heavily informed by the next few months’ work, as a restricted selection may have to be made from all the possible approaches possible, to make the work feasible within the timing of the
doctorate. The intention is for this to be part of the selection exercise in the summer, further discussed in the dissertation and confirmed by this and the Viva at the end of the year.

![Figure 5- research time plan for next 6 months](image)

### 7 Summary and Conclusions

During the past five months data on the strategic decision process within Ford has been collected, and some early results analysed. More data is needed to confirm whether the initial results are borne out by a wider data set and robust qualitative analysis is planned to draw conclusions and refine the model of what is happening now. Gaps identified by interviewees mainly concern a lack of both metrics and methods to incorporate risks and conduct analysis against different future scenarios. Other gaps identified by the Research Engineer correspond to a lower use of non-economic metrics, especially for sustainability or resilience. Unexpectedly, the sustainability metrics from the Ford sustainability tool (PSI) seem to be almost wholly absent, although this may not be the case once the data gathering
has covered a broader area of the organisation, and may reflect the fact that some areas have never used this tool. This needs to be investigated as it has implications for how this research develops. Additionally the unfamiliarity of interviewees with the two formal concepts of sustainability and resilience (as opposed to the in-house shorthand use of “sustainability” to mean primarily tailpipe CO$_2$ emissions) argues for a lack of awareness of these areas within the organisation; any new approaches must either therefore be easy to understand (even self-explanatory) or accompanied by some form of simple training.

Many respondents were aware of looming issues such as demographic changes, climate change and resource shortages, and were concerned about how to respond to new trends or incorporate them into decision processes which appear to have low capability to handle this new information. In terms of a strategic decision-making methodology, the company mainly relies on its management and specialists’ human “database” of expertise. Strategy in the data so far arises both from top-down planning and bottom-up issue or opportunity discovery. The decision process in either case appears to be the same. Ford employs a very flexible, iterative, theoretically consensus-driven decision making style, which looks like Whittington’s (1993) Processual approach. However true decisional power is concentrated at the top of the organisation, and the approach does not use many formal methods to compare, rank (or generate) options and so it may be difficult to “import” a new approach from theory or another organisation. This points to the need to win top-down support for any new approaches, and to work with the company’s business process teams in the design of them, to create a culturally acceptable solution, and increase the level of ownership and likely use of the research results.

In the search for best-practice from outside the company, both Pujari and Williams’ work suggests some possible metrics; for organisational resilience and sustainability innovation (and also disruptive potential) respectively (Pujari et al., 2003) (Williams, 2007). The recently-developed idea of embedded strategic CSR called Creating Shared Value offers one methodological approach in which to use any new metrics (Porter and Kramer, 2011); as does Transition Engineering (Krumdieck, 2011a) (Krumdieck, 2011b). Both have the potential to encompass both sustainability and resilience, being concerned with the benefits of applying the first on the state of the second; whereas either Transition Engineering or (engineering) Robustness Design – or a combination of both - may offer a tool for analysing and designing the adaption of company processes itself. Finally Krumdieck’s work on resource resilience highlights the need for translating polarising “issues” in risks and opportunities which companies are better equipped to digest and deal with, and that critical
questions should be “Resilience to what?” and “How do we decrease unsustainability?” to achieve this (Krumdieck, 2011a) (Krumdieck, 2011b).

These strands will be continued and drawn together over the next few months to create a synthesis of the best approaches for different kinds of strategic decisions, and provide a gap analysis to find the most suitable metrics and methods for application within Ford. A pilot study will be planned, possibly within one of the strategic studies with which the project will be linked in the next few weeks, to assess their utility and effectiveness; this will be conducted in Year 3, or earlier if a suitable opportunity arises. The confirmed lack of metrics and methods for handling strategic sustainability and resilience established so far, indicates that this research should deliver useful results for the company throughout its duration.

Julie Winnard 14th March 2012

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References


Delft University of Technology.


Appendix 1

EngD Research Interview Questions 2011- Strategic decisions processes

Current version of semi-structured interview questions as at March 2012

<table>
<thead>
<tr>
<th>Name</th>
<th>Job Title &amp; Grade</th>
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Location

General scene setting & background questions:
- Q1 How long have you been working in the automotive industry?
- Q2 Which other sectors have you worked in as well?
- Q3 How long have you worked for Ford?
- Q3 And how long in this kind of job?

Easing into the specific questions:
- Q4 What is your experience of how the company makes decisions?
- Q4b What do you understand to be the decision-making process?
- Q4c What is your role within general and strategic decision-making?

Q5 What are the differences in your view between how Ford makes daily/detailed decisions and high level/longer range ones?

Q6 How are you involved in higher-level or long-term decision-making? (Proposer, participant, decision owner etc)

Q7 How do the high-level/longer range decisions relate to daily and short-range ones?

Q8 Are you aware of a company definition for what constitutes a ‘strategic decision’?

Q8b How would you define a strategic decision, and are there significant differences between your definition and what you believe the company’s definition to be?

If they believe they are involved in strategic decision-making:

Metrics/Information focus:
- Q9 What sort of factors do you consider when making long range/high-level/strategic decisions?
- Q9b What is it most useful to consider? (Why?)
- Q9c Is there anything included which is unhelpful? (Why?)
- Q9d Is there any missing information which you think would be useful? (Why?)
- Q9e How far ahead in time is considered?

Methods focus:
- Q10 What standard approaches, if any, are used in decision-making? (to arrange information, analyse it, compare options, present recommendations etc)
- Q10b What approaches do you feel might be appropriate but which are not currently used?
- Q10c How do strategies get made, and adjusted or discarded within Ford?

Focus questions (only if sustainability, resilience and risk don’t come up earlier):
- Q11 How do you come across sustainability- in the wider meaning of environmental impact within these decisions?
- Q11b Ditto sustainability- in terms of social impact?
- Q11c Ditto sustainability- in terms of economic sustainability?
- Q11d And what about organisational resilience? (The capacity to absorb shocks, keep functioning and adapt).

Q12 Is there anything else important that you’d like to include about decision-making at Ford?