Appendix E - Training manual for SuReSDS™

How to use SuReSDS™ to support decisions in a strategic study: Assessing systems, Creating options and scenarios, Testing options

Simple instructions/ training slides
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General instructions

• Work through each step in order, completing each step to create reasonably satisfactory answers before moving to the next
• Using simple wording is fine; and you do not need “hard” data to use the process successfully
• Answer questions/ carry out tasks as shown
• Make notes of any assumptions you make at any point as you may need these again later
• The facilitator can support you with information on how to carry out the task or about general sustainability and resilience, but you lead & participate in the training /analysis
SuReSDS general process flow

The process can start in any of the tasks and cycle round more than once. It can also run backwards and forwards through these steps as different options are considered.

Detailed method steps-overview
Step 1: Scoping the study

- What is the study trying to find out about a strategy decision and why?
  - Can you summarise the decision?
  - How will you know when the study is finished?
  - If you have more than one purpose do you need >1 study?
- What is the information requested, when and in which format, for reporting out of this study?
- When is the study/analysis set in time (now, future, varies)?
- Does the study try to answer a question about sustainability and/or resilience? (this may be hidden)
  - If you cannot find any, this technique may not be appropriate
  - Keep going until Step 3 before deciding this
- Does the team have sufficient knowledge and expertise on the issues to be studied, to analyse strategy simply?

Step 2: Scope the system boundary

- What sort of system is being affected by the strategy or decision you are making or analysing?
  - (corporate level business model, Product-Service-System, a factory, a subsystem; or a technology used in many places etc. etc.)
  - Almost anything can be thought about as a system; this helps you analyse what happens when your decision makes a change
- Simply put, what are the system impacts...
  - What is it meant to do normally? (in one sentence)
    usually a system turns something(s) into some other thing(s) by transforming them in some way: e.g. energy, info, materials, money into happy customers by delivering some function or service
  - What are the other impacts of the system’s activities?
    - What are the other good, bad or neutral effects of doing this?
    - What is it possibly going to do if it fails?
- What/who are all the stakeholders significantly affected by these impacts? (people, groups, entities)
  - Identify at least one each from society, environment & economy
Step 3: Reframing the study aim (#1)

- In the light of the study and system scope identified in steps 1 and 2
  - Rephrase the study purpose and system to reflect
    - Sustainability questions it aims to address
      - Reducing negative impacts and improving positive impacts of the system’s activity or strategy decisions which affect it
      - On society and the environment, or even the economy outside of the company as well as its direct stakeholders (customers, employees, shareholders etc)
    - Resilience questions it aims to address
      - Usually it is a requirement to make the system outputs resilient to some external disturbance & work well in different possible future scenarios for this (e.g. sales fluctuations)
Step 3: Reframing the study aim (#2)

- If one of these types of issue - sustainability or resilience - does not appear to be present, you can assume a solution is needed for the other one without damaging the “missing” quality
  - E.g. solve a sustainability issue - ideally with better/without sacrificing any resilience
- If neither type of issue is present (such as in cost-only analysis) the SuReSDS approach may not be suitable. Are you sure not even economic resilience is an issue? Or has something else like energy use or pollution been turned into a cost?

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Step 4: impacts on the stakeholders (#1)

- Draw a Value Exchange Map:
  - Write all stakeholders down round the edge (reminder - have at least one each for society, environment, economy)
  - Identify all value exchange flows between each pair or round each set/circle of stakeholders, which the existing or preferred new system function enables/accidentally causes
    - This will be your baseline for comparison
    - Some flows are negative - damaging or removing value
  - Identify how you might measure each flow in reality
    - Some flows are side-effects of main system function
    - Flows can be negative or positive in their impact but this may depend on which stakeholder’s view you take! (One man’s cost is another man’s profit)
    - Identify any problem flows and beneficial flows closely related to and affected by the strategy decision; we will concentrate on these

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Example (simple) Value Exchange Map

European vehicle fleet CO2 strategy (to meet EC targets)
Step 4: impacts on the stakeholders (#2)

- For each strategy option, operating normally:
  - Assess how it affects these baseline flows (or may affect them—note places where more investigation is needed!)
  - Increases or decreases in flows may be negative or positive in terms of the value this adds or destroys
    - Whose viewpoint will you use to assess this if views conflict?
  - Does the option introduce new flows or remove any?
  - How might any new flows be measured?
  - Are there any major unknowns?
  - Include all lifecycle phases from manufacture to disposal or recycling/re-use and try to create a complete picture of the major value effects of different types, of any decision.
  - Use the original existing version of the system as the “baseline” to compare other options with, or pick one future strategy as the baseline.

Step 5: Model the system functions (#1)

- Using the information from the value diagram, and a simple view of your baseline system identify the main elements of the system and draw a simple P-diagram using the guide/format overleaf
  - Use the system function(s) you wrote down in step 2
  - Describe the elements and functions as accurately as possible—but verbal rather than numerical descriptions are best right now
  - Break the overall system function(s) description into smaller pieces with a little more detail if required, maximum 7
    - This is to keep the analysis simple enough for human brains working in groups
    - If you have too many bits or functions in your system, try analysing just the most important part of the system, the bit your strategy affects, or take a simpler higher-level view
  - The impacts you identified at the same time in step 2 should all appear in one or other of the output type boxes, or maybe as feedback
  - Any negative effects of failure also appear in the “undesirable” box
- Are all the effects on the stakeholders identified earlier in the value diagram, covered by the outputs/impacts shown on the P-diagram?
Blank P-diagram

Complex systems deal with multiple inputs, perform multiple functions and have several outputs occurring at the same time, for example emissions are undesirable side effects of car use.

Signals → System functions → Noises

Control Factors → Desirable outputs

Undesirable outputs

Feedback routes

Step 5: Model the system functions (#2)

- **Control Factors** should be the only aspects of the system which can be easily adjusted by you when it is active to make it perform better.
  - Anything requiring the system to stop working to change, is really a redesign or rework of the system. But these are also ways to adapt.
- **Noises** are external disturbances which you cannot control and which you do **NOT** want to affect your system’s performance.
- **Signals** are external influences which you may or may not control, and which you **DO** want the system to respond to—appropriately!
- Sudden signal or noise changes—especially large ones—are **shocks** for your system.
  - In “normal” conditions for each strategy option, how do signals and noises vary and what does this make your system do?
- You will need to adjust parts of this diagram for analysing each other strategy option, because it will affect one or more elements of the design and functions/impacts.
Step 6: Test the system’s performance

- Form one set of simple future scenarios of external operating conditions the system may encounter (e.g., market conditions, user profiles): try
  - Most likely, best and worst case; or
  - Normal, unusual and extraordinary conditions
    - You may only need to think about a small set of signals and/or noises which are the most important or relevant to your strategy decision

For the baseline strategic option:
- What is the system’s sustainability in each scenario case?
  - The value and overall balance of all positive to negative impacts (value flows)
- What is its resilience in each scenario?
  - How this set of sustainability metrics change when the system is exposed to normal disturbance (general noises), market changes (trends in signals) or different specific scenarios;
  - its response, recovery and adaptation
    - This is short, medium and long-term reactions of your system, respectively
    - Response means what the system immediately does without changing its control factors
    - Recovery or Adaptation long-term in particular may require the design of the system (e.g., control factors or functions) to change
- Repeat for the other options- see next page.
Step 7: Effects of each strategy

- Now considering both the P-diagram and Value Exchange Map for each alternative strategy:
  - What effect does the strategy being proposed/studied have on the value exchanges? All good or a mix?
  - How does it affect the system’s overall sustainability and resilience performance? Rate this.
  - Is the system with the strategy in place still affected by the scenarios- does it fail or underperform - and do we still need a better design?
    - If yes does it need a control factor adjustment (minor), a better function design (moderate) or a wholly new system (major change)?
  - Have any new ways been introduced that the system can fail? Or any new negative impacts?
  - Is each strategy better or worse than the baseline one?

Example Value Exchange with a strategy assessment

Green = better
Yellow = + OR - but more minor
Orange/red = worse
Blue = neutral

Stripy= it depends on actual values or on individual users
Step 8: Review the results

- Do the results of steps 6 & 7 answer the study questions?
  - Can you now make your decision?
  - If not what has been missed or needs investigating?
  - Results may need to be converted for reporting out
- If a new strategy and therefore system is required:
  - Generate some more strategy (system design) options
  - Modify the system model and value flows diagram in each case and repeat this process from step 2, checking for changes and assessing the new options’ performance
- The study’s original aims should indicate when this iteration process is complete
- The options can then be compared more formally to each other (next phase) to find the optimum one
  - Using feasibility, cost, project risk etc. additionally
Example Opportunity Space Grid

<table>
<thead>
<tr>
<th>Strategy/Scenario</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Best</strong></td>
<td>Technically adequate, ok costs &amp; risks</td>
<td>Not assessed</td>
<td>Technically adequate, ok costs</td>
<td>Technically &amp; risks very good</td>
<td>Technically excellent &amp; good costs</td>
</tr>
<tr>
<td><strong>Most likely (Middle)</strong></td>
<td>Technical Performance borderline</td>
<td>Technically Unfeasible-Rejected</td>
<td>Technical &amp; costs very good here</td>
<td>Okay but risks very high here</td>
<td>Good but higher costs and risks</td>
</tr>
<tr>
<td><strong>Worst</strong></td>
<td>Technical Performance inadequate-Rejected</td>
<td>Not assessed</td>
<td>Technically good but higher costs here</td>
<td>Not resilient here Rejected</td>
<td>Adequate with higher costs &amp; risks</td>
</tr>
</tbody>
</table>

- option 2 rejected early on as basically unfeasible
- 1 & 4 rejected on the grounds of bad sustainability and/or resilience performance in one or more scenario
- 3 and 5 are left; choice would depend on likelihood of scenarios and organisation’s attitude to risk. Some firms may develop both further.

Next phase- comparing options via the Opportunity Space (optional) #1

- Lay out the strategic options (system designs) on a large grid against the scenarios. Try:
  - Strategies (which you control) in columns
  - Scenarios (which affect your system) in rows
- Record in each box the general value, sustainability and resilience performance assessments you have made in the previous steps.
- **This is the Possibility Space of strategy ideas.**
  - Do any of the options have such bad results (or not work) in some scenarios, they should be rejected? Show this.
Next phase- comparing options via the Opportunity Space (optional) #2

- Now add to each grid box:
  - Technical and resource feasibility of each option
    - This might vary with the scenarios, for example if you are trying to meet a target
    - Ignore economic costs at this stage; but do include e.g. whether technology exists or may do in future within each scenario
  - If the project to deliver this strategy is not feasible for your organisation alone, can it be done in partnership with others, even unusual ones? Show/note this.
  - Black out any boxes which are unfeasible even using a partnerships or consortium approach
    - This may be just in one scenario or across a whole option
  - The remaining areas are the Feasibility Space of technically possible options
Next phase- comparing options via the Opportunity Space (optional) #3

- Think about the timeframe in which the strategy has to be delivered
- Add an assessment of the probability of successful delivery, bearing in mind
  - project-related time risks (as opposed to design risks)
  - likely market or other organisational context trends
  - whether the scenario itself affects these
- Indicate any options which appear unfeasible against particular scenarios on this basis
- What remains is the **Probability Space** of likely options

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Next phase- comparing options via the Opportunity Space (optional) #4

- Finally, add costs and availability of the options (to your organisation and any partners) to the grid
  - as well as any delivery-related environmental/social/other risks
  - costs if unclear financially can be expressed in another unit than money, e.g. in terms of energy ROI or CO₂ expended to get the strategy benefits
- Rank the options in each scenario into low medium or high risk (an overall view)
- It should by now be apparent which options represent good and bad risks strategically
- This last version is the **Opportunity Space** showing the best options to pursue

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Follow-up

- Does the process make sense?
- Any questions?
- I have some feedback questions about how you feel the training went. Would you like to consider them-
  - Now?
  - Later?
Instructions

Following are two simple examples to allow you to practice using the steps within SuReSDS. Please choose ONE to use in the training. Try working through the process from the beginning using the information & steps given, keeping to a relatively simple level.

The examples are fictitious although inspired by real situations; you can use your own judgement and knowledge as well as that given, but please stick to fuzzy descriptions (such as “customer opinion” and quantities such as “a lot” or “not much”) rather than trying to create numerical data.
Example A- Arrow Air

**Situation:** Arrow Air is a UK-based short-haul airline flying a mix of business and private passengers between mainly domestic airports, including Penzance, Aberdeen and London City. Its fleet is reliable currently but ageing, so the Board are considering: should they replace it, renovate it, or neither?

**Useful strategic background:** short haul air competes mainly with fast trains. Air transport is not currently subject to carbon taxes but this may change soon. Plane utilisation per trip is a key profit enabler.

Arrow Air clues

If you get stuck, try considering:
What system is the Board considering?
Over what sort of timescale?
What is the main thing the system “does”?
What else does it do as a side effect?
What are all its inputs and outputs?
What competitive scenarios (for e.g. short haul air ticket sales) should be considered?
Example B- Cuppa Coffee Machine

Acme Coffee Ltd makes a top of the range countertop machine, the Cuppa Coffee, sold to business and private customers. It uses consumable packets which Acme also supply (although not exclusively), water and power. As “green” tech is a new consumer/client want, how can they reduce the environmental impact of their next model yet maintain profits and their market-leading performance?
Cuppa Coffee Clues

If you get stuck, try considering:
What service does the system really provide?
Are there alternative ways to do this?
Where do the biggest environmental impacts occur during the product’s design lifecycle, and the life of individual units?
Can any of these be improved whilst having a positive effect in social or economic terms?