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# On ‘self-facilitating’ templates for technology and innovation strategy workshops

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**Aligning technology and other functional perspectives for innovation and strategy is challenging. This is compounded by communication barriers arising from high levels of complexity, uncertainty and ambiguity associated with technologically intensive innovation. Conceptual frameworks, tools and methods such as roadmapping, portfolio matrices and scenario planning are used to support the management of technology and innovation activities. These often have a strong visual aspect that helps to address the issues of dialogue exchange and interaction. From a visualisation perspective, roadmapping is of particular interest given its prominence as a flexible method and highly visual tool. This paper focuses on the mediating role that structured roadmapping templates have during interactive strategy workshops. A quasi-experiment comparing the performance of two templates is reported, comparing a ‘classic’ format with a new template that was designed to be ‘self-facilitating’. This new template incorporates guidance that a facilitator would normally provide, in order to minimise intervention and empower groups to organise their own strategic discussions. The new template is shown to perform significantly better in terms of completeness, consistency, quality and ease of use.**

**Keywords:** Roadmapping, strategy, innovation, templates, visualisation

## 1. Introduction

Management tools play an important role in supporting the development and deployment of technology and innovation strategy. Given the complexities of the business environment, tools that have strong and accessible forms of visual representation provide a powerful means for helping to share and disseminate knowledge and understanding among managers (Platts and Tan, 2004). One of the key tools is roadmapping. Its importance, as a planning tool in industry, is widely recognised and acknowledged (Geum et al., 2013; Gindy et al., 2006; Kostoff and Schaller, 2001; Lee and Park, 2005; Lee et al., 2007; Vatananan and Gerdri, 2012). This tool, which has its origins in the technology-intensive industries of the 1970-90s (Willyard and McClees, 1988; Garcia and Bray, 1997; Groenveld, 1997), has considerable potential to impact on business performance if it can be successfully implemented in an effective manner (Cooper and Edgett, 2009). A key feature that distinguishes roadmapping from other tools/methods is the use of structured time-based visual depictions of strategy – enabling strategic integration, alignment and synchronisation. This feature is acknowledged as a principal factor in roadmapping’s popularity; that is “the ability to provide a graphic representation which can be used to explore and to communicate the relationships between markets, products, and technologies over time” (Geum et al., 2013).

It is important to stress that there are two fundamental modes to the use of graphics in roadmapping, with the visual format and expression adapted to suit their respective purpose, namely:

1. As a consensus-oriented method – workshops often form an important part of roadmapping processes, with graphical templates in the form of paper wall charts used to support workshop facilitation, enabling inter- and intra-organisational dialogue in a creative environment (Phaal et al., 2007; Kerr et al., 2012a).

2. As a means of dissemination – once the strategic context is captured and narrative developed, the graphical nature of the technique enables wider communication and engagement in support of strategy deployment/implementation (Kerr et al., 2012b; Kerr and Phaal, 2015).

This paper focuses on the first of these two modes, namely: the mediating role that structured roadmapping templates have during workshops.

It is often said that the process of roadmapping is more important than the roadmap itself, emphasising the knowledge sharing and consensus-building benefits of the approach. The primary mechanism for participant engagement is multifunctional, multidisciplinary and multi-organisational workshops. From a participant involvement perspective, workshop activities are centred on populating the roadmapping wall chart and exploring the significance and implications of its content. The most common form of roadmap structure (Phaal et al., 2008), illustrated in Fig. 1, reflects the systems thinking used in technology intensive sectors such as electronics and aerospace. Systems thinking is used to architect the multilayered logic of the roadmap, which combined with the time dimension, provides a strategic canvas that can support dialogue and communication across both internal and external organisational boundaries. This structure is flexible and scalable, and can be customised for a wide variety of strategic contexts (Lee and Park, 2005), allowing the dynamics of systems to be mapped prospectively (Phaal et al., 2007) and retrospectively (Phaal et al., 2011).

The multilayered time-based roadmap structure shown in Fig. 1 has been implemented in many technology and innovation strategy workshops (Phaal et al., 2001; 2007) in the form of basic wall charts for group activities. Figure 2 depicts a popular form that has been used frequently in a mature workshop process (Phaal et al., 2007). However, there is a lack of research and empirical evidence as to the effectiveness of such charts and their different formats. To address this, an experiment has been undertaken with a company based in Sweden to test the performance of a new ‘self-facilitating’ style of wall chart as compared to that of the reference format (Fig. 2).

The term ‘experiment’ is used here rather loosely, as a field-based quasi-experiment (Campbell and Stanley, 1963), since it is recognised that the approach reported in this paper does not conform to the norms of the scientific method – limitations of the study are discussed in Section 4. Methodological factors to consider include standardisation, randomisation, placebo (expectancy) effects and experimental biases associated with process and the beliefs/attitudes of the researcher (McDermott, 2002). However the workshop described in Section 3 presented a rather unique opportunity to conduct a quasi-experiment in a ‘real world’ environment, with a degree of control that is not normally possible in such conditions, as opposed to more controlled laboratory experiments in social science (Benz and Meier, 2008). Robson (2011) emphasises that “... real world research focuses on problems and issues of direct relevance to people’s lives, to help find ways of dealing with the problem or of better understanding the issue”. The research described in this paper aims to support strategic innovation through practical and efficient multidisciplinary workshops that enable communication, decision-making and consensus-building for aligned and directed action.

The template for the new chart incorporates process guidance, which a facilitator would normally provide, with the intent of minimising interventions and to empower workshop participants to organise their own strategic discussions, aligned with the principles set out by Kerr et al. (2013). Additionally, it is compatible with lean-agile innovation approaches (Sehested and Sonnenberg, 2010), drawing on principles from lean production (Jackson, 2006) and agile software development (Hamid and Abushama, 2013). The template for the new format was also designed to encourage options thinking (Faulkner, 1996), by embedding visual cues (i.e. decision tree structures) to support planning for uncertainty and financial appraisal (Thorn et al., 2011).

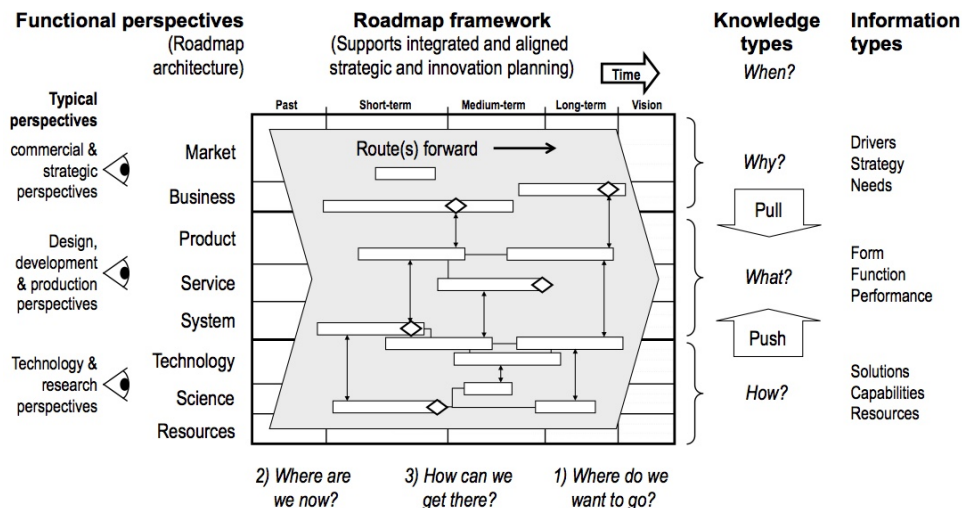


Figure 1. Roadmap framework (Phaal et al., 2008).

Topic:		Team:		Date:	
		Short-term	Medium-term	Long-term	Vision
Trends & Drivers					
Products, Services & Systems					
Technology					
Resources					

Figure 2. 'Classic' roadmap workshop template (Phaal et al., 2007).

## 2. Template function and format

The development of a roadmap, inherently, involves social mechanisms (Kostoff and Schaller, 2001). Workshops are often a crucial social mechanism as they provide a means for stakeholders to collaboratively explore, create and shape strategy (Kerr et al., 2012a). Groenveld (1997) has highlighted the importance of roadmapping workshops for ensuring the “integral involvement of, and input by, the organisation”. Facilitated workshop-based processes can also be very efficient, as evidenced by the ‘fast-start’ T-Plan (Phaal et al., 2001) and S-Plan (Phaal et al., 2007) approaches that adopt a rapid prototyping philosophy for strategy development. One of the important principles of deploying management tools, such as roadmaps, within ‘real world’ industrial settings is that their application should be ‘neutrally facilitated’ (Kerr et al., 2013). It is the role of the facilitator to combine procedures, tools and appropriate techniques into an effective workshop process (Vennix, 1996). They should direct, clarify and pace the workshop processes to achieve results that are as high as possible in relevance, quality and overall usefulness to the participants (Phillips and Phillips, 1993). The facilitators should avoid as far as possible getting involved in detailed discussions between workshop participants and should not contribute to the actual content (Kerr et al., 2013).

While facilitation offers important advantages such as encouraging full participation, promoting understanding, consensus and shared responsibility among participants (Kaner et al., 2007), it does have some inherent weaknesses. Facilitation introduces an extra non-standard human dimension, which can have undesirable consequences in terms of quality, consistency and participant satisfaction. In roadmapping workshops, multiple small groups are frequently run and facilitated in parallel, with each of the groups being tasked with creating a ‘topic roadmap’ under a theme or focus common to all the groups. It is often the case that there are not enough facilitators to effectively manage each group in the parallel sessions and therefore outputs can vary significantly in terms of their consistency in quality, relevance and style. Additionally, the application of the roadmap wall chart (Fig. 2) is closely tied to the presence of a roadmapping expert as the lead facilitator. Organisations that are unable to access such expertise are disadvantaged and even discouraged from using such a template, which they might have otherwise found helpful. The potential to transform a conventional roadmap wall chart into one that is self-facilitating offers a means to pragmatically address the weaknesses in facilitation practices.

The consequence of self-facilitation is that the facilitator surrenders a significant part of their role and power to that of the tool (i.e. the roadmap wall chart) and the workshop participants. At that point, the tool starts behaving like an expert system (Feigenbaum, 1981) whereby it is able to direct its users and respond to their what-if situations. Achievement of self-facilitation necessitates embedding the procedures and relevant techniques for a tool’s application into the tool itself. Knowledge of the required procedures and techniques for effective results may be tacitly held by the facilitator, so it is therefore important to find practical ways to transform such tacit knowledge into explicit formats which the workshop participants (as principal users) can understand and apply. This transformation can be realised through externalisation, i.e. the use of metaphors or descriptors (Nonaka, 1994). The physical manifestation of this is achievable

through the appropriate design and development of visualisations, in the form of templates, that both enable and support the self-facilitation process.

The use of visualisations as facilitative aids has been recognised by authors such as Franco and Montibeller (2010) and Massey and Wallace (1996), who have highlighted their support in facilitating group interactions to create shared perspectives on problems/challenges. Eppler and Platts (2009) acknowledge the role visual representations can play in facilitating the “synthesis of information, enabling new perspectives to allow better, more exhaustive comparisons”. From a psychosocial perspective, the actual format of the workshop wall chart has an important contribution to make as it is the primary mechanism for framing and contextualisation (Kerr et al., 2013). It is about “getting the decision context right” and “structuring the elements of the decision situation into a logical framework” (Clemen and Reilly, 2001). Thus for workshop participants, the wall chart is their principal focal point and the architecture of the template is used both “as an interpretive schema for framing the workshop activities and as a canvas upon which is populated the content of participant discussions and interactions” (Kerr et al., 2012a).

Considering the roadmap template shown in Fig. 2, its format is a skeletal structure consisting of a time-based axis against layers of functional perspectives (Kerr et al., 2012b). So although the actual architecture itself provides a degree of cognitive stimulation from a framing/contextualisation standpoint (Kerr et al., 2012a), it is limited due to its graphic design and format. In workshops, this version requires clear and concise explanation for its use by participants and proactive facilitation to ensure the expected level of detail and outputs are generated. In fact, this basic template (Fig. 2) places a greater demand on the facilitator and a heavier cognitive load on the participants, who must simultaneously grapple with generating appropriate content for the roadmap and the roadmapping process requirements/protocols. However, the design and development of more visually structured templates does have the ability to provide significant support in realising lightly facilitated processes and self-organising activities (Kerr et al., 2013). But empirical research studies on roadmap visualisations and investigations into the appropriate graphic design elements are needed in order to provide an explicit evidence-base upon which to build and test robust visual formats. A similar proposition was put forward by Kerr et al. (2012a) when they stated that future research was needed into “how to best structure the roadmap canvas and configure its associated information architecture for a given strategic issue/decision together with the specific context surrounding that problem set”.

As an initial step into exploring the visual elements for enabling/supporting self-facilitation and to then test the effect on workshop outputs, a new class of template is required that embodies two novel design features – i.e. visibility of the process steps and built-in guidance/prompts. These two features are deemed to have a critical impact on helping workshop participants to use the roadmap charts more effectively and consistently (across the parallel groups). The design intent and rationale are as follows:

- Process steps built into the chart, with different parts of the template allocated to each step. For example, to establish the vision, current status and steps toward the vision, including decision points and options, and capture of key learning points.
- Process and content prompts, depicted in light grey text, to serve as a guide and checklist for populating the chart. For example, this would include the potential set of factors that influence the route/s to potential value and barriers/enablers depending on the capabilities and resources available to the organisation. Such background annotations enable a lot of information to be conveyed in a subtle and non-prescriptive manner to participants, which would normally require facilitator input and explanation.

An early example where these two design features were implemented was an adaptation of roadmapping for early-stage technology ventures, where the task is to rapidly map potential commercial exploitation and associated demonstration pathways (Phaal et al., 2012). Although the intent of the template was not one of self-facilitation, anecdotal evidence through both facilitator and workshop participant feedback highlighted the potential positive effects the in-built process steps and annotated prompts can have in allowing the activity to run more smoothly and in improving the quality of outputs across the participant groups.

Before the experiment to examine the performance of a new self-facilitating style of roadmap wall chart (with a Swedish company), a pilot application was first undertaken in The Netherlands to test the basic concept of how options thinking and decision trees could be incorporated into a prototype template design. It consisted of a one-day workshop undertaken with three technology ventures in collaboration with a local incubator, business development and valuation experts. Roadmaps (and decision trees) were developed; following which, an expert in venture valuation provided an appraisal of the prospects of each venture, drawing on the qualitative content from the roadmapping activity. Each venture was able to produce a clear decision tree, demonstrating that it was both feasible and beneficial to integrate options thinking into roadmap workshop templates.

Building on the Dutch pilot, the prototype template was revised taking into account fieldwork observations and user feedback, leading to the new template presented in Fig. 3, where self-facilitation is guided by a visual series of sequential process steps:

- 1) Define the future value opportunity scenario/vision (right hand side of the template) in terms of market, business, application, technology and resources.

- 2) Clarify the current state (left hand side of the template), with respect to the future value opportunity.
- 3a) Establish the core path to value in terms of plausible ‘stepping stones’, demonstrators and decision points, connecting the current and future states.
- 3b) Map the market, business and commercial drivers in relation to the core path.
- 3c) Map the technology, finance, resource and partnering requirements in relation to the core path.
- 4) Consider the decision points, alternative pathways and options (to create a decision tree from the core path).
- 5) Elaborate the learning points including key assumptions, risks, uncertainties, knowledge gaps, enablers and barriers. If appropriate and time allows, this step includes the optional tasks of organising information into sub-themes (layers of the roadmap) and quantifying the decision tree, if data is available, to enable options analysis.

On the template (Fig. 3), prompts are provided in light grey text for all the steps. As prompts, these annotations provide guidance but are not intended to be prescriptive. They include:

- Visual cues to support the process such as the vision section, stepping stones to connect the current to future state, fishbone diagrammatic arrows to map demand and supply side elements, and a background decision tree structure to encourage options thinking.
- Themes and issues that might be pertinent to the discussion in relation to each process step. These are for participants to consider during the workshop activity and, if relevant to the topic, to be incorporated into the roadmap content.

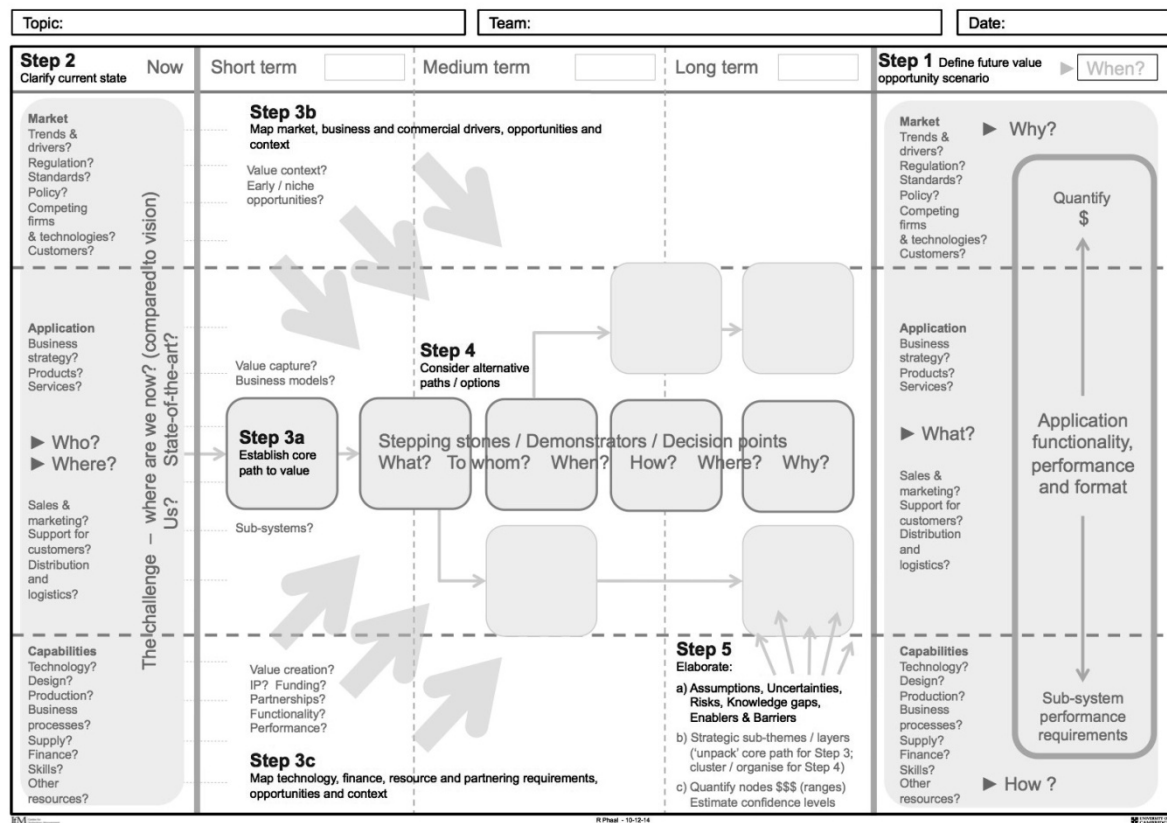


Figure 3. ‘Self-facilitating’ template for the Swedish experiment (a lighter tone of grey was used in the actual workshop chart, with process step numbers highlighted using a green font).

### 3. Swedish experiment

The experiment was conducted with a large Swedish company that develops electro-mechanical systems, manufactured and sold globally. The company has invested in agile visual management systems for its new product development process as a lean approach to innovation (Sehested and Sonnenberg, 2010). They were interested in extending this system to innovation strategy, and wished to explore roadmapping as a potential management tool for that purpose.

The aim of the experiment was to compare the performance of the new ‘self-facilitating’ template design (Fig. 3) to that of the ‘classic’ template (Fig. 2), which is considered to act as the reference format/datum given its deployment in numerous industrial engagements. The classic template (Fig. 2) does not include the two new design features – i.e. visibility of the process steps and built-in annotations giving guidance/prompts.

In order to compare the utility of the two templates, three diverse innovation opportunities were selected by the company with each being tackled by a matched pair of small multifunctional groups consisting of 3-4 participants (i.e. using classic versus self-facilitating templates). As far as possible the matched groups were equivalent in terms of technical and commercial knowledge, as judged by the senior management team from the company.

Both sets of groups were provided with a short 10 minute introduction to roadmapping and the workshop, and they were then provided with instructions for the use of the classic template with two slides: i) the template, with an animated overlay of virtual sticky notes to explain the process; and ii) a photograph of a template in use to illustrate the group-based process (similar to Fig. 4). Participants were all provided with sticky notes in order to capture and organise their discussions whilst using the templates.



Figure 4. Workshop group using the 'self-facilitating' template.

The groups using the classic template went to break-out rooms to start the process, whereas the groups using the new self-facilitating template were shown an additional slide indicating how to use that template, again animated with virtual sticky notes, before starting their activity. From this point, the process ran for exactly one hour, with the facilitator (researcher) keeping track of his activity in respect of both requested interventions (for example, answering queries or helping groups to 'unblock' discussions) and imposed interventions (for example, in reaction to an observed reduction in group progress as assessed through sticky note production and distribution on the templates).

After the roadmapping workshop session, all the teams regrouped to compare outputs. Participants were given 20 minutes to review and annotate all the roadmaps produced, and then provided with feedback forms to assess the utility of the templates before discussion. Four criteria were assessed, using a 5-point Likert scale, together with an opportunity to add specific comments on the template and associated process. The criteria were:

- *Degree of completeness*, for both templates; that is, the coverage of the topic in terms of depth and breadth.
- *Consistency of output*, for both templates, in terms of clarity and coherence of content.
- *Quality of output*, for both templates, where quality was defined as 'strategically helpful' in terms of understanding and decision-making.
- *Ease of use*, only for the template they used themselves, in terms of how intuitive it was to use without external support.

These four assessment criteria are in line with the concept of 'utility' corresponding to the "classic notions of functionality, usability, usefulness" (Moore and Purchase, 2011). In relation to the wider domain of visualisation evaluation studies, the emphasis was principally on effectiveness.

## 4. Results and discussion

The main results from the Swedish experiment, focusing on participant outputs and perceptions, are shown in Fig. 5 and Table 1. Photographs of the results produced with the classic template are shown on the left side of Fig. 5 and on the right for the new self-facilitating template.

Sticky note count and distribution provides a first crude measure of utility. Analysis of the photographs (Fig. 5) shows that there was a more consistent pattern observed for the self-facilitating template with 41, 36 and 37 sticky notes (for the three topics) as compared to 24, 51 and 24 with the classic template. Those using the self-facilitating template appeared to generate more insights, with 4, 6 and 8 learning points identified by those groups as compared to 4, 2 and 4 for the classic template.

Table 1 provides a detailed view of participant perceptions of completeness, consistency and quality against both templates, and the ease of use for only the template they used in their own group. T-test statistics were calculated using SPSS version 19 and were derived from output in which equal variances were not assumed, due to Kolmogorov-Smirnov tests indicating problems with data normality (Field, 2009). When assessing the template they used themselves, workshop participants rated the:

- *Degree of completeness* of the self-facilitating template ( $M = 3.64$ ,  $SE = 0.20$ ) as significantly higher than the classic template ( $M = 2.70$ ,  $SE = 0.21$ ),  $t(18.81) = -3.18$ ,  $p = .005$ .
- *Consistency of output* of the self-facilitating template ( $M = 3.64$ ,  $SE = 0.15$ ) as higher than the classic template ( $M = 3.10$ ,  $SE = 0.28$ ). However, this difference was non-significant,  $t(14.10) = -1.70$ ,  $p = .11$ .
- *Quality of output* of the self-facilitating template ( $M = 3.64$ ,  $SE = 0.20$ ) as significantly higher than the classic template ( $M = 3.00$ ,  $SE = 0.21$ ),  $t(18.85) = -2.17$ ,  $p = .04$ .

When assessing the template that the other group used, workshop participants rated the:

- *Degree of completeness* of the self-facilitating template ( $M = 4.10$ ,  $SE = 0.18$ ) as significantly higher than the classic template ( $M = 2.73$ ,  $SE = 0.33$ ),  $t(15.23) = 3.63$ ,  $p = .002$ .
- *Consistency of output* of the self-facilitating template ( $M = 3.60$ ,  $SE = 0.16$ ) as significantly higher than the classic template ( $M = 2.64$ ,  $SE = 0.24$ ),  $t(17.15) = 3.28$ ,  $p = .004$ .
- *Quality of output* of the self-facilitating template ( $M = 3.90$ ,  $SE = 0.18$ ) as significantly higher than the classic template ( $M = 2.64$ ,  $SE = 0.24$ ),  $t(17.92) = 4.17$ ,  $p = .001$ .

In terms of *Ease of use*, workshop participants rated the self-facilitating template ( $M = 4.18$ ,  $SE = 0.26$ ) as higher than the classic template ( $M = 3.10$ ,  $SE = 0.35$ ). This difference was significant  $t(17.19) = -2.48$ ,  $p = .02$ .

Participants judged that the new self-facilitating template performed significantly better on all measures, with average increases in scores (on the Likert scale) of between 0.5 (for *Consistency of output*) to 1.1 (*Ease of use*). Statistical analysis indicates that the difference in perception of *Consistency of output* was not significant when participants considered their own template alone, perhaps reflecting the consensus-building nature of the process where the group develops a common strategic view through discussion. When comparing the utility of the other template, with reference to their own, the results were even more polarised with average increases in scores of between 1.0 (*Consistency of output*) and 1.4 (*Degree of completeness*) and all results were assessed to be statistically significant.

In terms of overall utility, the self-facilitating template scored 3.8 compared to 2.8 for the classic template – an improvement of 1.0 on the Likert scale, which represents a substantial improvement. No participant scored the classic template 5 on any measure, while scores of 5 were achieved for all measures except *Consistency of output* for the self-facilitating template. Conversely, no participant scored the self-facilitating template 1 on any measure, while scores of 1 were scored on all measures except *Ease of use* for the classic template.

Benefits of the new style of self-facilitating template were emphasised in the comments received from participants, particularly when they were new to the process of roadmapping, with the design features generally considered helpful. However, some participants raised concerns that while the annotated guidance built into the new template was helpful, there is a danger that this might constrain creativity and less structure/guidance would be desirable for more exploratory applications. The use of light grey visual cues is intended to counter this concern, but it must be recognised that any suggested structure or guidance, however subtle, is likely to influence participant thinking.

From the perspective of the facilitator, the groups using the classic template required marginally more attention than those using the self-facilitating template, although no group required substantial intervention or support. The topic roadmapping process was designed for small groups of about three participants, which can generally self-organise, allowing six groups to be easily managed by a single facilitator circulating every 10 minutes or so (Phaal et al., 2007). Group progress is easy to judge because of the highly visual nature of the process with participants using the template and sticky notes to coordinate and capture their discussions. It was observed that two groups using the new self-facilitating template made notably rapid progress, while progress was markedly slow for one group using the classic template (which required multiple short interventions to resolve).



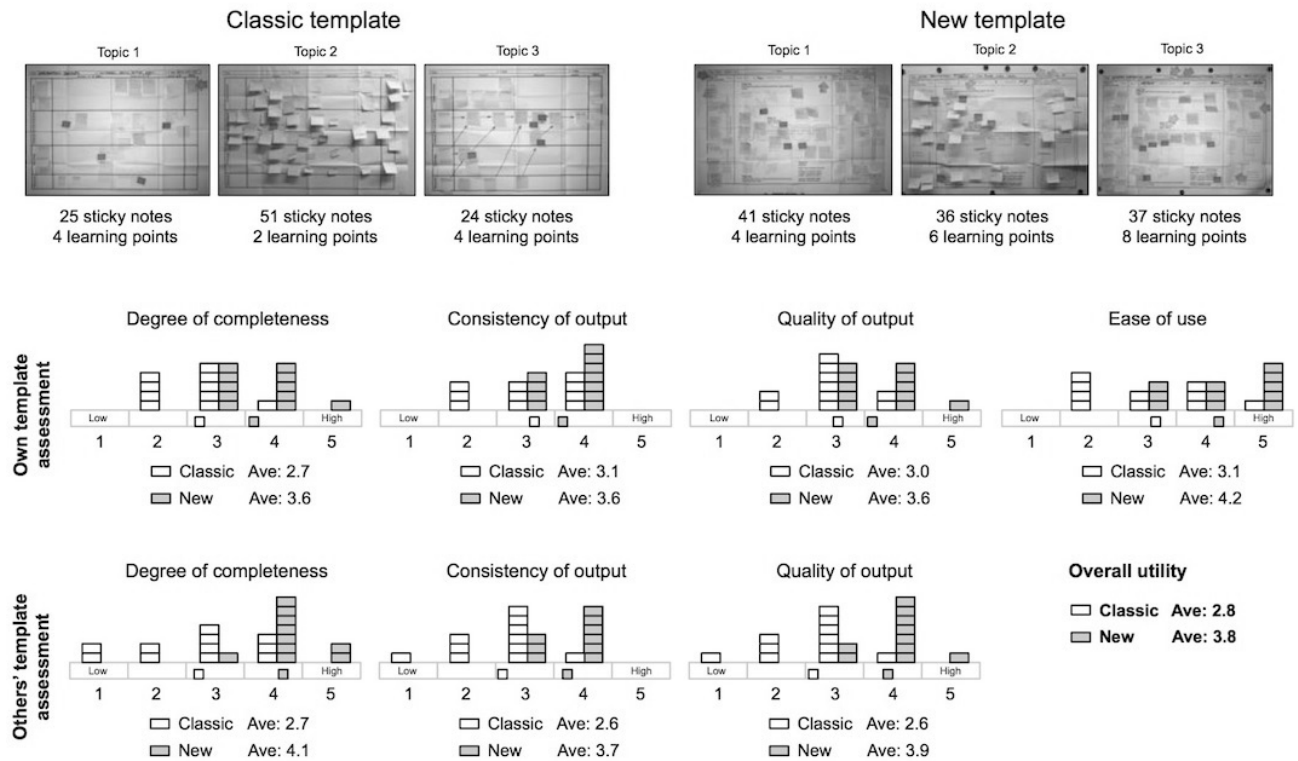


Figure 5. Results from the Swedish experiment.

Table 1. Results from the Swedish experiment (n = 21).

	Completeness		Consistency		Quality		Ease of use	
	Classic	New	Classic	New	Classic	New	Classic	New
Assessment of template used by respondent								
Mean (M)	2.70	3.64	3.10	3.64	3.00	3.64	3.10	4.18
Change	+0.94		+0.54		+0.64		+1.08	
Standard Deviation (D)	0.67	0.67	0.88	0.50	0.67	0.67	1.10	0.87
Standard Error (SE)	0.21	0.20	0.28	0.15	0.21	0.20	0.35	0.26
Skew	0.434	0.593	-0.223	-0.661	0.000	0.593	0.388	-0.409
Kurtosis	-0.283	-0.293	-1.734	-1.964	0.080	-0.293	-1.236	-1.621
t-statistic	-3.18		-1.70		-2.17		-2.48	
2-tailed p-value	0.005		0.110		0.040		0.020	
Assessment of other template, which the respondent had no personal experience of using								
Mean (M)	2.73	4.10	2.64	3.60	2.64	3.90	Not applicable (participants only assessed 'ease of use' for the template they used)	
Change (vs Own)	+1.37 (+0.43)		+0.96 (+0.42)		+1.26 (+0.62)			
Standard Deviation (D)	1.10	0.57	0.81	0.52	0.81	0.57		
Standard Error (SE)	0.33	0.18	0.24	0.16	0.24	0.18		
Skew	-0.437	0.091	-0.538	-0.484	-0.538	-0.091		
Kurtosis	-0.923	1.498	0.637	-2.277	0.637	1.498		
t-statistic	3.63		3.28		4.17			
2-tailed p-value	0.002		0.004		0.001			

In previous roadmapping workshops, when topics and groups have been identified for exploration, it is usually judged to be more expedient to cover more topics with the pool of available participants rather than the alternative scheme of focusing on the same topic with multiple groups (Phaal et al., 2007). As the Swedish experiment involved exploring the same three topics twice, with the classic and self-facilitating templates, the benefits of having more than one group explore a topic was discussed – the unanimous conclusion was that it was beneficial to do so for reasons of creativity. Each group approached the topic in a different way, with different insights, and it was thought that combining the

outputs from the two activities into one consolidated roadmap would be beneficial, especially given the rapid agile nature of the process.

As a formal experiment there are a number of factors that represent limitations to the research, and which could have biased the results. Some of these are highlighted here, and further methodological development would be beneficial to improve the reliability of the results of this kind of field experiment, bearing in mind the benefits and constraints associated with conducting research of this type:

- While efforts were made by the company to ensure balance between the groups using the classic and new template, perfect balance is not possible given the limited pool of staff with the necessary experience available to the company, and individual/group expertise and behaviour is recognised to have a substantial effect on task performance. However, the opportunity to have six groups focusing on three varied innovation topics mitigates this concern to a degree.
- All participants received the same general background presentation on the roadmapping, and similar instructions and conditions for template use. However, it was clear to all participants that the goal of the workshop was to compare the classic ('old') and new templates, and the second group received more information than the first (seeing the classic template), which could have biased perceptions. The fact that participants identified benefits of both styles of template provides some comfort that the potential assumption that 'new is better' was not the case.
- It is very challenging to repeat such experiments as one would in laboratory conditions, given the nature of the business context, changes over time, and not all variables being known or controllable. However, these uncertainties and biases should be considered in light of the considerable benefits of conducting research in a 'real world' environment, compared to more controlled (but potentially artificial) laboratory experiments in social science.

## 5. Conclusions

This paper reports on the results of a field experiment to test a new type of roadmapping workshop template designed to be 'self-facilitating', as it incorporates process steps and annotated guidance that a facilitator would normally provide. Compared to a conventional style 'classic' template, the new self-facilitating template performed significantly better on all measures: completeness, consistency, quality and ease of use. Based on these results and taking into account concerns expressed by participants about the potential dangers of providing too much structure, the classic template (Fig. 2) has been updated to incorporate embedded process steps in a light touch manner suitable for exploratory applications – see Fig. 6.

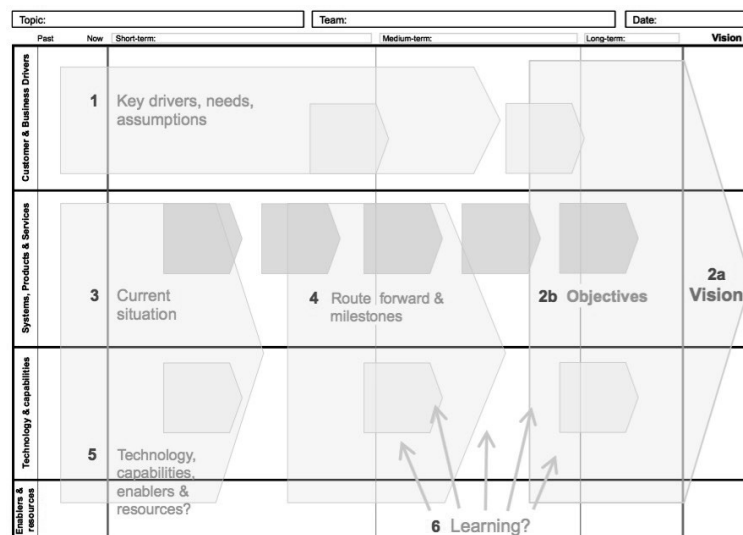


Figure 6. 'Classic' template redesigned to incorporate process steps and prompts (a lighter tone of grey was used in the actual workshop chart, with process step numbers highlighted using a green font).

Although widely applicable 'standard' templates can be designed in this manner, the suitability of such templates should always be reviewed critically during the client brief and workshop design phases, with customisation being considered when necessary. The templates should be designed to not be overly prescriptive, so enabling flexibility of use during workshop deployments in order to accommodate the inherent uncertainties associated with strategy processes. Future work will continue to experiment with the design and application of such templates, including both theoretical and practical considerations. The psychosocial aspects of how such templates are used by groups in workshop settings, such as those discussed by Kerr et al. (2012c), requires observation and study to improve their utility further.

Additionally, the concepts and features described in this paper can be applied to other tools and frameworks used in strategic planning, technology management and innovation workshops. Research and development continues, linked to parallel work on tools and toolkits (Kerr et al., 2013). For example: multiple management tools/frameworks can be combined into compound visuals (Kerr et al., 2012b; 2014); multi-factor scoring has been combined with roadmapping through composite workshop templates to more effectively enable evaluation and selection of opportunities (Farrukh et al., 2014).

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