Light-Weighting Innovation Strategy: A Roadmap-Portfolio Toolkit

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Abstract–**The field of strategic technology management contains a number of practical tools to help align technology investment with business objectives and so support successful innovation. However the application of such tools is often seen by organizations as being difficult to configure, combine and also resource consuming to deploy. Thus, the research question is: can a light-weighted intuitive approach deliver valuable results in a short time and thus provide companies with a tested process that they would be more willing to apply? The aim of this research was to develop and test an efficient roadmap-portfolio toolkit approach for supporting the development and implementation of innovation strategy by selecting and exploring opportunities. Drawing on literature and practice, the workshop process was developed around structured templates and run in eight organizations (four small companies and four units of larger companies), with the approach refined using learning from each application. The roadmap-portfolio toolkit was robust and delivered valuable insights to the companies, many of whom plan to use or adapt it for themselves in further workshops. From a practical perspective, companies can obtain value from light-weighted interactions if framed correctly, however a single workshop does not create a whole innovation strategy. It has been demonstrated that efficient, pre-configured toolkits are highly useful and functional when packaged as a template-based workshop process to support, not replace, wider strategic discussions and decision-making.**

I. OVERVIEW

The field of strategic technology management contains a number of practical tools to help align technology investment with business objectives and so support successful innovation [3, 6]. However, useful and effective tools such as roadmapping [7] and portfolio matrices [2] are often not used outside of major strategic initiatives or in smaller companies. They are seen as being difficult to select, configure and combine, and as resource consuming [1, 4]. To address such issues and related concerns, a light-weighted or 'lite' approach has been developed utilizing a roadmap-portfolio toolkit. The approach described in this paper was developed as part of a 'Strategic Technology and Innovation Management' (STIM) academic-industrial consortium[1]. Additional cases were also carried out with companies from the 'Practical and Innovative Solutions for Manufacturing Sustainability' (PrISMS) program[2]. The purpose of the roadmap-portfolio toolkit is to help smaller companies, and units within larger organizations, develop and implement innovation strategy in a manner that minimizes use of time and effort for both company and facilitator while still retaining effectiveness. It supports the presentation, selection and exploration of innovation opportunities in a workshop-based process, using templates to focus the workshop activities and reduce the need for detailed reporting.

[1] www.ifm.eng.cam.ac.uk/research/ctm/stim
[2] www.ifm.eng.cam.ac.uk/services/prisms

II. BACKGROUND

The approach is based on two well-established tools: roadmapping [5] and portfolio matrices [3]. Both of these tools are widely used to support strategic planning at product, firm and sector levels. Roadmaps are structured time-based graphical representations of strategy (Fig. 1). The layers in a roadmap represent key dimensions of the system being considered and this enables stakeholder perspectives to be both captured and presented in a structured way. Portfolio matrices are graphical representations of a number of strategic options for review (Fig. 2). Options are often plotted on a 2x2 matrix, for example using axes such as the opportunity and feasibility of different projects, where the size of the bubbles can be investment and the color of the bubbles can show timing or business area. Of course, the opportunity and feasibility dimensions can be built up from a series of sub-factors.

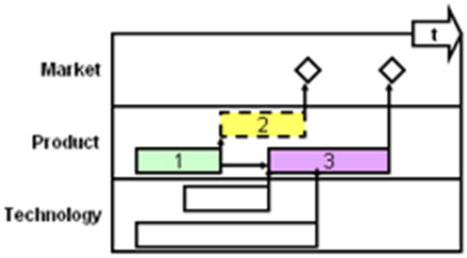

Fig. 1 Roadmap

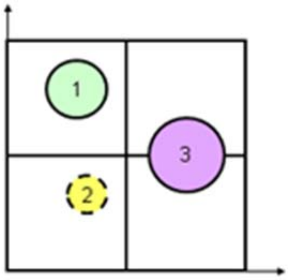

Fig. 2 Portfolio matrix

III. THE ROADMAP-PORTFOLIO TOOLKIT

The key elements of the developed approach for utilizing the roadmap and portfolio tools are: (i) the use of structured templates in order to focus the workshop activities (including supporting easy reporting), and (ii) the importance of iteration during and between phases of the process. Fig. 3

depicts the roadmap-portfolio toolkit. It is a simplified representation of the complex reality of innovation strategy development, which is a product of the many decisions and actions of the stakeholders involved. However, the approach provides structure within which the options can be mapped, understood and communicated, and provides a basis for strategic decision-making. The approach suits companies who have a reasonably well-formed strategic context for innovation discussions. The practical application of the toolkit has five main steps each supported by a template. A standard workshop is typically five hours of structured activities, discussion and reflection. Much of the output is captured on wall charts (using the designed templates). The steps involved in the workshop are detailed in Fig 3.

A. Planning and pre-work

This includes the set-up process, the pre-work and the preparation of the agenda and workshop templates. The strategic context and potential impact of the workshop outcomes should be made clear to encourage thoughtful completion of the pre-work. For workshop participants, the key pre-work requirement is to prepare their ideas using a structured template for printing onto sticky notes. Fig. 4 depicts the template used for eliciting 'opportunity' ideas/concepts/projects.

B. Presentation/clustering of opportunities and voting

A short introduction covers the aims, agenda and context, including a 'framing' presentation from the company. Then participants, in turn, describe and place their own pre-prepared sticky notes (Fig. 4) on the roadmap wall chart (an example of which is presented in Fig. 5) under the headings of short-, medium- and long-term. After all participants have presented, a clustering activity is carried out by everyone to identify overlaps, related opportunities, linkages and to define a set of horizontal categories (technology or application related). An example of a populated roadmap is shown in Fig. 6. A triage selection of opportunities is then carried out by dot voting, based on the group's amalgamated selection criteria for opportunity and feasibility factors. Fig. 7 shows the dot voting activity that takes place in a workshop.

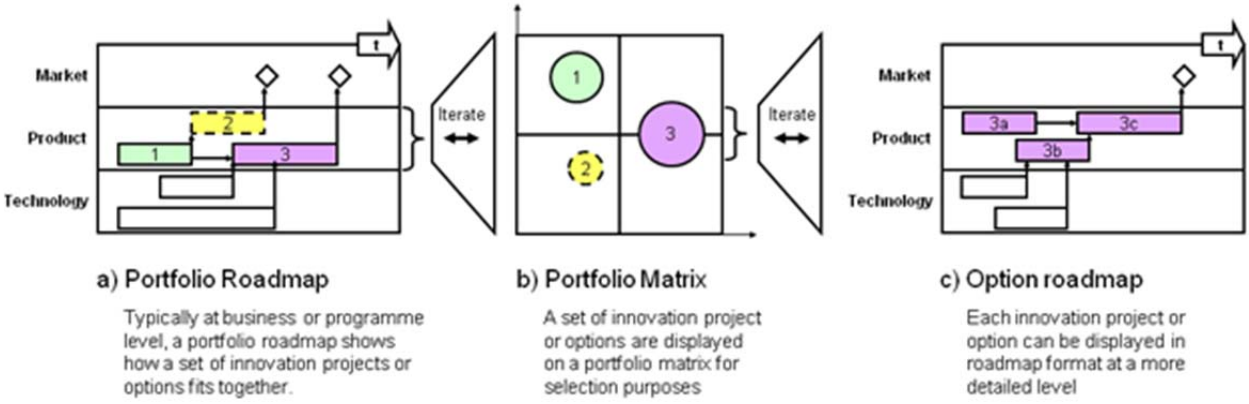

Fig. 3 Roadmap-portfolio toolkit

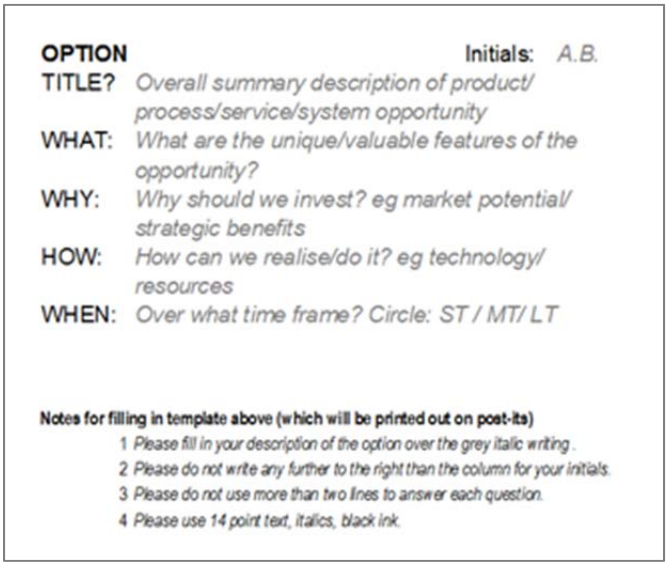

Fig. 4 'Opportunity' sticky notes template

Market / Application / Option	Short Term	Medium Term	Long Term

Fig. 5 Roadmap template

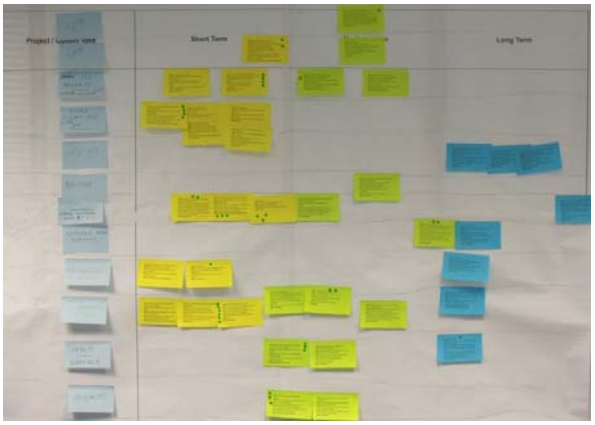

Fig. 6 Populated roadmap

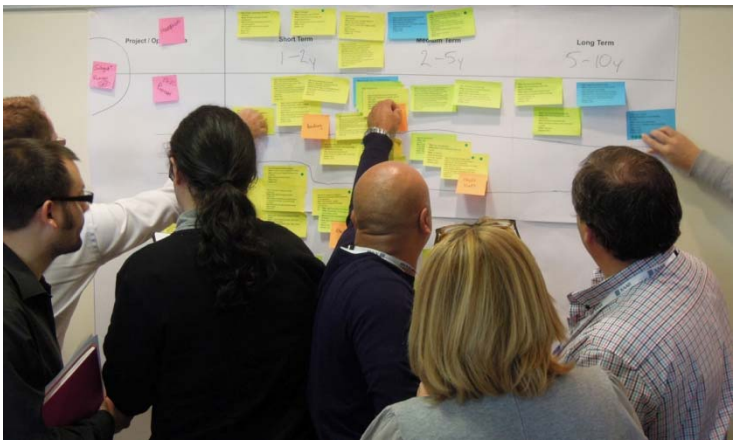

Fig. 7 Voting activity

C. Selection of 'opportunities' and discussion

The voting provides the initial basis for the selection of 'opportunities' to be explored in more detail in the second half of the workshop. The sticky notes are transferred onto the portfolio matrix template (Fig. 8) to enable discussion of which opportunities should be finally chosen for further exploration given the participant group composition and expertise in the room. Discussion may also reveal projects that are complementary or inter-connected, and complex 'opportunities' can be split or focused. Balance should then be considered in order to guide the final selection. Fig. 9 illustrates a populated portfolio matrix.

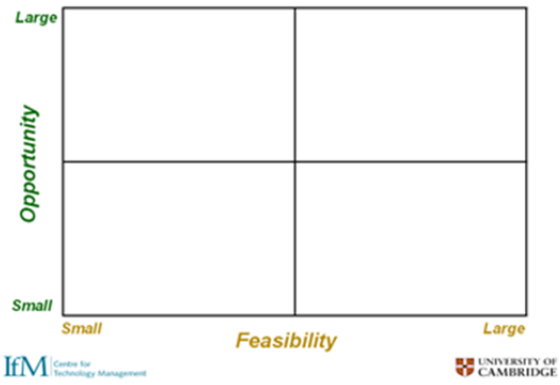

Fig. 8 Portfolio matrix template

Fig. 9 Populated portfolio matrix

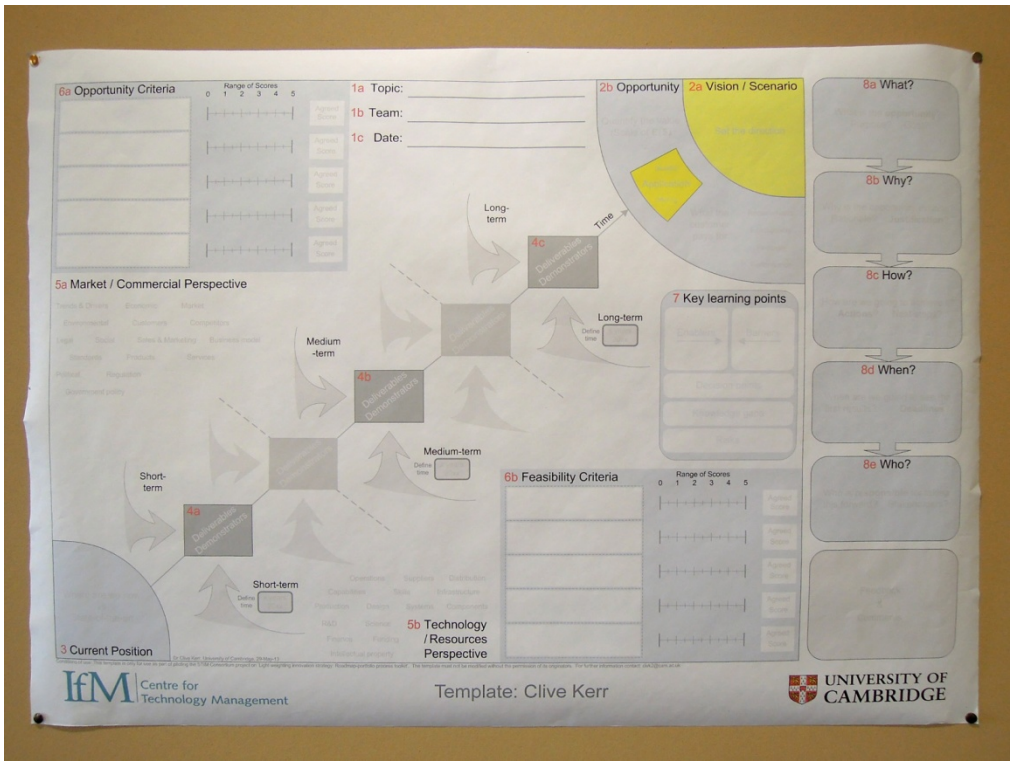

Fig. 10 Opportunity exploration mapping template (Source: Clive Kerr)

D. Opportunity exploration mapping, detailed scoring in groups and reflection

This step in the workshop process involves the detailed exploration of the selected 'opportunities' in small groups (2-4) using the 'Opportunity Exploration Mapping' template (Fig. 10). Pens and sticky notes are provided for all to contribute their ideas/input to the discussion, following the numbered stages on the template. The most important stage is defining the 'Vision' and what the customer values. Following this, the current position is identified and the steps to the vision are completed in as much detail as possible – highlighting key questions and gaps where necessary. Each group presents back using the 'elevator pitch' summary of: what, why, how, when and who. Comments from the wider group are captured on each chart in the feedback box provided. After all the groups have presented, the revised scores for each 'opportunity' are compared to the original portfolio wall chart and the implications are discussed.

E. Post workshop

Workshop outputs should be shared and agreed actions taken forward. As a light-weighted process, the populated templates can be disseminated without further processing using digital photographs, or simply as wall chart displays within the organization.

IV. COMPANY CASES AND RESULTS

The roadmap-portfolio toolkit approach and workshop process was tested and refined through application in eight pilot cases (four in small companies and four in units of larger companies; see Table 1 in Appendix A). Through these cases the roadmap-portfolio toolkit has been demonstrated to be robust and to deliver valuable insights to companies, many of whom plan to use or adapt it for themselves in further workshops. The longer term impact of the approach is being tracked in the pilot companies and feedback from new applications is being collected. One of the key learnings from the pilot cases was the importance of expectation management and pre-planning. In particular, the advance framing of the workshop with the participants is very important and should include a company statement to promote strategic alignment.

V. CONCLUSIONS AND FURTHER WORK

In terms of success, the workshop met two of its three aims, to select and explore innovation opportunities in an efficient manner, but was seen as less successful in developing an overall innovation strategy. From a practical perspective, companies can obtain value from light-weighted interactions if framed correctly, however a single workshop does not create a whole innovation strategy! It has been demonstrated that efficient, pre-configured toolkits are highly useful and functional when packaged as a template-based

workshop process and used to support, not replace, wider strategic discussions and decision-making. In the longer term, further work on the approach could be focused on redesigning the portfolio template to make it more intuitive and similar to the opportunity mapping template. Further work on how to bring in new opportunities following the workshop would also be worthwhile and interesting.

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APPENDIX A

Table 1 Pilot Cases

Pilot details	**Company/sector**	**Workshop size & Company aims**	**Pilot aims**	**Company outcome**
#1 SME Feb 2013 18 people in total.	Supplier of screens/ reagents for X-ray crystallography.	3 people in workshop. Prioritization of innovation activities.	Exploratory – to trial draft process and new sticky note template.	Very useful process and we now use the method for all new product ideas.
#2 SME June 2013 160 people in total.	Manufacturer of high quality precast concrete products.	11 people in workshop. Develop innovation in company.	Development – to trial draft process and new opportunity mapping template.	Worked well and very useful – an excellent tool to crystallize and map opportunities for the business.
#3 SME June 2013 50 people total, 10 people in pilot area.	Broadcast product and system design, integration and installation.	5 people in workshop. New group that is new to product innovation.	Development – to trial 5 hour timing with new introduction slides and retest the new templates.	The process enabled us to jointly (Sales, R&D, MD) to agree which product range and features to concentrate on.
#4 Large company. July 2013 24,000 people in total, 2,800 in unit worldwide, 100 in UK.	Develops innovative microscope systems for biomedical research & materials inspection.	9 people in workshop. To bring sales & technical thinking together for new platform development.	Test – 5 hour standard process with larger group and refined opportunity mapping template.	We would have benefitted from a two stage process to align our strategy more before the workshop.
#5 Large company. Sept 2013 17,000 people in total, 150 people in unit.	A technical centre of competence for circulatory equipment company.	6 people in workshop. More focus within innovation activities & integration with existing strategy.	Test – 5 hour standard process with single facilitator and revised selection criteria.	Would have benefitted from being challenged on criteria. More time required to define a more detailed innovation strategy.
#6 Large company. Sept 2013. 600 people in total.	Independent supplier of industrial inkjet print heads.	11 people in workshop. To support a new platform development by a technical group.	Test – 5 hour standard process with large group, narrow focus and own selection criteria.	As a light-weighted process it is effective. Plan to customize and use further.
#7 Large company. Sept 2013. 27,000 people in total, 800 people in UK.	Science to improve crop productivity, protect the environment and improve health & quality of life.	8 people in workshop. To prioritize and select ideas following a technology initiative group creativity workshop.	Test – 5 hour standard process. Discussion on criteria definitions.	Good methodology but not able to explore enough opportunities in given time.
#8 SME Oct 2013. 14 people in total.	Supply, design, install and service cost effective processing machinery and plant for many different industries.	3 people in workshop. To gain focus on opportunities to promote company growth.	Test – 5 hour standard process.	The process has made me realize that we need to understand our market/products better before jumping into new developments.