Towards risk-aware roadmapping: Influencing factors and practical measures

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Imoh M. Ilevbare *, David Probert, Robert Phaal

Centre for Technology Management, Institute for Manufacturing, University of Cambridge, 17 Charles Babbage Road, Cambridge CB3 0FS, United Kingdom

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ABSTRACT

In spite of the significance of uncertainty and risk in strategy, there is still a general lack of attention to their explicit consideration in strategic planning processes. This lack of attention is also obvious in roadmapping in its application to strategic and innovation planning. This paper introduces and explores the concept of risk-aware roadmapping, which explicitly manages uncertainty and risk in roadmapping, and sheds light on what such a process will entail given the factors that influence it. The study adopts a qualitative approach involving in-depth interviews with roadmapping experts and case studies of roadmapping exercises. This paper contributes to knowledge by providing a process that adds three significant steps to the standard risk management process, to suit roadmapping and strategic front-end innovation planning and identifying the risk of missing valuable innovation opportunities, which is very often overlooked in practice. Theoretical implications for organisational sensemaking are identified especially in the use and management of constraints for sensemaking activities such as innovation planning.

1. Introduction

Roadmapping provides a structured approach to innovation and strategy and has become one of the most widely used management techniques for these purposes (Phaal and Muller, 2009). It is increasingly being applied in industry due to its ability to deliver communication and consensus among decision stakeholders and provide a structured planning process. Uncertainty and risk are fundamental aspects of strategic planning (Noy, 1998; Ruefli et al., 1999), and there is heightened awareness that strategic planning and innovation should incorporate a more rigorous treatment of these issues (Funston and Ruprecht, 2007; Euchner, 2011). This also applies to roadmapping, which is particularly relevant to planning at the front-end (or early stages) of innovation that involves making strategic decisions under an uncertain and complex outlook (Phaal et al., 2008). It has been pointed out that roadmapping should deliver as part of its benefits, the identification, resolution and communication of uncertainties and risks surrounding the strategic issue it focuses on (EIRMA, 1997; Petrick and Provance, 2005).

However, a general lack of attention to uncertainty and risk has been noted across the majority of published roadmaps. As part of

this study, 650 published roadmap reports available in the public-domain (Phaal, 2011) were examined. Of these, it was observed that 64 acknowledged the presence of uncertainty and (or) risk. Of the 64 roadmaps, it was in only 22 (3.4%) that some measures to explicitly address the uncertainties and risks were taken. Eleven of these applied scenario techniques. Similarly, the explicit communication of risk and uncertainty in roadmap visuals has been found to be generally lacking. From a sample of 369 roadmap visuals, uncertainties and risks surrounding the respective objectives and targets were presented on the visual in only 14 (3.8%).

It was noted that in contrast to the similarly configured approach to roadmapping across the reports, there appeared to be no organised structure or comprehensive approach to addressing the uncertainties and risks within them. It becomes clear that there is a lack of a common understanding for dealing with uncertainty and risk in roadmapping. This along with the very low proportion of roadmapping exercises that make attempts to address risk might be attributed to the absence of appropriate guidance. It is noted from literature that this observation of a lack of attention to risk can be extended to strategy and innovation planning (Bromiley et al., 2001; Euchner, 2011), which are the typical applications of roadmapping. Given the fundamental nature of risk and uncertainty to strategy and innovation it is important that these issues are addressed.

In this paper, the foundations are laid for the concept of risk-aware roadmapping. The term 'risk-aware roadmapping' is used to describe the concept of roadmapping embedded with risk

* Corresponding author. Tel.: +44 7584222323; fax: +44 1223464217.
E-mail addresses: imi22@cam.ac.uk (I.M. Ilevbare),
drp1001@cam.ac.uk (D. Probert), rp108@cam.ac.uk (R. Phaal).

management procedures. This concept is developed based on evidence from case studies of roadmapping carried out for front-end innovation planning and experience of roadmapping experts. It identifies the various manifestations of uncertainty and risk in roadmapping and practical steps that can be taken to address these. Organisational sensemaking, which is particularly relevant to examining how organisations cope in situations of uncertainty and ambiguity, provides a useful theoretical perspective from which to examine aspects of risk-aware roadmapping. This study examines 'constraints' applied in the sensemaking activities of front-end innovation planning and identifies that additional ways of administering them may be required to improve results from these activities.

2. Overview of roadmapping for strategy and innovation

Roadmapping provides a structure for strategic planning and fits within the broader corporate, technology and innovation planning of the firm (Garcia and Bray, 2004; Willyard and McClees, 1987). It can be applied to a wide range of strategic issues, but it is particularly relevant to planning for the early stages of innovation, which involves making decisions that have long-term impact on the organisation (Phaal et al., 2008).

The primary feature that sets roadmapping apart from other traditional strategy formulation routines is the visual dimension that it brings to strategic planning (Bruce and Fine, 2004; Phaal and Muller, 2009). This is in form of the generic roadmap framework presented in Fig. 1. This time-based multi-layered structure drives data gathering and analysis. It brings out, along the time dimension, logical steps for planning, asking the questions *where are we*?, *where do we want to go*?, *and how can we get there*?, (Phaal et al., 2003). The multi-layered structure facilitates the alignment of interacting themes, and captures analysis on three broad levels (Gindy et al., 2006). The firm's value propositions (in form of innovation ideas, products, etc.), are the key focus (the roadmap middle layer). They are to be developed in response to the needs of the external market environment (roadmap top layer). The resources, capabilities and technologies advance ideas and facilitate delivery of value propositions (the roadmap bottom layer). Thus the top and bottom layers provide the underpinning for the product innovation from market-pull and technology-push perspectives respectively and thus facilitate the creation of roadmap (Wells et al., 2004).

Another feature of roadmapping is that it is usually carried out as a collaborative and social process involving a group of experts in the field of the strategic issue considered in the roadmap (Garcia and Bray, 1997). The roadmapping process depends on the cognitive effort of the group which usually serves as the primary (or initial) source of data and the means of its analysis. Roadmapping processes are usually carried out to spur action to drive innovation. Therefore they tend to be driven towards achieving consensus between participants, to increase the likelihood that the decisions reached will be implemented (Burger et al. 1995; Bruce and Fine, 2004).

There is no single universally accepted process for roadmapping, but there are four generic stages identifiable from literature (Beeton et al., 2008; Gerdsri et al., 2009). These are (1) initiation and planning, (2) input and analysis, (3) roadmap synthesis and output, and (4) implementation of the roadmap. The input and analysis stage is usually carried out in workshop forums. It is at these workshops that the group of experts participate and their cognitive efforts are combined for input and analysis of data towards consensus building (Kerr et al., 2012). This stage follows a series of divergent–convergence steps (Phaal and Muller, 2009). Divergence refers to capturing and exploration of knowledge and information, and convergence refers to the analysis and reduction of the knowledge to the most essential for the issue under consideration. This convergence step is often carried out through a democratic voting process, to obtain a selection transparent to participants, and therefore promote consensus amongst them.

This divergence–convergence cycle is similarly found in the generic phases of formal (or rational) strategic planning, in the form of generation of strategic alternatives (divergence) and selection from the set of alternatives after some evaluation may have taken place (convergence) (Mintzberg et al., 1976; Hart, 1992; Nasi, 1999). Similarly, the front-end of innovation involves divergent–convergent cycles of exploration (idea generation) and selection of new product ideas (Phaal et al., 2008).

3. Overview of uncertainty and risk

As an approach to strategic planning, roadmapping belongs to the field of strategic management. It has been noted that there is a lack of consensus on the definition of uncertainty and risk in this field (Ring, 1989; Miller, 1992). The effect of this is that in strategic management and planning, the relationship between uncertainty and risk is quite ambiguous and open to various interpretations. Nevertheless, it is important to make a connection between these concepts for the purpose of this study.
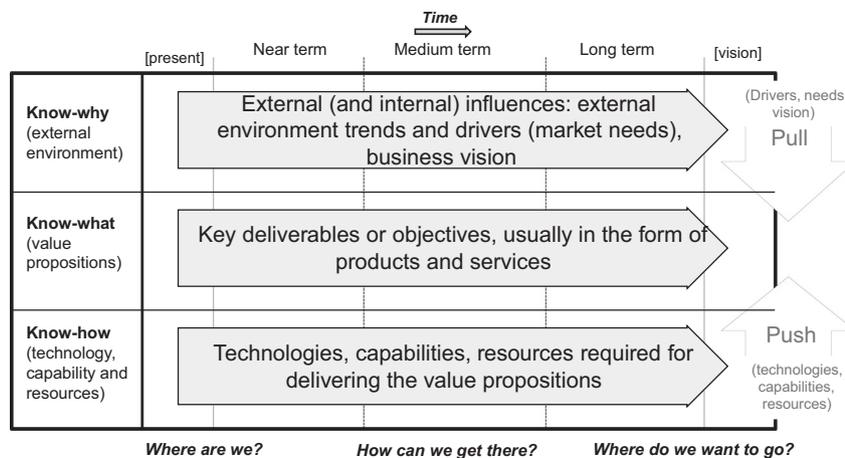

Fig. 1. The generic roadmap framework.
(Adapted from Phaal et al., 2003).