Methodology for the of building process integration of Business Model Canvas and Technological Roadmap

Miguel Angel Toro-Jarrín, Idalia Estefania Ponce-Jaramillo, David Güemes-Castorena *

Center for Quality and Manufacturing, Tecnologico de Monterrey, Campus Monterrey, Monterrey, NL, Mexico

ABSTRACT

The importance of linking efficiently the outputs of R&D processes with the business world has become evident. Researchers and practitioners have developed tools to help build business from a starting point (business idea/ product concept) to the description of elements that make the business possible. The Business Model Canvas identifies the essential parts of a business; it's applicability and simplicity has given it greater acceptance and dissemination. Furthermore, the Technology Roadmap is presented as a valuable tool to visualize the relationships over time of the market, technology and product strategies; TRMs allow decision makers to identify gaps between the current and the future business strategy.

BMC and TRMs have been used independently of each other. This work has the objective to present a methodology of the building process integration of these two tools, to provide a business model and a technology roadmap for the business idea or new product concept that are aligned to the current and future business needs. Then, it is explained and described in a practical manner by a case of study. One of the benefits of using this methodology is that a business constructs a BMC and TRM with two different approaches giving the process the perspective of future analysis and also visualizing elements for the current business. It was found that the building integration process allows constructing a robust business strategy proposal in a structured mode taking into account the benefits of each tool and reducing the disadvantages.

© 2016 Elsevier Inc. All rights reserved.

1. Introduction

In a world where the changes occur so fast, a look into the future is not only an additional tool for strategic planning but an essential exercise for every company. Rohrbeck and Schwarz (2013) appointed that the early acknowledge and visionary anticipation of the technological potential play a key role in a globalized world which is characterized by the improvement of competitiveness. They also observed that ignoring changes in business environment often results in losing opportunities or failing in responding threats. For Makridakis (Godet, 2010) the role of visioning the future is to provide managers and government policy maker's different ways to comprehend the future and help them have a total understanding of possible implications of social and technological changes.

The technology development and market demands accelerate changes in the world. In literature is found frequently that technology innovation is a key successful factor for performance improvement and survival of the enterprise, besides it is a determinant factor for sustainable economic development of nations and quality life improvement of their people (Keupp, Palmié, & Gassmann, 2012). According

to Rohrbeck and Schwarz (2013), firms suffer blindness caused by focusing mostly on the inside of the company and reinforcing practices that made the company successful in the past thus, it becomes evident that firms need to dedicate efforts to look outside the company and to be aware of the coming changes.

For this purpose, academics and practitioners have presented different alternatives to explore the future systematically. For example, Phaal, Farrukh and Probert (2004b) states that in order that technology management benefits a business it is required effective process and systems that guarantee that the existing and potential technological resources are aligned with its needs now and in the future.

On the other hand, if a firm has hints of trends that could drive future customer's behavior, and also technology development, the next stage is to envisioning the business that adapts better to those trends by using new technologies advantages. However, it is not easy to structure a business for the present scenario and it is more complicated to construct for a future scenario.

The objective of this study is to facilitate to managers, policy makers and practitioners the creation of a business model for both current and future scenario. In order to achieve this objective Technology Roadmap (TRM) and Business Model Canvas (BMC) are developed in a structured manner at the same time to construct a robust business strategy proposal taking into account the pros and reducing the cons of each strategic tool.

* Corresponding author.
E-mail addresses: matoro81@hotmail.com, a00618402@itesm.mx, guemes@itesm.mx (D. Güemes-Castorena).

2. Framework

The business strategy involves all the plans needed to create and deliver value to the customer. It defines: what segments the firm will attend; the means to deliver value to the segments identified; the manufacturing strategy; R&D strategy and the way the firm is presented to the public (Chungyalpa & Bora, 2015).

There are a number of tools to help organizations to manage resources more effectively in order to create value and explore the future, for example Pillkahn (2008) uses these tools for strategy development. According to Ringland (2010), these tools are valuable not only for the outputs generated at the end of the process but for the interaction between the team members because they improve organizational knowledge.

In this section, first previous integration works will be described, and secondly concepts that help forming the methodology of building the integration process will be defined.

2.1. Previous BM–TRM integration works

The use of BM and TRM certainly has many advantages, but a strategic business link is missing if it is used independently. Strategic management practitioners and researchers have combined BM and TRM to achieve a more robust strategy, the combination of these tools generates a new and more powerful tool for exploring the current and the future business and their parts (Pillkahn, 2008). Following, three studies that combined these tools will be analyzed.

1. Five Porter's forces: Many authors (Osterwalder & Pigneur, 2010; Abe, Ashiki, Suzuki, Jinno, & Sakuma, 2009; Abe, Shinokura, Suzuki, Kubo, & Sakuma, 2006) have used the five Porter's forces in order to integrate BM and TRM. According to Porter (2008), "understanding the competitive forces, and their underlying causes, reveals the roots of an industry's current profitability while providing a framework for anticipating and influencing competition (and profitability) over time". For helping construct the firm political strategy, studies based on the Porter's forces have been developed (Vining, Shapiro, & Borges, 2005), and for helping to apply the five forces analysis, Dobbs (2014) presents five templates to quantified the threats levels.

2. Abe, Shinokura, Suzuki, Kubo, and Sakuma (2006) found common parts in the generation of BM and TRM in a study named "Smart-Innovation Planning Method". The main purpose of the study was to use the output of BM as input for strategic roadmapping (SRM). The integrated these two tools by introducing further steps at the beginning and in the end of the process to generate BM and TRM in one single procedure. The methodology consists in 5 steps: 1) combination of business ideas and database, 2a) analysis of value chain, macroscopic environment, PEST and business environment, 2b) scenario forecasting, 3a) scenario planning, 3b) do explorative roadmapping using the reference scenarios, 4a) integration of result of step 3b and SRM, 4b) confirmation of target customer, product, supply method and profit model; and 5) decision making based on the valuation of factors.

3. Abe, Ashiki, Suzuki, Jinno and Sakuma (2009) reported a new business strategic planning method for the integration of BM and strategic roadmapping (SRM) named "Innovation Support Technology". The methodology is applied using three stages:

a) Product concept and business idea based on R&D outputs are described. Market and customers are pictured and determined based on this product concept and this business idea. The aim of this stage is to generate the technological scenario.

b) Planning of the business scenario with two objectives: To design and to obtain the business target of the company in the future, and roadmapping the product function and the enabling technology to achieve the business target in the future.

c) Contents of company technology roadmapping and discoveries through these roadmapping workshops are reflected to the business model. Target customers, value propositions, supply method, and profit model according to scenarios are confirmed. This stage benefits to discover bottle necks through milestone gaps between layers discover, also investment timing are investigated and verified and, business strategy is evaluated.

Abe, Ashiki, Suzuki, Jinno and Sakuma (2009) analyzed BM and SRM and summarized pros and cons (see Table 1).

4. de Reuver, Bouwman and Haaker (2013) developed a study on core concepts from business model and technology roadmapping. They concluded that business model roadmap obtains how operational actions and business model impacts are consistent, it means that if an organization has to choose between different business models, business model roadmapping helps to identify overlapping routes, route dependencies and points of return.

2.2. Business Model Canvas (BMC)

Zott and Amit (2010) define a business model as "the content, structure, and governance of transactions designed so as to create value through the exploitation of business opportunities". Chesbrough (2010) mentions that some of business model functions are: to identify market segment, to specify revenue generation mechanism, to define the structure of the value chain, to describe firm's positions within value network and to formulate a competitive strategy that gain and hold advantage over competitors.

According to Osterwalder and Pigneur (2009) a business model is representation of how an organization creates, delivers and captures value from a product or service. BMC is a graphical approach that describes nine elements needed to define a business model (see Fig. 1). An abridged description of each element of the business model is shown in Table 2.

2.3. Technology Roadmap (TRM)

Phaal et al. (2004a) define technology roadmap as a flexible technique used to support strategic and log-term planning, providing a structured relationships between evolving and developing markets, products and technology over the time. The TRM process addresses the identification, selection, acquisition, development, exploitation and protection of technologies (product, process and infrastructural) needed to achieve, maintain and grow a market position and business performance in accordance with the company's objectives.

The TRM aims to support the start-up of company-specific TRM processes as: 1) to establish key linkages between technology resources and business drivers; 2) to identify important gaps in market, product and technology intelligence; 3) to develop a first-cut technology roadmap; 4) to support technology strategy and 5) to plan initiatives in the firm to support communication between technical and commercial functions.

Phaal, Farrukh, and Probert (2004b) appoint that it is important that the technology strategy should not be developed independently from the business strategy, instead technological resources should be considered as an integral part of business plan. A successful TRM helps to establish a balance between market pull and technology push (see Fig. 2).

According to Phaal et al. (2004a), the following factors contribute to a successfully and sustainable roadmapping initiative:

- Clear business need, tangible benefits and appropriate timing for each activity.
- Good architecture that reflects the structure of the organization and the issue at hand.
- Strong commitment and ownership from senior management and a supporter in order to drive the process forward, perhaps supported by external independent facilitation.