

Managing business model innovation risks - lessons for theory and practice

Taran, Yariv; Chester Goduscheit, René; Boer, Harry

Published in:

Proceedings of the 16th International CINet Conference on Pursuing Innovation Leadership

Publication date:

2015

Document Version

Publisher's PDF, also known as Version of record

[Link to publication from Aalborg University](#)

Citation for published version (APA):

Taran, Y., Chester Goduscheit, R., & Boer, H. (2015). Managing business model innovation risks - lessons for theory and practice. In *Proceedings of the 16th International CINet Conference on Pursuing Innovation Leadership* (Vol. 16, pp. 919-929). Continuous Innovation Network.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal -

Take down policy

If you believe that this document breaches copyright please contact us at vbn@aub.aau.dk providing details, and we will remove access to the work immediately and investigate your claim.

MANAGING BUSINESS MODEL INNOVATION RISKS –LESSONS FOR THEORY AND PRACTICE

Yariv Taran¹, René Chester Goduscheit² and Harry Boer¹

¹Aalborg University, Centre for Industrial Production, Denmark

²University of Southern Denmark, Center for Integrative Innovation Management, Denmark

yariv@business.aau.dk

ABSTRACT

This paper focuses on the challenges related to, and the risk management needed in, the process of business model innovation. Business model innovation may involve hefty investments, high levels of uncertainty, complexity and, inevitably, risk. Although many firms follow a first mover strategic approach, arguing from a “no risk no reward” aphorism, a sloppy implementation approach towards business model innovation may result in catastrophic, sometimes even fatal, consequences to a firm’s core business. Based on four unsuccessful business model innovation experiences, which took place in three industrial firms, we discuss the reasons that led to these failures, and outline various possible solutions for practitioners to manage business model innovation adequately.

Keywords: Business Model Innovation; Risk Management; Case Studies.

1. INTRODUCTION

Business model innovation is risky business, especially if a firm follows a first mover, prospector (Miles and Snow, 1994) strategy and goes for a radically new business model. Many managers recognize that taking, while at the same time controlling, risks is fundamental to successfully developing and implementing a sustainable business model. However, in spite of the considerable body of literature on risk management, particularly in relation to project (e.g. Kendrick, 2003; Chapman and Ward, 2004) and product innovation (e.g. Keizer and Halman, 2007) management, it has not yet been fully incorporated into business model innovation practice (Deloitte & Touche, 2008).

2. LITERATURE REVIEW

2.1 RISK, RISK MANAGEMENT AND RISK APPETITE

The term risk refers to “*uncertainty of outcome*” (Chapman and Ward, 2004). Risk management has been defined as “*the systematic application of management policies, procedures and practices to the tasks of communicating, consulting, establishing the context, identifying, analyzing, evaluating, treating, monitoring and reviewing risk*” (ISO/IEC Guide 73, 2003).

The evolution of risk management has come a long way in the past two decades. However, although firms have successfully adopted risk management in their internal audit, treasury, insurance, environmental health and safety, and legal functions, it has not yet been fully incorporated into core business processes related to future growth, such as strategic planning, capital allocation, and performance management (Deloitte & Touche, 2008). This seems to imply that *unrewarded risks*, in the sense that no premium is obtained from managing them – only the potential for loss is reduced, are the main driver in today’s risk management practices, while managing *rewarded risks*, which are

part and parcel of decision-making processes associated with future growth, is not yet fully embedded in organizational change and innovation processes. Furthermore, even if firms attempt to manage rewarded risks systematically, for example in project (e.g. Kendrick, 2003; Chapman and Ward, 2004) or product innovation (e.g. Keizer and Halman, 2007) management, they essentially assume that those risks can be managed in isolation from the rest of the system. Recent surveys and studies (e.g. Taplin, 2005; Deloitte & Touche, 2008), however, have shown that a growing percentage of managers worldwide are interested in applying risk management in a much more comprehensive (i.e. proactive and holistic) manner.

Risk appetite is “*the total impact of risk an organization is prepared to accept in the pursuit of its strategic objectives*” (KPMG 2009, p. 3). HM Treasury (2006) developed a risk appetite scale, which helps firms to map various possible impact categories (e.g. reputation and credibility; operational and policy delivery; financial and legal/regulatory compliance) and to determine their corporate risk appetite on a scale ranging from “averse” to “hungry” (see Table 1).

How (risk) hungry is the firm?	Description
Averse	Avoidance of risk and uncertainty is a key objective
Minimalist	Preference for ultra-safe options that have a low degree of inherent risk and only have a potential for limited reward
Cautious	Preference for safe options that have a low degree of residual risk and may only have limited potential for reward
Open	Willing to consider all options and choose the one that is most likely to result in successful delivery while also providing an acceptable level of reward
Hungry	Eager to be innovative and to choose options based on potential higher rewards (despite greater inherent risk)

Table 1. Corporate Risk Appetite Scale (Source: HM Treasury, 2006)

2.2 BUSINESS MODEL INNOVATIVENESS SCALE

When can we call a change in an organization a business model innovation? Three approaches have been proposed. The first approach, associated with business model innovation *radicality*, “defines” a new business model on a scale ranging from incrementally to radically different from previous models. The second approach defines innovativeness in terms of, what might be called, the *reach* of the innovation. A suitable scale to measure the degree that an innovation is “new to whom” could be one ranging from new to the firm, via new to the market and new to the industry, to new to the world (Rogers 1983). The third approach considers measuring the innovativeness of a business model through its *complexity*, i.e. the number of building blocks changed. Any change in one of the building blocks would constitute a simple innovation, while simultaneous changes in all of the building blocks would be the most complex form of business model innovation.

If we combine these three approaches, a three-dimensional space, first proposed by Taran et al. (2008) and later published as Taran et al. (2015), emerges, which helps in qualifying the innovativeness of a new business model (Figure 1):

- **Radicality** – how new (incremental vs. radical) is each building block (see Table 2).
- **Reach** – to whom is the innovation new?
- **Complexity** – number of building blocks changed simultaneously.

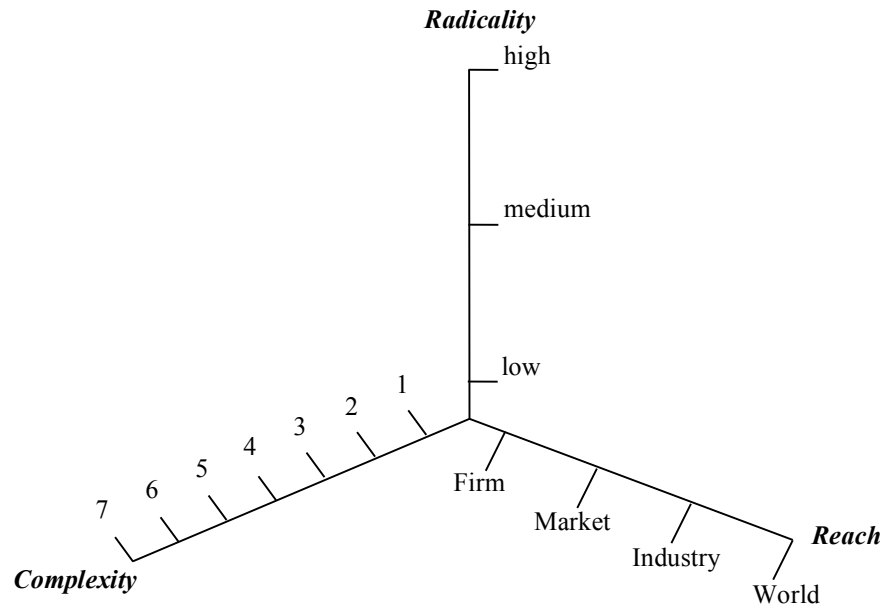


Figure 1. A Three-Dimensional (Business Model) Innovativeness Scale (Source: Taran et al. 2015)

Building block	Incremental innovation “Do what we do but better”	Radical innovation “Do something different”
1. Value proposition	Offering “more of the same”	Offering something different (at least to the firm)
2. Target customer	Existing market	New market
3. Customer relationship	Continuous improvements of existing channels	New relationship channels (e.g. physical/virtual, personal/peers/ mass awareness)
4. Value chain architecture	Exploitation (e.g. internal, lean, continuous improvements)	Exploration (e.g. open, flexible, diversified)
5. Core competences	Familiar competences (e.g. improvement of existing technology)	Disruptive new, unfamiliar, competences (e.g. new emerging technology)
6. Partner network	Familiar (fixed) network	New (dynamic) networks (e.g. alliance, joint-venture)
7. Profit formula	Existing processes to generate revenues followed-by/or incremental processes of (cost) retrenchments	New processes to generate revenues followed-by/or disruptive processes of (cost) retrenchments

Table 2. Incremental and Radical Orientation to Each Building Block

In this space, any business model innovation can be positioned in terms of its *degree* of radicality, reach and complexity. Some changes are more radical and/or complex than others, and some (e.g. radical product innovation, incremental process improvement) are better understood than others (e.g. a holistic, new to the world departure from all business models known so far). The assumption underpinning this paper is that the risks involved in business model innovation increase with the radicality, reach and complexity of the innovation.

2.3 Research objective

The above discussion shows that risk, risk appetite, risk management and, to a certain extent, business model innovativeness are relatively established constructs. However, their role and interaction in business model innovation processes is not well understood. More particularly, the question is how risk, risk appetite, risk management and business model innovativeness interact to affect the eventual outcome of a business model innovation process, in terms of its “success” or “failure”. The objective of this paper is:

To learn about 1) the interaction between risk, risk appetite, risk management and business model innovativeness and 2) its effects on the success of business model innovation.

3. RESEARCH DESIGN

3.1 CASE STUDIES DESCRIPTION

Four retrospective case studies of business model innovation processes undertaken by three industrial firms (Table 3) provide the empirical basis for this paper. We selected these firms based on their relatively successful, yet somewhat different, business model innovation experiences over the years, and focused on the, in total four, cases in which they failed to implement their new business model attempts successfully. The study began early 2009 and ended in 2013.

Alpha	Beta	Gamma
Large global firm, which is specialized in developing, manufacturing and marketing (for the most part) professional audio products	Large global firm, specialized in developing, manufacturing and marketing flexible electrical/electronic control and instrumentation solutions within power production, marine and offshore	Large IT firm, which is specialized in providing IT solutions for primarily public organizations
Two failure cases (A and B)	One failure case (3)	One failure case (IV)

Table 3. Firm Descriptions

3.2 DATA GATHERING TECHNIQUES

Given the exploratory nature of this research, the case study methodology was adopted (Yin, 2003). Multiple qualitative data collection methods were used to ensure the validity and reliability of the research. The desk research consisted of information gathered through books, articles, websites, as well as documents received from the three firms. The field research consisted of interviews (using a standard questionnaire), e-mail correspondence and company visits. The questionnaire covered all five constructs (risk, risk appetite, risk management, business model innovativeness, success/failure) plus contextual variables (e.g. firm background and strategy) and was semi-structured in order to allow the respondents maximum freedom to explain their views on the new business model and their understanding of the innovation process and the researchers to discover unexpected yet relevant issues. Since the case studies were analyzed retrospectively, the data could not be acquired through observations. The interviews were held with the firms’ middle managers (e.g. technology/innovation, product, project or marketing managers). In Alpha, 18 hours of interviews were conducted, and in Beta 7 hours of interviews in total. In Gamma, the interviewees represented the eleven organizations involved in that firm’s business model innovation. More than 25 hours of interviews were recorded.

3.3 CHOICE FOR DATA ANALYSIS

The cross-case analysis is focused on identifying and analyzing the similarities and differences between the four focal business model innovation experiences. In order to increase the credibility of the research, the data gathering and analysis of all cases focused on the following, theory based, criteria:

- **Characteristics of the business model innovations**, in terms of radicality (how new?), reach (new to whom?) and complexity (Table 2 and Figure 2).
- **Overall innovation management**. Here, we analyzed the innovation process of each firm using Tidd and Bessant's (2009) innovation model of "Search-Select-Implement".
- **Past, present and future risk appetite preference of each firm**. At this level we were particularly interested to learn how "hungry" each firm was in taking risks. Did the risk appetite remain the same or change over the years? And is there a link between the top management risk appetite and the firm's business model innovation experiences?
- **Risk and risk management**, including both strategic and operational risk occurring, and the way these risks were managed (e.g. explicitly, implicitly, stage-gate oriented).
- **Fit**. Looking for the role of the interaction between risk, risk appetite, risk management and business model innovativeness and its effects on the success of business model innovation, we particularly focused on the "fit" between these constructs, reasoning that the higher the risk appetite of a firm, the higher the likelihood that it will pursue a more innovative business model, which will involve greater risk which, in turn, needs to be managed more tightly in order for the new business model to be realized and become a success.

Given the exploratory character of the case studies, we also actively sought, but did not find, additional criteria emerging from the case studies.

4. DATA GATHERING RESULTS

Table 4 shows the four criteria used to cross-analyze the cases, and summarizes the data collected. The three firms and their failure cases are*:

- Alpha – Case A and Case B.
- Beta – Case 3.
- Gamma – Case IV.

5. CROSS-CASE ANALYSIS AND PROPOSITION DEVELOPMENT

The cross-case analysis produced five propositions, which are organized according to the four criteria formulated above.

5.1 CHARACTERISTICS OF THE BUSINESS MODEL INNOVATION AND SUCCESS RATE

Table 5 summarizes the business model innovation cases in terms of their radicality, reach and complexity. Cases A, B and 3 were low in radicality and reach. Case IV, however, was high in radicality and reach. All cases were highly complex.

Case A involved the establishment of a new business unit offering incremental

* The numbering of the cases stems from previous work, in which also success cases (e.g. case 1 and 2 of company Beta) were presented and analyzed. See e.g. Taran et al. (2015).

improvements to existing products, combined with outsourcing of marketing and sales to a partner. Case B concerned outsourcing of manufacturing to a partner, which, however, failed to result in a competitive product. Alpha is a highly competent design firm, pushing new products into the marketplace and with a successful history of collaborative technology development. However, they may have underestimated the complexities involved in establishing a successful operational collaboration through outsourcing. In Beta, new product development activities are usually based on market-pull. Case 3 may have failed because the firm “pushed” a radically new product into the market without any idea of how customers would respond. Gamma’s case IV was a radical and new to the industry innovation, which went far beyond the firm’s previous innovation experiences.

	Case	Radicality (to the core business)	Reach	Complexity (to the core business)
Alfa	Case –A	Low: (VP; PN)	Low: new to the firm	High: VP; TC; VC; PN; CR; PF
	Case – B	Low: (VC; PN)	Low: new to the firm	High: VP; TC; VC; CC; PN; PF
Beta	Case – 3	Low: VP; TC	Low: new to the firm	High: VP; TC; CC; VC; PN; CR; PF
Gamma	Case – IV	High: VP; TC; VC; PN	High: new to the industry	High: VP, TC, VC, PN, PF

VP=value proposition; TC=target customer; VC=value chain; CC=core competences, CR=customer relation; PN=partner network; PF=profit formula.

Table 5. Radicality, Reach and Complexity of the Four Cases

Thus, the case studies indicate that business model innovation failures are situated at the “extremes” of: 1) low radicality and reach, i.e. reactive firms pursuing a *Defender* strategy (Miles and Snow, 1994), and 2) radically (disruptively) new and far reaching, i.e. proactive firms pursuing a *Prospector* strategy. However tempting it may be to propose that firms best stay away from the extremes, the more compelling reason for failure seems to be lack of prior related knowledge (Cohen and Levinthal, 1990). Alpha was a technology developer, without any experience with operational collaboration. Beta understood how to translate market requirements into new products but did not understand how to push new technology in to the market place. Gamma overplayed its hand by trying to accomplish a new to the industry innovation, which went far beyond its previous experiences.

Proposition 1: *Irrespective of a firm’s strategy (defender, prospector) and the business model innovativeness pursued (radicality, reach, complexity), lack of prior related knowledge is likely to result in business model innovation failure.*

5.2 OVERALL INNOVATION MANAGEMENT

Both Alpha and Beta tried to reuse successful business model innovation processes (new idea generation and implementation processes). However, while Alpha was keen on pushing ideas and technology into the market place, Beta was more in favor of adopting a customer pull strategy. Furthermore, both firms tried not to repeat failures made in the past. Consequently, Alpha’s failed outsourcing attempts (cases A and B) led the firm to re-experiment with familiar, “pushed”, business model innovations, while Beta, based on the failure of case 3, chose to no longer push new ideas and technologies into the market place, without consulting their customers first.

	Alpha	Beta	Gamma
The four failure business model innovation cases	<ul style="list-style-type: none"> • Case A – New business unit offering existing technology-based products to a new market (studios), plus outsourcing of marketing and sales to a partner (low radicality, low reach, high complexity). • Case B – Outsourcing the manufacturing of one of the products – failure (low radicality, low reach, high complexity). 	<ul style="list-style-type: none"> • Case 3 – New technology-based product, aimed at serving existing and potential new customer segments: after one year of heavy investment in the product, the project was terminated due to incongruity with customer demands (product shape and size; price – too expensive) – (low radicality, low reach, high complexity). 	<ul style="list-style-type: none"> • Case IV – New IT solution based on approaching shift in technological opportunities within metering utility consumption: The project was terminated due to strategic shift within the firm and lack of believe in customer demand (high radicality, high reach, high complexity, given the difficulty in network structure among the participating organizations)
Overall innovation management	<p>Search processes - No search process in any of the cases. <i>“It was just something that came up along the way”</i>. One project was managed proactively in search of a radically new business model (Case B). Otherwise, it was internal competences chosen to be used elsewhere.</p> <p>Selection and implementation processes - Following a stage-gate model, radical innovation ideas are handled with extra awareness. A slower process, which always starts with small steps and then grows slowly. Radical ideas follow gates similar to those of incremental ideas. The difference is, though, that it takes more time to move from gate to gate.</p>	<p>Search processes – Recognized as one of the weaknesses of the firm. They do not really have any systematic processes to manage radical, or even incremental, innovation ideas. It is something that usually just <i>“pops up”</i>. They give more attention to ideas that come from their main customers.</p> <p>Selection and implementation processes - A stage-gate model is used to move the business concept idea through a maturity roadmap and development process. Many complaints about the fact that there is not enough market research behind ideas proposed. In effect, lacking understanding of the potential market and sales volume.</p>	<p>Search processes – Initial idea developed by area director of the firm. In continuation of this initial idea, ten additional organizations were involved into the further development of the business idea and the business model underlying the project</p> <p>Selection and implementation processes – An open, network-based approach to develop and test the business idea. A development process which was marked by a substantial number of iterations and radical shifts in the overall business model</p>
Risk appetite	Used to be between “open” and “hungry”. Currently moving towards “open” – “cautious”, and taking fewer risks. Intending to move to ‘hungry’ again in future.	Used to be between “open” and “cautious”. Currently moving towards “open” and “hungry”. Willing to take chances and aim high, but aware of the risks involved in that.	Mostly “averse”. Currently trying to move towards an “open” approach. Focusing on a new market position in the aftermath of a privatization process
Risk and risk management	No explicit risk management processes, but rather a project culture and a project/innovation model that is structured by many gates aimed at continuity and reducing the risks throughout the innovation process. It is not an advanced risk management model, or one that applies a risk assessment method, but nonetheless a very sufficient model to reduce many risks through the innovation process.	No explicit risk management processes were identified. However, their innovation processes are highly controlled, to insure that strategic decisions made at the gates are being implemented adequately at the stages throughout the innovation process, and, the firm considers those control processes as a form of risk reduction.	No explicit risk management processes were identified. Yet, they perceived the openness approach as a form of risk mitigation and sharing, by opening up both the business model and its innovation process, which would be the fundament of the project. The firm stated that the project was not so much an internal development project, but rather something, in which all the participating organizations should be able to mirror themselves (i.e. risk sharing).
Fit	None	None	None

Table 4. Summary of the Case Data

Proposition 2: *“Simply” repeating successful business model innovation processes and, equally “simply”, dropping unsuccessful approaches, lack of experimentation with new business model processes and lack of learning from failures decrease the success rate of business model innovation significantly.*

5.3 CORPORATE RISK APPETITE LEVEL

In all three firms, top management had a strong impact on the firm’s corporate risk appetite. However, while the replacement of the CEO in Beta, and the privatization process that took place in Gamma made both firms more “hungry” and eager to pursue new business model opportunities, in Alpha, the significant downturn in the company’s profits during the last couple of years, and the hiring of a new CEO, turned the firm to become more risk averse.

Proposition 1: *Top management has great influence on the risk appetite of the firm. Fit between corporate strategy and the top management’s risk appetite should be one of the hiring/firing criteria for top managers.*

5.4 RISK AND RISK MANAGEMENT

None of the three firms had an explicit risk management program in place. Risks were managed implicitly, i.e. embedded in the innovation stage-gate process design (Alpha and Beta), or not managed at all (Gamma). In effect, problems continued to manifest themselves in different ways. While some issues seemed to have a more tolerable impact (e.g. unexpected, but solvable, surprises; goals and objectives that required redefinition during the process; accepted solutions that were rejected in a later phase; implemented solutions that were less effective or glamorous than anticipated; and/or schedule and budget overruns), their cumulative effect caused the entire business model innovation project to fail. Clearly, none of the firms was satisfied with their risk mitigation processes, but none of them found a solution. They did not really know how to optimize the process and, particularly, understand how to manage risks proactively.

Proposition 4: *Lack of dedicated risk management in a business model innovation process increases the likelihood of failure.*

5.5 FIT

The four failure cases indicate that risk, risk appetite, risk management and business model innovativeness and, more importantly, the fit amongst these constructs, play a significant role in the success or failure of business model innovation initiatives. In cases A, B and 3, both companies Alpha and Beta were “open” (Table 1) to take risk, but they pursued low risk, low (overall) innovativeness initiatives, and did not apply any risk management mitigation activities regardless of the high complexity (Table 5) inherent in the process. In case IV, company Gamma used a more “averse” rather than “open” risk appetite approach to a highly risky, highly innovative initiative, and did not apply any risk management either. The underlying concept of “fit” plays a central role in various theories, including manufacturing strategy (e.g. Skinner, 1985), organization theory (e.g. Mintzberg, 1979) and innovation theory (e.g. Boer and During, 2001), but has not been used so far to understand the relationships between business model innovation and risk management. Miles and Snow (1994), for example, discussed the dynamics of internal-external fit. Where they argued that “minimal fit” is necessary for insuring a company’s survival, “tight fit” frequently results in excellent administration,

while “early fit” may enable a firm to sustain an unusually high level of performance over an extended period of time. Yet, they were also aware of the fact that “fit” has its limitations as well – even “Hall of Fame” companies may suffer from downturns in performance (e.g. due to unexpected external hazard impact).

Similarly, we also argue that a perfect fit between the four key constructs of risk, risk appetite, risk management and business model innovativeness, will not automatically insure business model innovation success (and vice versa), but it will increase the probability of success substantially. Both Alpha and Beta had multiple successful business model innovation experiences in their past, and it has been observed (e.g. Taran et al. 2015) that the successful cases had much better alignment features than the failed cases. Particularly in the risk, risk appetite, and business model innovativeness constructs. Although, as said, risk management was not managed explicitly in any of the three firms. Relative to the failure cases, additional “functions” to reduce risk were used in the success cases. For example, in the successful cases (e.g. a new joint venture; new business unit development) the firms built slack (e.g. Galbraith, 1973) into the process by taking more *time* to get from gate to gate as the level of radicality, reach and/or complexity increased. This gave both firms the flexibility to proceed with more caution and to terminate those projects that were expected to be unsuccessful without too many consequences. In addition, Alfa also *mapped each innovation project’s timetable* as red, yellow, or green to illustrate both its readiness to meet the next gate requirements deadline, as well as the sense of urgency for its process completion. We propose:

Proposition 5: *The likelihood of launching a successful new business model increases if the company’s risk appetite, the innovativeness of the business model, and the risk management approach adopted align with the risks associated with the intended innovation.*

6. CONCLUSION

6.1 CONTRIBUTION TO THEORY AND PRACTICE

The cross-case analysis produced five testable propositions. Together, these propositions suggest that successful business model innovation depends a great deal on the following characteristics:

- **Risk appetite.** The top management’s personality, risk appetite, and assessment of the firm’s economic position and outlook overall, have great influence on selecting the innovativeness of new business model initiatives.
- The **strategic aggressiveness** trajectory is vital to consider, and should be considered carefully. Top management perception greatly affects their appreciation of the nature of the innovation, and may lead to underestimation of the difficulties involved, even, or perhaps especially, at the two business model innovation extremes of:
 - Incremental (radicality), new-to-the-firm (reach), but highly complex business model innovations initiatives. Where risk-averse managers may have the impression or, possibly, illusion of “safe enough” business model innovation experimentation, the risk of achieving little or no positive impact in the market place is high.
 - Radical, new-to-the-industry or new-to-the-world (reach), highly complex business model innovations, which, in many cases, depart from the firm’s previous strategy, and do not, consequently, build on experiences with previous innovations.

- The importance of *learning from failure* should not be overlooked. There are many lessons to be learnt from a failed case, in terms of what not to do, and what to improve on for next time. The failure cases discussed in this paper indicate that due to locked-in path dependency trajectories (Nelson and Winter, 1982), firms tend to “simply” repeat successful BM innovation processes and to, equally “simply”, drop unsuccessful approaches. The inherent danger is that a firm fails to learn how to approach innovations that are essentially new to the firm. This may, in turn, decrease its growth potential significantly.
- **Risk management and alignment** should not be taken lightly. Even if 1) a firm’s risk appetite fits its economic (risky) position and outlook, and 2) the firm estimates the nature and characteristics (radicality, complexity, reach) of the intended innovation correctly, and is even prepared, if necessary, to learn new approaches, business model innovation is still loaded with risks. Hence, risk management and, more importantly, its alignment with the other three key constructs (i.e. risk, risk appetite, and business model innovativeness) is of paramount importance in any business model innovation process. Furthermore, it appears that using a widely used approach such as the stage-gate process (Cooper, 1993) to manage a business model innovation process is not enough. The three firms’ experiences suggest that incorporating dedicated risk management processes (Chapman and Ward, 2004) into a business model innovation process, whether that process is stage-gate driven or not, can help reduce the likelihood of innovation failure. Moreover, as case 3 suggests, risk management can also potentially facilitate meeting customers demand. Too much focus on technological aspects combined with insufficient attention for commercial aspects and, possibly, a ‘push’ strategy, may lead to technical success but commercial failure (*cf.* e.g. Voss, 1988).

6.3 FURTHER RESEARCH

The empirical investigation performed in this research involved four retrospective case studies, based on mostly qualitative data. There are several well-documented advantages to this methodology, such as richness and depth, but also weaknesses related to, amongst others, generalization. Accordingly, the case study results and propositions developed should be tested on a larger scale. We propose to conduct a mix of comparative and longitudinal case studies as a first step, aimed at enriching and sharpening the findings presented here. Thereafter a larger case or questionnaire-based survey may be used to test and generalize each proposition developed.

REFERENCES

- Amit, R. and Zott, C. (2001), Value creation in e-business, *Strategic Management Journal*, Vol. 22, No. 6-7, pp. 493-520.
- Boer, H. and During, W.E. (2001), Innovation. What innovation? A comparison between product, process and organizational innovation, *International Journal of Technology Management*, Vol. 22, No. 1-3, pp. 83-107.
- Chapman, C.B. and Ward, S.C. (2004), *Project Risk Management. Processes, Techniques and Insights*, Chichester: John Wiley and Sons.
- Cohen, W.M. and Levinthal, D.A. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly*, Vol. 35, No. 1, pp. 128-153.
- Cooper, R.G. (1993), *Winning at New Products: Accelerating the Process from Idea to Launch*, Boston: Addison-Wesley.

- Deloitte & Touche (2008), Enterprise Risk Management Benchmark Survey, Perspectives on ERM and the Risk Intelligent Enterprise, Deloitte & Touche LLP.
- Galbraith, J.R. (1973), Designing Complex Organizations, Reading: Addison-Wesley.
- HM Treasury (2006), Thinking about Risk. Managing your Risk Appetite: Good Practice Examples, London: The Stationery Office.
- ISO/IEC Guide 73 (2003), Risk Management: Vocabulary, Guidelines for Use in Standards, http://www.standardsdirect.org/standards/standards4/StandardsCatalogue24_view_26100.html, retrieved 7 June 2015.
- Keizer, J.A. and Halman, J.I.M. (2007), Diagnosing risk in radical innovation projects, Research Technology Management, Vol. 50, No. 5, pp. 30-36.
- Kendrick, T. (2003), Identifying and Managing Project Risk: Essential Tools for Failure-Proofing Your Project, New York: Amacom.
- KPMG (2009), Understanding and articulating risk appetite, <https://www.kpmg.com/CN/en/IssuesAndInsights/ArticlesPublications/Documents/Risk-appetite-O-200806.pdf>, retrieved on 15 July 2009.
- Miles, R.E. and Snow, C.C. (1994), Fit, Failure, and the Hall of Fame. How Companies Succeed or Fail, New York: Free Press.
- Mintzberg, H. (1979), The Structuring of Organizations, Englewood Cliffs: Prentice-Hall.
- Nelson, R. and Winter, S. (1982) An Evolutionary Theory of Economic Change, Boston: Harvard University Press.
- Rogers, E.M. (1983), Diffusion of Innovations, New York: The Free Press.
- Skinner, W. (1985), Manufacturing: The Formidable Competitive Weapon, New York: John Wiley & Sons.
- Taran, Y., Boer, H. and Lindberg, P. (2008), Rethinking the business model concept. A bursting bubble or a fundamental shift in change management thinking?, Proceedings of the 9th International CINet Conference, Radical Challenges for Innovation Management, Valencia, Spain, 5-9 September, pp. 775-786.
- Taran, Y., Boer, H. and Lindgren, P. (2015), A business model innovation typology, Decision Sciences, Vol. 46, No. 2, pp. 301-331.
- Taplin, R. (2005), Risk Management and Innovation in Japan, Britain and the United States, London: Routledge.
- Tidd, J. and Bessant, J. (2009), Managing Innovation. Integrating Technological, Market and Organizational Change, Chichester: John Wiley & Sons.
- Voss, C.A. (1988), Implementation - a key issue in manufacturing technology: the need for a field of study, Research Policy, Vol. 17, pp. 55-63.
- Yin, R. (2003), Case Study Research. Design and Methods, Thousand Oaks: Sage Publications.