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Means to Survive Disruption: Business Model Innovation and Strategic Continuity Management?

JUKKA HEIKKILÄ, MARIKKA HEIKKILÄ, MARKO NIEMIMAA & JONNA JÄRVELÄINEN

Abstract Advances in Information Technology provide opportunities for totally new business. However, we are facing not only growing number of new ventures, but increasing restructuring of existing businesses. This can be perceived e.g. in shortening life-cycles of the companies. The restructuring and birth of new companies means changing or even disrupting existing businesses. Therefore, companies, regardless of their maturity, should be prepared to evaluate these threats and opportunities actively.

Against this backdrop, we suggest to combine business modelling with systematic Business Continuity Management. We discuss the two approaches and their usefulness under different circumstances and illustrate their use when implementable, rapid reaction to changes is required, such as in industry restructuring, or business merging and reorganization. We coin this combination as Strategic Business Continuity Management.

Keywords: • Business Model Innovation • Business Continuity Management • Disruptions • Growth • Disruption •

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1 Introduction

We have recently witnessed numerous occasions where the technological progress has enabled new companies to innovate business models (BMs) that have severely threatened incumbents' business continuity (BC) (Eggers & Park, 2017). These disruptions have established business models obsolete by shaking the industry boundaries. While the newcomers are bringing their business models to the markets, also the incumbents are under severe pressure to renew their own business models, or gradually fade into non-existence. This means that business modelling is of importance not only for start-ups, which build their business model from scratch and adapting their model based on feedback from the markets, but also for more established companies facing needs to restructure their businesses, balancing with introduction of new business models and of securing the continuity of their existing revenue streams.

In this paper *our main question is whether we could make companies more adaptive by business modelling, and especially, by BC management?* We focus specifically on the continuity of business models due to their central role for companies' business strategies and for ensuring the continuity of revenue streams (e.g. Amit & Zott, 2001; Bouwman, et al., 2008; Chesbrough & Rosenbloom, 2002; Chesbrough, 2010). With BC Management we refer to a company's ability to withstand and restore from intra- and extra-organizational contingencies. And BM we define as the logic to creation, capturing and delivering value for customers and business (Teece 2010: 172).

We integrate these two separate streams of literature - BC management and BM - to conceptually elaborate an approach coined as Strategic Business Continuity Management (SBCM) consisting two parts: (1) value preservation, as suggested by BC; and (2) value creation, a distinction also considered relevant in BM-literature (Demil & Lecoq, 2019), as suggested by BMI and Stress Testing.

This paper is structured as follows: we start with description of literature on company survival, Business models and Business continuity management. Then we present the SBCM approach and provide some illustrative cases. Discussion and Conclusions, and future research sections end this paper.

2 Combining Business Continuity Management and Business Modelling for survival and performance

In this chapter we first describe the statistics regarding survival of the companies and the drivers for the business model innovation. We continue with the literature on Business Continuity and thereafter Business Model and Business Model Innovation research.

2.1 Survival of the companies and drivers for changing the Business Model

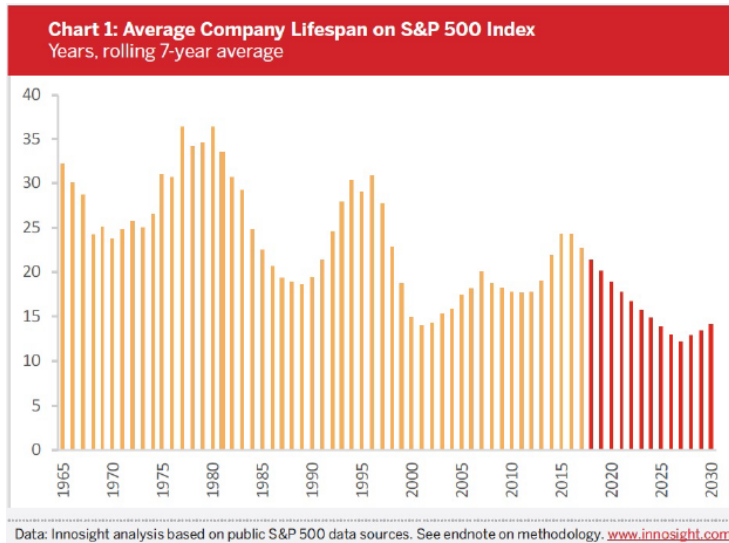


Figure 17 Shortening Corporate Lifespan (Anthony et al., 2018)

Increased use of Information and communication technology and big companies shortening life-span has happened simultaneously: The average lifespan of a company listed in the S&P 500 index of leading US companies has decreased by more than 50 years in the last century, expected to go towards 15 years after 2020 (Figure 1). The majority of corporations is closer to the average of constant 10-years half-life (half-time means that 50% of companies are discontinued during their first ten years), because there are relatively speaking less long-living outliers (Daepf et al., 2015). This means that we can expect more than two-thirds of the S&P 500 to consist of companies that we have not heard of after 2025. Similar phenomenon can be seen within Small and Medium-sized enterprises (SMEs); typically, less than half of the new European SMEs survive for the first five-year period (Eurostat, 2015).

The mortality of organizations does not, however, mean that the business is destroyed. On the contrary, the business ideas, intellectual property, and whole parts of the organizations may get traded and continue life after restructuring. The evidence emphasises the importance of company after-life: only in 8% of the publicly traded firms in North-America the closing of the company is due to liquidation or bankruptcy (Daepf et al., 2015). More often, the reasons are mergers and acquisitions, reverse acquisitions and takeovers, which mean continued business survival. However, the news is that reviving existing business have been only marginally more effective than incubating from the beginning (Laakso, 2012; Xi et al., 2017).

What are then the drivers of these incontingencies, disruptions and business modelling? In empirical studies it has been found that the major reasons to dynamic business

modelling stem from technological development and especially from the market developments - in few cases regulatory drivers play a role (only 18% of all cases studied by de Reuver et al., 2009). It has also been found that the changes of the virtuous, or vicious cycles may also arise from the business model itself, especially on its higher-order unintended direct and indirect side-effects on a company's business drivers (Demil & Lecoq, 2010). On the other hand, restructuring and financial market mechanisms allow successful companies to buffer against extrinsic age-dependent sources of mortality by either raising capital or acquiring skill-sets of competitors (Xi et al., 2017) to meet the threats, a strategy discussed in one of the seminal papers on long term role of business models (Demil & Lecoq, 2010). So even though SMEs are not up to cope with latest advances in technology – the main disruptor - in the long run, SMEs are adaptive in the short term and targets for restructuring.

To summarize, the survival rate of big corporations and SMEs are surprisingly similar and their survival rate over time does not seem to depend on initial conditions. But, of the vanished companies, the majority continue as part of an incumbent, many as spin-offs or otherwise in new ownership. Therefore, we find it useful to reconsider the role of business modelling practices against the backdrop of continuity management. It is thus imperative for companies – whether market leaders or challengers – to not contemplate but to be proactive with their business models (Demil & Lecoq, 2011; Heikkilä et al., 2016). They need to stay alert and periodically evaluate the viability of their business models against environmental contingencies, but also to keep their changes implementable internally.

2.2 Business Models and Business Model Innovation

BMs are studied especially in the fields of information systems science, organization science and management strategy (Zott et al., 2011; DaSilva & Trkman, 2014; Wirtz et al., 2016). Recently, term Business Model *Innovation* has emerged to describe an activity or process in which core elements of a firm and its business logic are deliberately altered (Bonakdar, 2015; Bucherer et al., 2012; Hartmann et al., 2013; Heikkilä et al., 2018; Lindgardt et al., 2009; Pohle and Chapman; 2006). The logic through which organization transforms its products and services into value is one of the most significant strategic-level decisions (Foss & Lindenberg, 2013; Zott et al., 2011). The BMs are typically succeeding strategy (Casadesus-Masanell & Ricart, 2010) with a shorter temporal perspective (DaSilva and Trkman, 2014), and - from the perspective of BC Management – leading to improved, positive realization of the strategy.

BM Innovation is a transformational approach to create new solutions for business (Demil & Lecoq, 2010). The aim is to specifically innovate new aspects of the business with BM techniques on continuous cyclical basis (Casadesus-Masanell & Ricart, 2010, 2011; Demil & Lecoq, 2010) even with trial and error (Sosna et al., 2010). Thus, this may server as the means to circumvent the foreseen threats to *value creation* capacity ex-ante at least in theory.

A crucial component of BMI is stress testing. It is a kind of sensitivity analysis targeted towards identifying stress factors that may put elements of business model at risk. Stress testing consists of following stages (Haaker et al., 2017): 1) Describe BM, 2) identify and select stress factors, 3) map BM to stress factors, 4) create heat map, 5) analyze results, and 6) formulate improvements and actions (Haaker et al., 2017). From the point of view of this paper, the implementation of the changes are formulated, but not implemented. Furthermore, the value of Business Continuity Management is to have planned ahead and rehearsed optional courses of actions, whereas after completing stress testing, you are starting the preparations for change.

2.3 Business Continuity and Business Continuity Management

The early literature on Business continuity were about disaster recovery (Herbane, 2010). In practice, this meant that companies prepared detailed procedures that would support their recovery efforts should an IT system fail (Post & Diltz, 1986). Later on, Business continuity approach was broadened to business processes (Smith & Sherwood, 1995; Trček, 2003; Cerullo & Cerullo, 2004) where focus was on designing considerate redundancy in critical business processes and on the resources needed to run those processes to increase the resilience against contingencies (Butler & Gray, 2006). In this paper we follow the recent Business Continuity stream, *BC Management*, aims at holistic and socio-technical approach to proactively manage preparations and response to incidents (Herbane, 2010). It seeks to prepare organizations to all kinds of contingencies, although in any contemporary setting technological incidents are the priority. BC Management is seen as strategic as it “readies an organisation to *preserve value* derived from competitive advantage” (Herbane, et al., 2004, p. 439). This kind of value preserving thinking feels rather intuitive since, after all, unanticipated contingencies “threaten the strategic goals of organisations” (Richardson, 1994, p.63). Thus, operational disruptions do not only create immediate loss but, when prolonged, hamper reaching the set strategic goals. BC is thus seen as an essential part of the realization of the strategy that is implemented in practice through various resources (e.g., employees, servers, facilities) and processes (e.g., order handling, sales, IT service production). BC seeks to ensure these resources and processes are resilient such that they are able to continue even in the wake of adverse events, and restore promptly when disrupted. The resilience is inherently socio-technical in nature (Herbane, 2010; Järveläinen, 2012) and built both on diverse technologically redundant solutions (Bajgoric, 2006; 2010) and social and organisational arrangements (Niemimaa, 2017), such as high-availability servers, redundant network connectivity, deputy arrangements and so forth.

Scholars and practitioners have brought forth several business continuity *methods* to assist organizations to improve their BC (e.g., British Standard Institute, 2006; International Organization for Standardization, 2012; Botha & von Solms, 2004; Gibb & Buchanan, 2006; Lindström et al., 2010). Generally, the preparations span across several methodological steps that involve 1) initiating a business continuity project; 2) identifying risks and their business impact; 3) designing continuity plan, processes, and procedures necessary for establishing a management system; 4) implementing the designed

measures; 5) testing their effectiveness and exercising for incidents; and 6) continuous maintenance and update of measures through the established processes and procedures (Pitt & Goyal, 2004; Stucke et al., 2010; Niemimaa, 2017), see Figure 2, right hand side. The generic frameworks are complemented with methodologies and approaches that focus on specific issues, such as achieving business continuity standard compliance (Freestone & Lee, 2008), integration with *risk management* (Nosworthy, 2000), *managing supply chains* (Benyoucef & Forzley, 2007), *outsourcing* (De Luzuriaga, 2009), and building a resilient IT *infrastructure* (Bajgoric, 2006).

There is a serious downside of BC Management in its original value preserving role, because strategy and its business model realization do not usually consider resilience. In the best case, BC can spotlight the potential contingencies of the present business model (Niemimaa, 2015) but fails to notice contingencies that may render the whole strategy obsolete. In the turbulent economy, business modellers have been better aware of the need to adapt to existing and upcoming contingencies or uncertainties strategically (DaSilva & Trkman, 2014; Haaker et al., 2017). A business model related approach for resilience is a form of sensitivity analysis called stress-testing (Bouwman, et al., 2017; Haaker et al., 2017), in which business model elements are tested against future uncertainties using scenario analysis.

BC Management uses sometimes scenarios, too (Herbane, Elliott, & Swartz, 2004; Tammineedi, 2010), but strategic issues have received only cursory treatment in BC literature (Herbane et al., 2004), and even then, the focus has been largely on finding compelling arguments to win senior management support (e.g., De Koning, 1995; Lindström & Hägerfors, 2009; Seow, 2009).

We can summarise that multidisciplinary groups of BC Management scholars and practitioners have sought to provide companies with necessary tools and knowledge to help them proactively and holistically prepare for all kinds of contingencies. Consequently, they suggest combining BC Management with organizational strategic initiatives (e.g., Herbane et al., 2004; Niemimaa, 2015b), since strategic initiatives tend to be better resourced and win management buy-in more easily than separate operational initiatives⁵¹.

As the above discussion suggests, through its history, BC has focused on either restoring or ensuring the continuity of operations. In other words, BC has essentially focused on *value preservation* (Herbane et al., 2004). We argue that due to the tendency to focus on the value preservation, the literature has overlooked an important source of contingencies which threaten the actual business logic through which the organization creates value to its customer. More specifically, these relate to environmental or internal contingencies that threaten the organization's business model. Accounting for these contingencies, *requires a shift in BC approaches from operational value preservation to strategic value creation*. Otherwise, BC Management should be able to deal with some of the most

⁵¹ Both sufficient resources and management buy-in are broadly recognized as critical success factors for BC (e.g., Lindström & Hägerfors, 2009; Seow, 2009)

significant business continuity risks – risks that have potential to render business models ineffective, or when under restructuring to maintain an organization’s value creation capability (see the competitive cycles in Casadesus-Masanell & Ricart, 2011). This means that BC Management has to provide both the means to recover quickly, and to maintain performance during the disturbances.

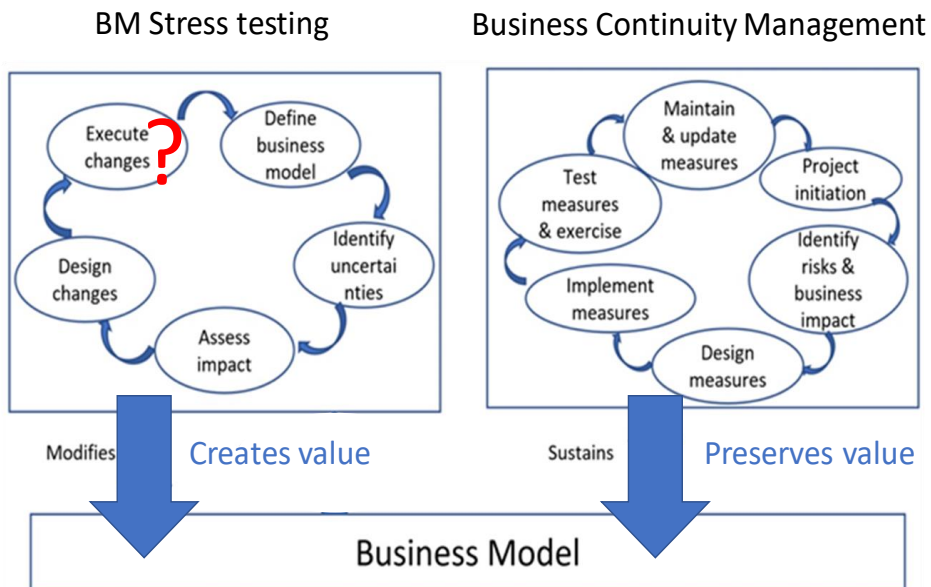


Figure 2. Strategic Business Continuity Management Framework

This way BC Management relates to BM innovation. This leads us to consider the potential combinations of BC Management and BM Innovation together, which we coin as Strategic Business Continuity Management.

3 Strategic Business Continuity Management

Reflecting the identified shortcomings in literature, we propose an extension to existing approaches so that BC management would truly become a) holistic; and b) strategic. Figure 2 provides an abstract depiction of the approach we propose.

Our extension proposes BM and Stress Testing as inter-related concepts to BC Management. In Figure 2, the right-hand side is the traditional, value preservation, approach of BC Management, explained above. The left side depicts the value of Business Model Stress testing by keeping the business model updated against disturbances by revising the business model elements. The proposed BM Management approach combines the both above to *implement the changes faster*, by helping to identify early the candidates of threats and response to them in advance.

The steps we propose in Figure 2 should feel rather intuitive to any BC Management expert - in the content rather than in the structure. By proposing an approach that makes use of transformational business model innovation and stress testing in BC Management context, the BM becomes itself as a potential disturbance for company's business continuity. It directs our attention better on the potential elements under transformation – the benefit from the approach is that it mediates the strategy and transformational business model to BC Management.

This is crucial under the circumstances of moving or disrupting markets. We typically are able to see and describe those threats we already have concepts for (Weick & Putnam, 2006), and thus it is no wonder that these considerations have not easily emerged from the traditional BC Management methods. Next, we'll elaborate the combination of Stress testing with Business Continuity Management with steps of Stress Testing (the steps adapted from Haaker et al., 2017):

Define Business Model

- As suggested, if the organization has not already explicitly articulated its business logic, it should be done at this step. Articulating the static business-model-in-practice can be a thorny quest. Though this can be done by building on any of the available (formal) business model methods and languages (Haaker et al., 2017), it is equally useful to freely describe the components of business model in common language with the help of an BM innovation expert.

Identify Uncertainties

- Identifying uncertainties for BC focuses primarily around issues that threaten operations and define feasible optional arrangements, e.g., how can we set up alternative customer service processes promptly, and what is the (absolute) minimum level of service we have to deliver and how long does it suffice (i.e. business requirements for recovery. Combined with business model stress testing methods such as using ready-made scenarios with SWOT analysis (Haaker et al., 2017) and/or on brainstorming with likely scenarios, such as merging with or acquiring a new company in this paper. Even though qualitative risk analysis methods are well-documented and often well-known for organizational planner, Stress Testing provides a feasible alternative for SBCM. Instead of enumerating and estimating all possible external uncertainties in the first place, the focus is on the level of business model, i.e., what risks does the uncertainty pose to the components of the business model (or to the transformational business model). Only thereafter the impacts on organizational resources and processes will be evaluated in the BC Management sense.

Assess Impact

- Assessing the impact of the identified uncertainties can be done during the business modelling using e.g., Stress Testing systematically the impact of the legislative change across the business model component parts (e.g., does it impact our customer base, how does it change the value proposition, do we need changes to technologies that deliver the product/service). Thereafter this can be juxtaposed with the company's current business model and what modification it

will bring to BCM. This could be represented in tabulated form, as it allows the planners to start comprehending the potential impact of the business model's transformation that they deem to have most potential for disrupting their current business. All identified impacts should be documented to be considered in the next phase.

Design changes

- After documenting the potential impact, practical measures for the change can be crafted. important point is to develop measures upon likely disruptions rather than estimate the feasibility of the strategic changes at this point. The power of BC Management is in the pro-actively planned measures against changes and maintaining performance during disruption and recovery, so the temporal effects should be articulated precisely – what are the signals of a disruption taking place, and when the continuity measures should start. The challenge here is to be generic enough and not going into too much details; but the measures must be specific enough to be practical. A feasible option is to define the changes in such a way that BC Management addresses the BM modification with the help of such adverbs as “redundant”, “resilient”, “backup”, and “alternative” that remind of the high-availability requirements for “sustaining”, “corrective”, “revising” and “redirecting” outcomes. These adverbs give an idea of the BC Management methods that account the risks and cushion the business impacts.

Execute changes

- BC Management plays a major role in maintaining the way the company operates and makes revenue under changes, and prepares for rapid response to changes, by sustaining the existing situation, or by getting prepared to alternative operations. Some advocate “trial-and-error” discovery approach to BM innovation (McGrath, 2010), or consider it a vital part of the BM evolution (Sosna et al., 2010), but in SBCM thinking the response should be also implementable, and this is where BMs and Stress Testing fall short. The decision on which changes to execute and which “fights to fight” on the markets is largely a decision for the senior management, but the espoused strategy, current resources and operations are an important constraint to the extent of change. For the actual execution of the plans, standard project management methods and quality function deployment are useful in designating resources and responsibilities and feasible measures in practice. This provides the senior management grounds to prioritize feasible alternatives under the prevailing internal and external circumstances.

4 Evidence from the practice: need for SBCM

During the years 2014-2018, we conducted 123 case studies studying innovation of BMs in European SMEs. Out of these cases, 29 were Action Design Research Cases (ADR) carried out in close collaboration with companies.

A tool for Business Model Stress Testing combining future scenario planning with BM thinking was developed in four of these ADR studies. The companies considered Stress

Test as a structured, mature and generically applicable tool. Stress Testing appears to bring forth relevant and critical issues of BM components, and to lead towards agile and iterative BM innovation. In addition, five cases tested the Stress test without the help of us researchers. These cases show that if entrepreneurs use the Stress Test tool, they use the tool according to their own convenience and tweak the steps and the content of scenarios to what is convenient and what does make sense to them. Stress test helped them to focus and to see where changes in their BM are required.

Thereafter, Stress testing tool was tested in twelve more case companies. These cases show that users had difficulties in deciding the abstraction level of the scenarios, but on the other hand the usage of the tool was becoming more creative, implying that the tool is utilised by users in ways, which were not originally intended by the developers. The overall conclusions from these cases was that the BM Stress Test increases awareness of BM's viability.

Looking carefully in some of the other case studies, we notice further complications that justify combining BC Management and BM Stress Testing for Strategic Business Continuity Management. First, the case of a company, which provides solutions for improving in-door air and atmosphere with plants: It utilized BM tools and thinking for transforming and innovating its product-based business towards services. After 8 years of operation, it focuses heavily on financial calculations and follow carefully its success in monetary terms. Business model is nowadays utilized only implicitly, but the emphasis is clearly on the value preservation of the present business model. As the time passes and low-end disruption competition emerges they should move to the transforming side of the SBCM model, while simultaneously maintaining their profit-making capacity against profit reducing competition.

Another case is the Sport Prescription case, where the entrepreneur proposed an innovative business model, requiring close collaboration with several incumbent companies. He was not willing to anticipate the uncertainties of the networked mode of operations, but instead wanted to handle them one by one when he faces them. This led him to stick to his original BM and consequently, denial of alternative, transformational business models. In this case there was no Business Continuity Planning - not to mention BC Management – and the business models could not be implemented. As a consequence, there was now plan B, nor any systematic way to tackle the inevitable options for merging, trade-sales, or solvency. The business idea is still owned by the founder, but it does not generate any revenue.

The case of Pain Meter involved a serial entrepreneur, who understood from the very beginning the difficulties of introducing a new instrument for clinical follow-up. In retrospect, a kind of BCM started from the exit-plan, but it soon emerged towards SBCM, when the founder and partners were considering alternative plans to implement alternative transformational business models. The focus was on the partner network and securing for funding to run proofs-of-concepts with subcontracted prototypes to create

further value and additional options for investors, whenever they are willing to move. The company is soon to be traded for integrated with a medical company.

A case of a mature company in maritime sector brings up an interesting aspect regarding selection of potential future scenarios – bury one’s head in the sand -phenomenon. When the company decided against which uncertainty they stress test their current BM, they did not want to take into account the trend of autonomous shipping. This was because the owner simply did not believe that ships could be autonomous and refused to even consider such option.

With these anecdotal evidence, we wanted to highlight the importance to have optional, concrete plans that ensure/preserve profitability, or create additional value while being under the pressure to perform against the evitable, disruption or restructuring.

5 Discussion and Conclusions

In this article, we have proposed an extension to the BC approaches that aim to increase the scope of BC and its organizational significance in the landscape of accelerating restructuring of industries and merging and fusing companies. These extensions match with the aims of other scholars that have argued for holistic and strategic BC (Herbane et al., 2004; Gerber & von Solms, 2005; Zuccato, 2007) by combining it with BM Innovation. The discussions have, however, largely focused on the former arguing how value preservation can be viewed as strategic (Richardson, 1994; Herbane et al., 2004). Here we broaden the scope to range of threats to the value creation, while under the inevitable disruptive and restructuring pressure.

The benefits of BC in general stem from the preparedness to circumstances measures of fast recovery from contingent situations, whereas its handicap is the loose connection with strategy. In this article, we illustrate, how to combine it with static business models and transformational BM innovation to realize the ideas of Demil and Lecoq (2010) and iterative approach suggested by Casadesus-Masanell and Ricart (2011). BMs serve as proxies for the strategy and provide the necessary granularity and vehicle for communication with actual implementation and strategic direction (Heikkilä, 2010).

We see the contingencies of disruption and restructuring particularly contemporary and current markets as the technological progress has enabled organizations to innovate new, radical business models that can render obsolete in an instant any incumbent’s value creation logic (Eggers & Park, 2017). The rapid technological change combined with new innovative business models provide both possibilities and serious threat to organisations, and the role of BC Management is increasing in maintaining the profitability and survival during the change. The question of “why some incumbents do well and adapt, while others struggle?“, under these technology-driven changes has become a key question of our time (Eggers & Park, 2017). When viewed from the perspective of BC, the new BMs represent (abrupt) contingencies in the environment that appear as risks threatening the business continuity of a company, and that, consequently, require organizations to make

preparations. To respond to these changes, SBCM serves as a promising tool for business continuity threats.

The proposed two-part approach of Strategic Business Continuity Management (SBCM) differentiates between BC activities that focus on value preservation and those that focus on value creation, but are simultaneously linked to each other through business models. While value preservation focuses on sustaining (by BCM) those processes and resources that implement a particular existing business model, the value creation part focuses on exploring threats to business model innovation (by Stress Testing) that can directly contribute to how the organization can *implement the* additional value creating changes *faster*. When this combination becomes a part of the company's strategic, value creating activities, we expect that it can secure more resources and gain management buy-in more easily that are needed for effective value preservation but that are often recognized as significant challenges (Lindström et al., 2009; Seow, 2009). That is, we'd like to stress that the importance of the value preservation part has not diminished neither have we sought to reduce its importance. When the implementation of the new BM through technologies, resources and processes is designed, the value preservation part of SBCM should be used to ensure that they meet the organization's BC targets (such as maximum time to recovery) and communicating about the strategic intent and the feasible possibilities of innovative changes.

The latter is especially important in the context of business modelling, as indicated by Sosna et al. (2010) in their analysis of trial-and-error during business evolution: *"We have seen that the 'who' was as important as the 'how' in Naturehouse's business model development process. The level of resilience and commitment to change of the OM [operational management] and top-management team were absolutely critical to the success of the business model experiments. In this context, the role of centralized decision power can be seen as a two-edged sword: if a leader with significant (or complete) decision power is committed to business model experimentation, the chances for success are significantly increased. But if they are obstructive to business model re-designs or innovations, it will be nearly impossible for other managers to run any experiments, set up learning processes, or implement a new business model effectively."* (Sosna et al., 2010).

Last, we have merely started to explore this area emerging at the intersection of BC and BM and call for more contribution between the scholars and practitioners working in these areas. Indeed, this paper is an outcome of a fruitful collaboration between scholars from both "camps". We argue that such interdisciplinary efforts are needed to prepare organizations and respond for the significant technology-driven reconfigurations that take place both at organizational and societal level.

5.1. Future Research

In this research, we have opened a new discussion between Business Continuity Management and BM (especially Stress Testing). The approach we provide focuses on

high-level, abstract phases, by supplementing Stress Testing with the features of BCM and taking Stress Testing output to the benefit of Business Continuity. This we provide a Strategic Business Continuity Management framework that covers both value preservation and value creation in Business Modelling, especially for the situations like re-structuration of industries and merging of companies, which we expect to increase along the progress of digitalization.

While the phases of SBCM are already readily applicable (see figure 2.) for business benefits, more research needs to be taken to provide more effective tools for different circumstances. Identifying uncertainties and contingent circumstances is a crucial part of the whole approach as it largely determines the content of the subsequent phases. But, how well do our existing business continuity methods perform when dealing with environmental contingencies pertaining to BMs? For BC to be truly proactive (Butler & Gray, 2006) companies need to (optimally) recognize uncertainties already before they actually unfold, so this could be mainly in retrospect. However, the relevant approach, would be to develop methods to surface potentially disruptive BMs to effectively help companies to prepare before the BMs transform from *potentially* disruptive to disruptive.

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References

- Amit, R., & Zott, C. (2001). Value creation in e-business. *Strategic Management Journal* 22(6-7), pp. 493-520.
- Anthony, S.D., Viguierie, S. P., Schwartz, E. I., & Landeghem, J. V. (2018). 2018 Corporate Longevity Forecast: Creative Destruction is Accelerating. S&P 500 lifespans continue to shrink, requiring new strategies for navigating disruption. *Executive Briefing // February 2018, Innosight*.
- Bajgoric, N. (2006). Information technologies for business continuity: an implementation framework. *Information Management & Computer Security*. 14(5), pp. 450-466.
- Bajgoric, N. (2010). Server operating environment for business continuance: framework for selection. *International Journal of Business Continuity and Risk Management*. 1(4), pp. 317-338.
- Benyoucef, M. & Forzley, S. (2007). Business continuity planning and supply chain management. *Supply Chain Forum*. 8(2), pp. 14-22.
- Bonakdar, A. (2015). Business Model Innovation. PhD diss., University of St. Gallen.
- Botha, J. & von Solms, R. (2004). A cyclic approach to business continuity planning. *Information Management & Computer Security*. 12(4), pp. 328-337.
- Bouwman, H., Faber, E., Haaker, T., Kijl, B., & Reuver, M. D. (2008). Conceptualizing the STOF Model. In *Mobile Service Innovation and Business Models*. Springer, Berlin, Heidelberg, pp. 31-70

- Bouwman, H., Heikkilä, J., Heikkilä, M., Leopold, C., & Haaker, T. (2017). Achieving agility using business model stress testing. *Electronic Markets*, 1–14.
- British Standards Institute (2006). *Societal security — Business continuity management systems — Requirements – Part 1: Code of Practice*.
- Bucherer, E., Eisert, U., & Gassmann, O. (2012). Towards Systematic Business Model Innovation: Lessons from Product Innovation Management. *Creativity and Innovation Management*. 21(2), pp. 183–198.
- Butler, B. S. & Gray, P. H. (2006). Reliability, Mindfulness, and Information Systems. *MIS Quarterly*. 30(2), pp. 211–224.
- Casadesus-Masanell, R., & Ricart, J. E. (2010). From Strategy to Business Models and onto Tactics. *Long Range Planning*. 43(2), pp. 195–215.
- Casadesus-Masanell, R., & Ricart, J. E. (2011). How to Design a Winning Business Model. *Harvard Business Review*, Jan-Feb (Internet version).
- Cerullo, V. & Cerullo, M. J. (2004). Business Continuity Planning: A Comprehensive Approach. *Information Systems Management*. 21(3), pp. 70–78.
- Chesbrough, H. (2010). Business model innovation: opportunities and barriers. *Long range planning*. 43(2), pp. 354–363.
- Chesbrough, H., & Rosenbloom, R. S. (2002). The role of the business model in capturing value from innovation: evidence from Xerox Corporation's technology spin-off companies. *Industrial and Corporate Change*. 11(3), pp. 529–555.
- Daepf, M. I. G., Hamilton, M. I. J., West, G. B., Bettencourt L. M. A. (2015). The Mortality of Companies. *Journal of the Royal Society Interface*, <https://doi.org/10.1098/rsif.2015.0120>
- DaSilva C.M. & Trkman, P.(2014). Business Model: What It Is and What It Is Not. *Long Range Planning*. 47(6), pp. 379–389.
- De Koning, W. F. (1995). A methodology for the design of security plans. *Computers & Security*. 14(7), pp. 633–643.
- De Luzuriaga, J. (2009). Ensuring business continuity for business process outsourcing companies. *Journal of Business Continuity & Emergency Planning*. 3(4), pp. 312–316.
- Demil, B., & Lecocq, X. (2010). Business model evolution: in search of dynamic consistency. *Long range planning*. 43(2), pp. 227–246.
- De Reuver, M., H. Bouwman & T. Haaker (2013). Business model roadmapping: A practical approach to come from an existing to a desired business model. *International Journal of Innovation Management*. 17(1), pp. 1–18.
- Eggers, J. & Park, K. (2017). Incumbent Adaptation to Technological Change: The Past, Present, and Future of Research on Heterogeneous Incumbent Response. *Academy of Management Annals*, 11(2), pp. 1–83.
- Eurostat (2015). *Business demography statistics*, retrieved 25.3.2018 from http://ec.europa.eu/eurostat/statistics-explained/index.php/Business_demography_statistics#Death_rate.
- Foss, N. J., & Lindenberg, S. (2013). Microfoundations for strategy: A goal-framing perspective on the drivers of value creation. *The Academy of Management Perspectives*. 27(2), pp. 85–102.
- Foss, N. J., & Saebi T. (2017). Fifteen Years of Research on Business Model Innovation: How Far Have We Come, and Where Should We Go?. *Journal of Management*. 43(1), pp. 200–227.
- Freestone, M. & Lee, M. (2008). Planning for and surviving a BCM audit. *Journal of Business Continuity & Emergency Planning*. 2(2), pp. 138–151.
- Gerber, M. & von Solms, R. (2005). Management of risk in the information age. *Computers & Security*. 24(1), pp. 16 - 30.
- Gibb, F. & Buchanan, S. (2006). A framework for business continuity management. *International Journal of Information Management*. 26(2), pp. 128 - 141.

- Haaker, T., Bouwman, H. Janssen, W. & de Reuver, M. (2017). Business model stress testing: a practical approach to test the robustness of a business model, *Futures*. 89, pp. 14-25
- Hartmann, M., Oriani, R., & Bateman, H. (2013). The Performance Effect of Business Model Innovation: An Empirical Analysis of Pension Funds. In 35th DRUID Celebration Conference (pp. 17-19).
- Heikkilä, M. (2010). *Coordination of Complex Operations Over Organizational Boundaries*. Jyväskylä Studies in Computing 111, Dissertation, 265 pages.
- Heikkilä, M., Bouwman, H., Heikkilä, J., Haaker, T., Lopez-Nicolas, C., Riedl, A., (2016). Business Model Innovation Paths and Tools. *29th Bled eConference: Digital Economy*, June 19-22, 2016, Bled, Slovenia
- Heikkilä, M., Bouwman, H., & Heikkilä, J. (2018). From strategic goals to business model innovation paths: an exploratory study. *Journal of Small Business and Enterprise Development*. 25(1), pp. 107-128.
- Herbane, B. (2010). The evolution of business continuity management: A historical review of practices and drivers. *Business History*. 52(6), pp. 978 - 1002.
- Herbane, B., Elliott, D. & Swartz, E. M. (2004). Business Continuity Management: time for a strategic role? *Long Range Planning*. 37(5), pp. 435-457.
- International Organization for Standardization (2012). *ISO 22301, Societal security — Business continuity management systems — Requirements*.
- Järveläinen, J. (2012). Information security and business continuity management in interorganizational IT relationships. *Information Management & Computer Security*. 20(5), pp. 332-349.
- Kim, W. C. & Mauborgne, R. (2004). Blue Ocean Strategy. *Harvard Business Review*. (Oct:), pp. 1 - 10.
- Laakso T., (2012). *Yrityssaneerausohjelman onnistuminen : käyttäytymistaloustieteellinen näkökulma (Success of restructuring programs)*. Aalto University publication series Doctoral Dissertation, 163/2012, ISSN: 1799-4934, 180 pages (in Finnish).
- Lindgardt, Z., Reeves, M., Stalk, G., & Deimler, M. S. (2009). Business Model Innovation. When the Game Gets Tough, Change the Game. The Boston Consulting Group, Boston, MA.
- Lindström, J. & Hägerfors, A. (2009). A model for explaining strategic IT- and information security to senior management. *International Journal of Public Information Systems*. 2009:1, pp. 17-29.
- Lindström, J., Samuelsson, S. & Hägerfors, A. (2010). Business continuity planning methodology. *Disaster Prevention and Management*. 19(2), pp. 243-255.
- Niemimaa, M. (2015a). Interdisciplinary Review of Business Continuity from an Information Systems Perspective: Toward an Integrative Framework. *Communications of the Association for Information Systems*. 37(4), pp. 69-102.
- Niemimaa, M. (2015b). Extending ‘Toolbox’ of Business Continuity Approaches: Towards Practicing Continuity. in *Americas Conference on Information Systems*. Puerto Rico, US: Association for Information Systems, pp. 1-11
- Niemimaa, M. (2017). Information systems continuity process: Conceptual foundations for the study of the “social”. *Computers & Security*. 65:March, pp. 1-13.
- Niemimaa, M. & Järveläinen, J. (2013). IT Service Continuity: Achieving Embeddedness Through Planning. In Eight International Conference on Availability, Reliability and Security (ARES), pp. 1-19
- Nosworthy, J. D. (2000). A practical risk analysis approach: managing BCM risk. *Computers & security*. 19(7), pp. 596-614.
- Osterwalder, A., & Pigneur, Y. (2010). *Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers*. John Wiley & Sons.
- Pitt, M. & Goyal, S. (2004). Business continuity planning as a facilities management tool. *Facilities*. 22(3/4), pp. 87-99.

- Pohle, G. and Chapman, M. (2006). IBM's global CEO report 2006: business model innovation matters. *Strategy & Leadership*. 34(5), pp. 34-40.
- Post, G. V. & Diltz, J. D. (1986). A Stochastic Dominance Approach to Risk Analysis of Computer Systems. *MIS Quarterly*. 10(4), pp. 363-375.
- de Reuver, M., Bouwman, H., McInnes, I. (2009). Business Model Dynamics: a case survey. *Journal of Theoretical and Applied Electronic Commerce Research*. 4(1) On-line version ISSN 0718-1876, <http://dx.doi.org/10.4067/S0718-18762009000100002>
- Richardson, B. (1994). Crisis Management and Management Strategy - Time to "Loop the Loop"?. *Disaster Prevention and Management: An International Journal*. 3(3), pp. 59-80.
- Seow, K. (2009). Gaining senior executive commitment to business continuity: Motivators and reinforcers. *Journal of Business Continuity & Emergency Planning*. 3(3), pp. 201-208.
- Smith, M. & Sherwood, J. (1995). Business Continuity Planning. *Computers & Security*. 14(1), pp. 14-23.
- Sosna, M., Trevinyo-Rodríguez, R. N., & Velamuri, S. R. (2010). *Long Range Planning*. 43(2-3), April-June 2010, pp. 383-407.
- Statistics Finland (2018). New and terminated companies. ISSN=1797-0660. 3rd quarter 2017, appendix 1. Start-ups. Helsinki: Tilastokeskus http://www.stat.fi/til/aly/2017/03/aly_2017_03_2018-01-25_tau_001_fi.html. (in Finnish),
- Stucke, C., Straub, D. W. & Sainsbury, R. (2008). Business Continuity Planning and the Protection of Informational Assets. in *Information Security: Policy, Processes and Practices*, D. W. Straub, S. Goodman & R. L. Baskerville (eds.), Armonk, NY: M.E. Sharpe, pp. 152-171.
- Tamineedi, R. L. (2010). Business Continuity Management: A Standards-Based Approach. *Information Security Journal: A Global Perspective*. 19(1), pp. 36-50.
- Teece, D. J. (2010). Business models, business strategy and innovation. *Long range planning*. 43(2), pp. 172-194.
- Trček, D. (2003). An integral framework for information systems security management. *Computers & Security*. 22(4), pp. 337-360.
- Von Solms, R. & Van Niekerk, J. (2013). From information security to cyber security. *computers & security*. 38:2013, pp. 97-102.
- Weick, K. E. & Putnam, T. (2006). Organizing for mindfulness: Eastern wisdom and Western knowledge. *Journal of management inquiry*. 15(3), pp. 275-287.
- Wirtz, B. W., Pistoia, A., Ullrich, S., & Göttel, V. (2016). Business Models: Origin, Development and Future Research Perspectives. *Long Range Planning*. 49(1), 36-54.
- Xi, G., Block, J. H., Lasch, F., Robert, F. & Thurik, R. (2017). How Does Firm Survival Differ between Business Takeovers and New Venture Start-Ups?. IZA Institute of Labor Economics Discussion Paper No. 11155. Available at SSRN: <https://ssrn.com/abstract=3081387>
- Zott, C., Amit, R., & Massa, L. (2011). The Business Model: Recent Developments and Future Research. *Journal of Management*. 37(4), 1019-1042.
- Zuccato, A. (2007). Holistic security management framework applied in electronic commerce. *Computers & Security*. 26(3), pp. 256-265.