

Innovation in micro, small and medium sized enterprises: New Product Development, Business Model Innovation and Effectuation

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Abstract

Digitalization increases the need for innovation of the business models to a new high, also in micro, small and medium sized businesses (SMEs). Every third SME is engaged in Business Model Innovation (BMI) activities, but few of them in a systematic manner.

Earlier empirical and theoretical research suggest that BMI is, and should be, an iterative process of adjustments in pursuit for better performance and success with New Product Development (NPD). NPD and BMI research streams use causal constructs with focus on external technology driven or market driven internal resource optimization. Studies on effectuation and bricolage, in turn, indicate that entrepreneurs' passion, curiosity, and originality can compensate limited resources for innovation in SMEs.

Building on these approaches, we propose a framework to analyze innovation in SMEs with case studies. The empirical data was collected in in Horizon2020 funded Envision project, where we use multiple case study approach. For this study, we select failed, surviving, and successful BMI cases to recommend effective BMI for SMEs and line out directions for future research.

Keywords: Business Model Innovation, New Product Development, Effectuation, Bricolage, SME, Market strategy, Performance.

1. Introduction

Digital transformation provides opportunities also for start-ups and early stage companies to innovate products and new ways of doing business. Where *New Product Development (NPD)* takes radical, technology-push disruptive change process as its

starting point for new, competitive products (Christensen & Raynor, 2003), an evolutionary view about market-pull incremental effects on operations and products is provided by *Business Modelling* (McGrath, 2010). These alternative views have been under debate on innovation in corporations (e.g. Christensen et al., 2016). Moreover, studies on micro, small and medium sized organizations' (SMEs) survival provide growing evidence that entrepreneurial passion and originality can, indeed, compensate limited resources (Stenholm & Renko, 2016). This intrinsic motivation and aspiration of abstract nature, i.e. *effectuation* – is expected to help SMEs in business model innovation, BMI (Sarasvathy, 2001a,b). The effectual view supplements the above rational, causal theories of market-pull with incremental adjustments and technology push of radical, disruptive change.

But are there links between NPD, BMI, and effectuation to performance in the real-life of SMEs? For this purpose, we synthesize a framework for inquiry to find out the elements of failure, survival and performance in select case SMEs. We first discuss NPD and its connection to BMI. Then, we present effectual reasoning and bricolage, and how they are related with BMI. Third, building on the previous discussion, we compose a framework for analyzing innovation activities, strategic intent, and performance of SMEs with five selected SME cases. Finally, we discuss our findings, innovation performance of SMEs, and directions for further research to confirm our tentative results.

1.1 Lessons from innovating new products

General finding in NPD literature is that radically new products built on novel technology fail often, mature slow, and are accepted on the market gradually over time due to tardiness of diffusion and negative attitudes towards new technology (Samli & Weber, 2000). But, if such a product offers clear advantage in comparison with competing products, the success rates are improved significantly (Bishop & Magleby, 2004). New technology becomes even more attractive in the light of the findings that on unfulfilled markets novel products tend to sustain longer than products built on minor developments, or product line extensions (Samli & Weber, 2000).

Spending big (i.e., >20% of the turnover) on new product R&D works in increasing the number of new successful products (Samli & Weber, 2000). High-quality development teams consisting of dynamic, motivated, experienced and talented developers improves the odds of success further, especially if the management provides direct support, or introduces systematic methodology for NPD (Bishop & Magleby, 2004). Furthermore, speed of NPD has become increasingly important due to continuous reduction in the product life-cycle time and increased competition due to global, technological progression. Rapid NPD, prototyping, and testing increases likelihood of success, as iterations help in discovering errors, and provide flexibility and better understanding of the product potential on the market early (Chen et al, 2010; Ries, 2011). As an indication of this, Sarja (2016) raised scalability, visibility, and timing as additional factors important to the success on digital products business landscape. As trying to build innovations only on internal technology-push is unlikely to succeed (Samli & Weber, 2000), companies are encouraged instead to focus on their

customers' needs already during the development of the product (Bishop & Magleby, 2004). This also helps to prepare unfulfilled product-markets for innovation. The same applies, if the novel technology and market analysis are used in combination during NPD-process beyond regular interviews with customers and end-users. Careful examination of alternative technologies, products, and markets during the development by product developers with end users further enhances the likelihood of success (Bishop & Magleby, 2004).

Interestingly, while the most growth potential in markets is attributed to SMEs (EC, 2014; EASME, 2015), SMEs often are limited in capabilities of the above NPD success factors (Leithold et al., 2016). Thus, creating NPD capability is the first requirement SMEs must fulfil. Noke and Hughes (2010), for instance, show, how SMEs employed strategies that combine their internal capabilities while minimising their internal weaknesses by partnering and outsourcing. Their study thus highlights that it is essential for SMEs to get involved in external NPD partner networks to kick-start the change process and to gear up for superior product-market innovating capability (Noke & Hughes, 2010).

We conclude that NPD literature separates technology-push and market-pull as drivers of innovation. Because customer involvement is to help in incremental innovation, involving customers may be detrimental to radical innovation (Scaringella et al., 2017). The reasoning is that when a firm focuses on existing customers, it may not recognize opportunities that arise in emerging markets or customers being offered disruptive solutions by innovators (Christensen, 1997). In the light of the above, it is claimed that the process driven by technology-push leads often to radical innovations, whereas market pull is more often served with incremental innovations to the user needs. However, recent research argue that the two forces are complementary and necessary in NPD (Scaringella et al., 2017; Sarja, 2016). Therefore, building successful new products on new technology is lucrative, because of the potential upside benefits – fast adoption, long lifetime, low competition. However, most of the means for successful new product launch do not depend on the technical skills only, but on the capabilities of the product development teams, systematic management support, ample resources combined with the knowledge and skilled, iterative probing, realization, and shaping of the market, technology and needs.

1.2 Business Model Innovation Effectiveness

Business model innovation means notable changes in the logic how an organization creates, delivers, and captures value. Foss and Saebi (2017) sum 'mainstream' BMI outcomes and research directions by analyzing 150 peer-reviewed scholarly articles on BMI published between 2000 and 2015. Their analysis reveal external (e.g., technology, regulatory, stakeholder needs) and internal (e.g., strategy, capabilities) antecedents that drive the BMI (scope, novelty) with expected outcomes (financial performance, innovativeness, cost reduction). This process is moderated by macro-, firm-, or micro-level variables, and emergers as cognitive structures (Foss & Saebi,

2017)¹. The structures can either respond to exogenous technological and regulatory changes (e.g., Zott and Amit, 2008; Teece, 2010), or operate as a learning process of iterative analysis and experimentation in response to changes in the environment (e.g., Chesbrough, 2010; McGrath, 2010; De Reuver et al., 2017). We see these as fine tuning the previous view on the NPD incremental adjustment of internal resources.

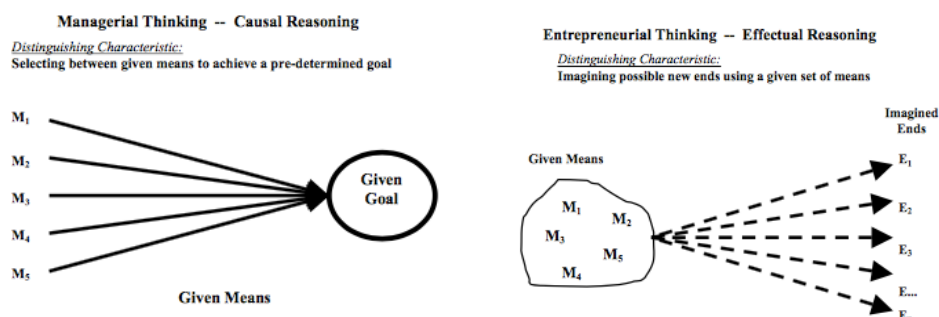
Yet, as evidence suggests, new business models have often been the source, and not the outcome, of industry change (Markides, 2008; Christensen et al., 2016). Companies on ‘traditional’ industries have been able to generate supernormal profits by designing new business models in the presence of major technological progress, or in the absence of regulatory limitations. These new business models have boosted large-scale disruptive industry change reaching far beyond reacting to changes in business environment, or developing new products. It is about being active in innovating and implementing radically new ways of doing business by the management.

BMI drivers of SMEs mostly differ from those of previously mentioned industry-changes – a typical high-tech start-up or growth venture builds its future on one product to the global market (Sarja, 2016). Furthermore, we do not know too well what facilitates BMI in entrepreneurial firms, and how are these drivers and obstacles different from incumbents (Foss & Saebi, 2017). A recent empirical study (Bouwman et al., 2016) reports that 37% of SMEs in Europe are involved in BM Innovation, but only 15% of them are familiar with mainstream BM methods like CANVAS, STOF, Visor, or BM Cube. Diverse tools are used, but their use is limited in scope and sophistication, compared to method-based BM-toolsets. More than 50% of the SMEs use consultants for BMI, which may explain the unexpectedly high penetration of BM among the studied SMEs.

To conclude, despite the lack of sophistication, BMI is about to become mainstream in SMEs, leveraging their BMI capabilities and capacity. But does our contemporary BMI research capture the unique features of SMEs?

1.3 Effectuation, bricolage and entrepreneurial survival

Whereas BMI and NPD literature is mostly focused on causal approaches on developing business towards given goal, the entrepreneurial literature emphasizes the effectual side of businesses, which is considered as the inverse of causal. Causal



¹ Doz and Kosonen argue that “...business models stand as cognitive structures providing a theory of how to set boundaries to the firm, of how to create value, and how to organise its internal structure and governance.”, (2010, p. 371).

rationality starts with a pre-determined goal and a given set of means, and seeks to identify the optimal, such as fastest, cheapest, or most efficient alternative to achieve the given goal. The effectuation process is highly subjective, starting from the capabilities and resources of the entrepreneur, and takes this “*set of means as given and focus on selecting between possible effects that can be created with that set of means*”. (Figure 1, Sarasvathy, 2001a)

Figure 1 Causal and effectual reasoning (Sarasvathy, 2001a).

Sarasvathy (2001b, p. 252) proposes four aspects that differentiate causal and effectual reasoning. She builds on her conceptual study, and on her empirical enquiry on serial entrepreneurs:

- 1) Effectuation Entrepreneurs have been shown to have high tolerance for ambiguity. Whereas causation models aim to maximise the potential returns by selecting optimal strategies, the effectuation predetermines how much loss is affordable and focuses on experimenting with as many strategies as possible with the given limited means (Sarasvathy, 2001b).
- 2) Causation models, such as Porter (1980), emphasise detailed competitive analyses. Effectuation emphasises strategic alliances and pre-commitments from stakeholders as way to reduce uncertainty and to create barriers of entry (Sarasvathy, 2001b). Present business modelling requires extensive partnering from the very beginning for developing new products and viable services.
- 3) Causation models are appropriate, when, e.g., knowledge or expertise of a specific new technology pre-exists. Effectuation is better for exploiting contingencies that arise unexpectedly over time (Sarasvathy, 2001b). This is where also recent BMI studies have paid attention to (Bouwman et al., 2017).
- 4) Causal reasoning focuses on predictable aspects of an uncertain future. According to Sarasvathy, effectuation, in turn, focuses on the controllable aspects of an unpredictable future. For example, causation model, such as Kotler (1991), defines a market – assumed to exist independent of the entrepreneur - as the universe of all possible customers. An effectuating entrepreneur would define her market as a community of people willing and able to commit enough resources and talent to sustain her enterprise’s survival, and creates the market by bringing together enough stakeholders, who buy into her idea (sometimes called as FFF, Family, Friends & Fools). BMI researchers have identified the tendency of entrepreneurs to seek familiarity in business models (Chesbrough & Rosenbloom, 2002), and the challenges they face when confronted with unfamiliar concepts.

Later research show that effectuation may play a role in search of BMI effectiveness: e.g. Sosna et al. (2010) suggest that initial BM design takes form on the owner-manager’s cognition and sense-making and in the early phases of NPD and BMI processes may be characterized by effectuation behavior.

Effectuation is closely related with *bricolage* (Fisher, 2012). The term was coined by Weick (1993) in organizational studies, later adopted Baker and Nelson, (2005), and Ciborra (1996) in Information Systems field. Bricolage means good understanding of the resources at hand; innovative, ‘good enough’ use of combinations of resources at hand to problems, or, opportunities; and active self-correcting trial-and-error “make

do” -behaviour. For example, Stenholm and Renko (2016) suggest that the entrepreneurs passionate about developing their firms and inventing new solutions are more likely to engage in bricolage. This involves “creative manipulation of ‘existing’ or ‘available’ resources, such as materials and financial resources, to solve a problem at hand or to create new opportunities” (Stenholm & Renko, 2016). Furthermore, bricolage is a form of effectual reasoning of an entrepreneur to avoid the hazards embedded in the critical early stages of a new firm (Stenholm & Renko, 2016). They conclude that “passion for inventing and developing enhances entrepreneurs’ “make do” behavior and, consequently, indirectly increases the chances for entrepreneurial survival”. This is an addition to more rationalistic success factors by NPD and BMI literature. However, there is mixed evidence on the effectiveness of bricolage. For example, in Ciborra’s early (1996) study on a multinational high-tech company, bricolage helped it to adapt, but simultaneously constrained its effectiveness. To summarize, many of the earlier justified criticism towards business planning (e.g. Sarasvathy, 2001b), business modelling, and BMI has been alleviated in recent BMI techniques. Sarasvathy’s original effectuating entrepreneur resembles recent lean startup ideologies (Ries, 2011). Their main argument is that it is rational to bricolage and iterate, because it eventually leads - through an unpredictable groping process - to rational goal (like in satisficing behavior under uncertainty). Lean startup emphasizes also effective and measurable outcomes, like BMI does (Heikkilä et al., 2015). Therefore, effectuation and bricolage should be explicitly embedded in innovation effectiveness evaluation at SMEs.

1.4 Synthesis of above research streams

Figure 2. summarizes the concepts of this paper, and spans the framework of inquiry. It links three potential drivers (technology push, market pull, and effectuation) with three methods for innovating (NPD, BMI, bricolage). These are in turn accompanied with three market strategies (sustaining, low end entry, and new market creation (Christensen, 2009)). Eventually, the decisions and steps taken are expected to influence performance, which can range from failure to survival and success.

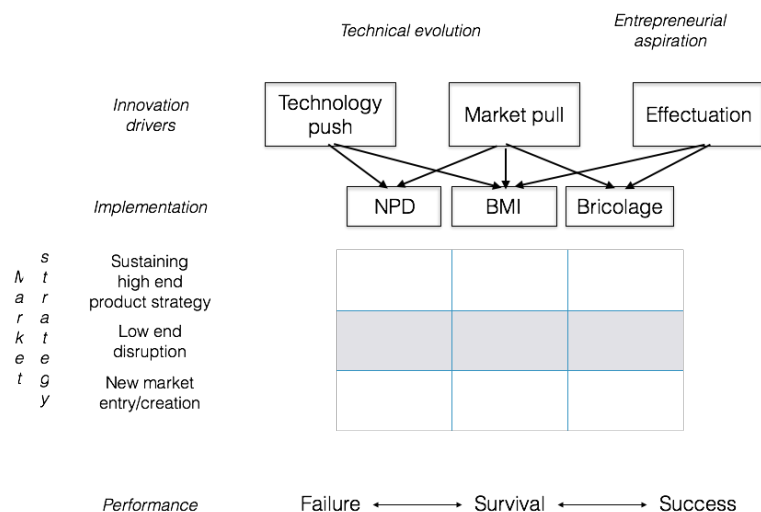


Figure 2 Synthesized framework

Innovation drivers:

- Technology push: Technical evolution triggers, or enables new ways of doing business as much as it does create new products. Often the starting point is basic scientific research, or applied research and development in organisations. These proceed through design and development into a product that can be manufactured effectively and economically and then sold on the market. Radical breakthroughs are more likely to be achieved through technology push.
- Market Pull refers to the need for a new product or a solution to a problem, which comes from the market. These needs might be perceived by an entrepreneur, for instance through market research, which assesses what needs exist, how far they are met by existing products and how the needs might be met more effectively by means of a new or improved innovation. Market pull more often leads to incremental innovations.
- Effectuation: highly subjective approach, where innovation starts from the capabilities and resources of the entrepreneur. The entrepreneur selects between possible services/products that she can create with the set of means available to her.

Implementation

- NPD: Product idea passes through a series of stages from ideation through design, manufacturing and market introduction. Recent research suggests that technology push and market pull are complementary and necessary for NPD (Scaringella et al., 2017; Sarja, 2016).
- BMI: Organization, finance, customer, service and technology are main components of the BM. Change in one or several of these may result in business model innovation.
- Bricolage: utilising the combinations of resources at hand to act on problems, or, opportunities. Self-correcting trial-and-error “make do” -behaviour.

Market Strategy

- High-end strategy: incremental improvements to the current products on markets
- Low-end strategy: provide a simple or low price solution offering good value for money.
- New Markets: Serve customers, who were not previously served by existing incumbents.

Performance

- Failure: the business/innovation fails. For instance, the product is redrawn from the markets, or business is in solvency, or bankrupt.
- Survive: the business/entrepreneur is hanging on, or at high burn rate; avoiding failure, but not profitable.
- Success: the business is clearly profitable

2. Research Methodology and case selection

We use multiple case study approach to analyse BMI effectiveness in five SMEs (Table 1). Multiple cases serve as repetitions, extensions and contrasts to the emerging theory, and the researcher develops an understanding of why certain conditions did or did not occur, and then offers interpretations (Yin, 1984). Data was collected by the authors of this paper and the other consortium partners in a multi-national EU-funded project. The research collection follows a case study protocol, which forms the basis for data gathering and case data repository. This makes the data well-(Sarasvathy, 2001b) structured and suitable for cross case analysis. The protocol is available on request from the authors.

Using subjective sampling, we selected five SME cases with different performance outcomes (failure, survival, success). Under these outcomes, we can first detect whether

TABLE 1: CASES	COMPANY SIZE	OUTCOME
ATELIER	Micro	Failure
EVERYONE DESERVES PLANTS	Small	Survive
FRESH NATURAL AIR	Medium	Survive
EVENT MANAGEMENT SERVICE	Small	Success
ELECTRONIC MEDICINE DISPENSER	Medium	Success

the drivers, implementation approaches, or market strategies are different for outcomes (they should) and then pursue explanations to the differing outcomes with the synthesized framework (see Figure 2). The cases are listed in Table 1. In the Appendix, we describe and analyze the cases in more detail.

3. Analysis

Atelier (case a, figure 3) started as self-employed artist 12 years ago. The entrepreneur was devoted to creating handicraft products (NPD) by combining raw materials in novel ways. Despite the innovative products, the production does not scale up, visibility is hard to get, and timing depends on fashion rather than on Atelier’s action. The atelier had a store where she sells her products to tourists (mainly in summer), or

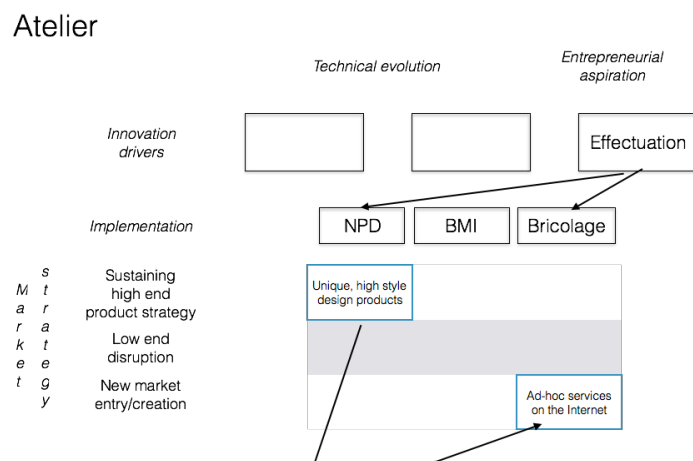


Figure 3 Failure: Atelier (case a)

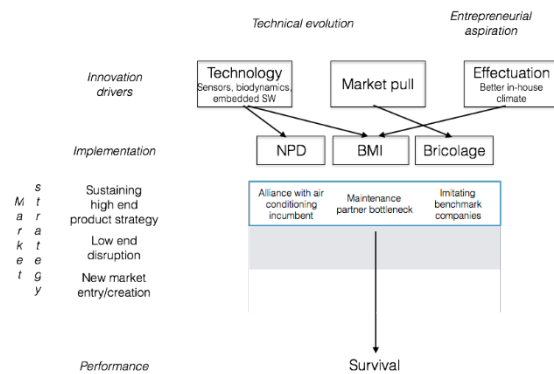
locals looking for a birthday gift etc. She also imitated the competitors by being present in Facebook and in online store. In 2015 she switched from a self-employed

person to an independent entrepreneur. Then she could hire a person to run the store and administrative matters.

Unfortunately, the sales could not to cover increasing costs. The business was closed one year after she became an entrepreneur with company status and consequent legal obligations. But, already the same year she started experimenting with a new business idea related to remote life style coaching which she marketed in her Facebook. The case is typical case driven by effectuated entrepreneur and bricolage.

Everyone Deserves Plants (case b, figure 4) is an SME initially established by a designer, who had the vision to create a beautiful consumer product for cultivation of herbs in-house. With partner network – such as researchers specialized in greenhouse cultivation - the micro-sized start-up company developed, and recently patented world-wide its unique IT-controlled led light and growth system. In parallel with NPD, they started using BMI tools to design and revise their business model and value proposition (they imitate the BM of Nespresso with alterations), analyze the potential

Fresh Natural Air



markets, and to create user profiles (i.e., ‘personas’). This way they dared to abandon a fancy and fashionable mobile app for the users, but their analyses proved that there were no markets for remote control feature. The product is competing with other high-end consumer products, because there have not been direct competing products. To increase its sales, the company refocused its sales channel strategy from design shops to high-end malls and warehouses. In four years of operation the size of the company has been growing from four to 13 people. Thanks to its awarded and patented product the SME is attractive to the investors to raise capital, but it has not been able to reach the planned turnover targets and is making loss. Scaling up the production is possible, but the market is still emerging – it seems the visibility of the product and timing of market entry are not optimal.

Everyone Deserves Plants

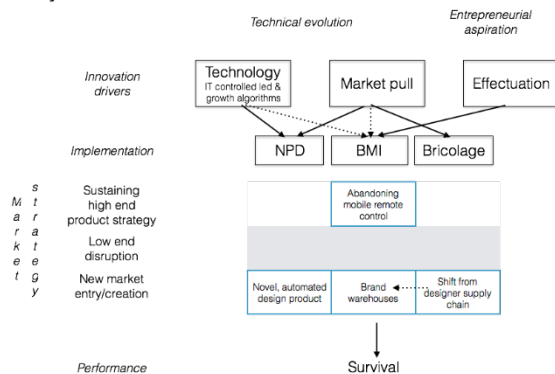


Figure 4 Survivals: Everyone Deserves Plants (case b) and Fresh Natural Air (case c) Case c (figure 4), Fresh Natural Air, started from the idea of the founder, who suffered from poor in-door air quality. He wanted to improve the air quality by bringing part of nature inside, i.e. living plants. He started to build a green wall with a fellow university student, who had both practical and theoretical knowledge on purifying water with ecological means. The first prototypes were put together of plastic and vent duct tape. Simultaneously, they were designing business models using BM canvas. The challenge was to make the product look good and the plants flourish. So, they developed a remote sensing system with embedded sensors to measure the status of the green wall and its environment. This data is analyzed automatically in a cloud software. The adjustments to the plants growth parameters are fed back to the green wall at customer's premises. Yet, the system needs regular manual maintenance (watering etc.). Imitating benchmark companies from other industry sectors, the SME decided to bundle all – green wall, remote control and maintenance – into one service, which it leases to b-to-b customers. Right timing is hard, despite the good visibility, because the maintenance does not scale up well. Initially the target was new market entry, but later they refocused on clean tech markets, and have an alliance with a large air conditioning incumbent firm, which could help in securing maintenance services in selected cities. The personnel of the company has increased from 3 to 60 in five years. It is making loss, but has doubled its turnover for the last two years. Thanks to its

iterative BMI and NPD, (it's been awarded, too), the SME is seen attractive by the investors.

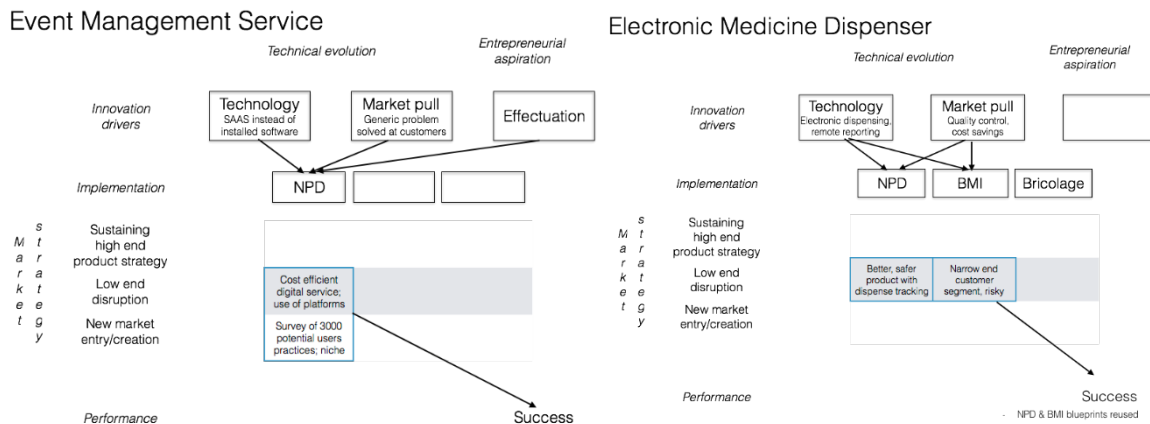


Figure 5 Successes, Event management service (Case d) and Electronic Medicine Dispenser (Case e)

Event Management Service, case d (figure 5), was established in 2007 by two co-founders. They worked in hotel and travel business, and found managing events a constant struggle with reservations, cancellations, detailed HoReCa2- arrangements, etc. They were looking to find a service or product to help in this task, but to their surprise they could not find neither affordable services, nor suitable products (software), so they started developing one for themselves, in true NPD sense. In parallel, they made a market survey that confirmed the existence of a niche market for automating of the event arrangement and management in businesses and public sector organizations. The initial in-house, back-office version was further developed to a web-based SaaS service for event management. The market survey made them also known to the potential customers, and their revised product got a flying start from the beginning. The aim was to provide affordable service to cut costs of arranging events on the current market, but they could also reach new customers that were not served by the existing incumbents. Nowadays, the awarded service is available worldwide, and runs constantly through NPD iterations, which ensures compatibility with customers' information systems. Their initial timing was good, product gained good visibility through the market survey. The current implementation of the platform scales up well. Case d has grown during the last four years from 12 to 21 persons. Through these years, it has been profitable for several years showing steady turnover growth and even better growth in net income.

Electronic Medicine Dispenser, case e (Figure 5), established in 2003, is a high-tech company with technology-push approach. Its innovative new dispenser service was expected to have pull from the market: in addition to its main value proposition of providing improved dispensation safety and quality of medication to the patients, it could promise cost savings to the hospitals and nursing homes. The company is experienced in NPD, but in this case, they used also BMI tools (BM canvas and ecosystem analysis) to support the process. Business modelling revealed that the envisioned product was not lucrative enough for one of the key partners in terms of

2 Hotels, Restaurants, Catering

business. Therefore, case e decided to discontinue the development, and instead, focus its NPD & BMI efforts onto more potentially profitable and feasible products. Even though the dispenser service failed first, company's partners eventually implemented a derivative design and brought it to market with SME's major incumbent partner, which is a visible actor with a credible reputation on the market. SME is employing around 120 persons and runs profit. Their present implementation of the service scales up well, and was synchronized on time with the incumbents' product launch to gain momentum. To us, case e appeared least driven by effectuation, but rather relying on NPD combined with customer and partner network based BMI.

4. Findings and Conclusions

Researchers have observed that business model schemas are complex structural representations of the underlying activity systems. As such, they are also difficult to ideate from scratch due to the challenges of working out at once all the attributes and interrelationships comprising a complex system (Baden-Fuller and Morgan, 2010; McGrath, 2010). This means that ideation anchors to a known way of developing new products, elements of a business model, or available resources (bricolage), when met by changing circumstances. This all is expected to depend on entrepreneurial effectuation. Therefore, we expanded the concept of BMI with elements of NPD, effectuation and bricolage of entrepreneurs. Our framework also can depict the market strategies with profitability and sustainability.

We used the framework to analyze five case SMEs. Most of the case companies are awarded thanks to their innovative product/service and/or business models, too. The case companies were established around 10-15 years ago. One of them filed in bankruptcy, two are surviving along investors' funding rounds, and two companies are going strong.

- Most profitable business model has a scalable product (case d) that meets directly a customer need outside the customers' core business. BMI plays a minor role, because the business has hit a 'sunspot' from the beginning, and is able to keep that position due to constant product updates in close development co-operation with their customer.
- The other successful case (case e) innovated an idea, which could scale-up by co-operating with its partners. However, they could not convince all partners (not all parties are entrepreneurs, but rather risk averse bureaucracies) to commit to the service at the first place, even though the market was there. The launch did not appear profitable according to business modelling. BMI helped the company, first, to put the market entry on halt, and then, to reconfigure the fundamental idea with more powerful partners and reschedule the launch. Fast business modelling iteration seemed to be a key to successful adjustment to the market needs, improving visibility, and timing in addition to its originally good scalability.
- Survival cases' (cases b and c) business models both have a physical, fancy product with extended, IT-based features and lucrative stories, but their business models need constant revisions due to the bottlenecks in expanding

to new markets with logistic, linguistic, and product related complications. Fast iteration is a necessity, but contracting, sub-contracting and building the physical operations on various markets takes a time and a lot of entrepreneurial effectuation, but the problems with scalability and timing persist.

- Finally, the failure (case a) had high-end sustaining product strategy, improving the quality of the existing product and service by formalizing business. However, the SME did not survive on the market with that approach, because it was accruing extra costs, and losing entrepreneurial agility.

All the cases follow different paths of evolution and market strategies, and in all survivor cases the take-off has taken years, even with the most successful of the selected case. It hit a bulls-eye niche with NPD, thanks to its effective indirect pre-marketing for the clientele, and has been able to maintain that position by iteratively co-creating integrated new features without losing its core product simplicity. The need for BMI is marginal. It is a textbook example of successful NPD.

The companies that could create a viable business model can implement product and BMI very differently. It seems that innovative physical, high-tech products take a long time to develop to a mature profitable business even though entrepreneurs know and iterate their business model regularly (cases b & c). On the other hand, the most profitable of the pack, case d, has a business that is virtual by nature, builds on platforms, and scales up to thousands of users by self-service and has high demand in a niche market. It shares some similarities with case e, which used to develop a portfolio of new products at constant rate, but later to direct their development efforts according to BM analyses towards most potential business prospects. Their business modelling thus articulated the product and business roadmaps in a way that they could be put aside for a while and ramped-up in short notice, as the opportunity emerged.

The cases show how effectuation has a strong influence in the initial stages of the innovation. Typically, the idea for the business came from the life or work experiences of the founder(s). What is remarkable in most surviving cases is that the companies/entrepreneurs learned to broaden their business thinking with BMI. The initial mindset is product-centric, many times with altruistic mind-set of improving the lives of the people, or their environment. Typically, after the rounds of BMI they can improve timing and visibility of their products better to the needs of the markets. However, the problem of scalability with physical products remain.

Finally, In SME context, the value of BMI is in iteration and as the means to identify and react upon exogenous changes. The idea of combining NPD, BMI and entrepreneurial effectuation by bricolage seems to reflect the reality in the case companies mostly well. It is also worth noting that BMI improves the entrepreneurs' product and business development skills, and helps to time innovations entry to the market.

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7. Appendix

Cases

	CASE A: ATELIER	CASE E: ELECTRONIC MEDICINE DISPENSER	CASE B: EVERYONE DESERVES PLANTS	CASE C: FRESH NATURAL AIR	CASE D: EVENT MANAGEMENT SERVICE
DRIVERS	Effectuation. The entrepreneur wants to create new and improved products following her artistic visions.	Technology push: Electronic dispensing device and remote monitoring of medicine use. Market Pull: Cost saving through reduced need of patient visits, improved safety and quality.	Technology push: IT controlled led lightning & growth system (patented). Market pull: There was not (yet) markets for product that consumer could control via mobile phone. Effectuation: A designer wanted to design a product for cultivating herbs in-house.	Technology push: Sensors, biodynamics, embedded SW (patented). Market pull: Clean-tech forerunner related with high growth potential. Effectuation: The product idea came from the CEO who suffered from poor indoor air quality.	Technology push: SaaS instead of installed software. Market pull: Lack of services was recognized, market creation by survey. Effectuation: The founder had 10 years of expertise from the field with an emerging vision.
IMPLEMENTATION METHOD	NDP: The entrepreneur was devoted to creating and implementing new products. Bricolage: She was combining the raw materials in new ways to create new products by herself.	NDP: the company was accustomed to creating high-tech products. BMI: BM and ecosystem analysis revealed that the BM is not viable for one of the main partners.	NDP: the product was designed by the founder. BMI: BM canvas and later Value proposition canvas was used. Bricolage: for expanding to international markets, they select the target cities/countries by hunch, but want its viability affirmed by BM analysis before entry.	NDP: The entrepreneurs created prototypes and minimum viable products to test the product with users. BMI: simultaneous development of product and BM with canvas. Bricolage: The first prototypes were created of duct tape and some plastic boxes.	NDP: The founders created the product first for internal use, then offered it to markets. BMI: market analysis showed the lack of products on the market.
MARKET STRATEGY	High end: High-quality, unique products.	Low end: The aim was to use high-tech to provide cost saving and affordable service for current market.	New market: Novel, automated design product that was initially to be distributed via design shops, later switched to brand warehouses.	High end: High-quality service, requiring both remote and on-site maintenance, cooperation with major air conditioning incumbent.	Low end: The aim was to use latest technology for lowering costs of the activities in the clientele. New market: Reaching new customers by market survey with affordable costs.
PERFORMANCE	Failure. The business was closed. Soon she was experimenting with a new business idea of life style coaching.	Failing first, then success. The business development was discontinued, the SME put its effort in other business ideas, but ramping up at opportunity. The SME is profitable.	Survive. The company has not been able to reach the planned turnover targets and is making loss. The size of the company has increased from 4 (2013) to 13 (2015). SME is attractive to the investors.	Survive. The company is making loss, but has doubled its turnover for the last two years. The size of the company has increased from 3 (2012) to 60 (2017). Product story is lucrative to investors.	Success: The SME has been very profitable for several years. The size of the company has increased from 12 (2012) to 21 (2015).