



Directed Innovation of Business Models

Stelian Brad

Technical University of Cluj-Napoca, Romania

Emilia Brad

Technical University of Cluj-Napoca, Romania

Business model innovation is an important issue to keep business competitive and increase company's profits. Due to many market attractors, identification of appropriate paths of business model evolution is a painful and risky process. To improve decision's effectiveness in this process, an architectural construct of analysis and conceptualization for business model innovation that combines directed evolution and blue ocean concepts is proposed in this paper under the name of directed innovation. It displays the key points where innovations would happen to direct adaptation of the business model towards sustainable competitiveness. Formulation of mature solutions is supported by inventive problem solving tools. The significance of the directed innovation approach is demonstrated in a case study dealing with business model innovation of a software company.

Keywords: business model, directed innovation, blue ocean space, directed evolution, innovation determinants, university

Introduction

The progress of technology, especially the communication technologies and Internet, as well as the modern means of fast transportation for long distances, has dramatically increased the speed at which many technology-oriented businesses are running today. Speed for running businesses is in fact a critical issue. The progress in communication, information and mobility technologies has facilitated the increase of competition in the global market, because more companies can reach a market in every corner of the planet and information about competitors and suppliers at global scale is relatively ease to obtain. Being recognized the crucial role that technical performance plays in the commercial success of any product, in nowadays digital-driven global market focusing business competitiveness only on product performance is not enough. It is for sure a necessary condition for keeping competitive, but it is not sufficient. This is caused by the fact that what is new today on the market will have one or more competitive correspondents in a few months period.

Recent surveys of a consulting institute from Switzerland – BMI Lab –

revealed the fact that product innovation has a potential to supplement the profit with about 1.7% in 3 years and with about 0.1% in 5 years, whereas business model innovation has a potential of supplementing the profit with 8.5% in 3 years and with 6% in 5 years (Hofmann, 2014). These numbers describe average values of data collected from different industrial sectors. The conclusion is that business model innovation can bring much more value to the business than product innovation, because the synergies created behind the business model cannot be copied and replicated so easy and so fast. Thus, special attention should be paid to the formulation of effective business models with respect to some performance indicators.

This paper comes from the position that effective business models cannot be designed without considering their existence in connection with the external environment and the context in which it evolves. In addition, this paper claims that effectiveness of business models cannot be fully achieved without strong differentiation in the space of competition. Searching in the published literature on these issues, the result is that many research works on business models and business model innovation recognize that dynamics in business environment is an important influence factor on business model's effectiveness (Demil & Lecocq, 2010, p. 238; Achtenhagen, Melin, & Naldi, 2013, p. 428; Morioka, Evans, & Monteiro de Carvalho, 2016, pp. 660–661). Also, some works show that appropriation of business models shall be reflected in relation with the context in which businesses operate, too (McNamara et al., 2013; Souto, 2015; Hall & Roelich, 2016; Zhao, Pan, & Lu, 2016). From these perspectives, it is accepted that business models have to be designed following a more structured methodological approach and consideration of clear strategic goals, rather than using empirical approaches. Various proposals are reported in the literature in line with this issue. For example, Toro-Jarrin, Ponce-Jaramillo, and Guemes-Castorena (2010) integrate Business Model Canvas and Technological Roadmap to align business ideas with the current and future business needs. It brings customer validation as an important step in business model design.

However, competitiveness of the business model strongly depends on several other critical elements, such as constrains that are outside the control capability of the company, as well as effectiveness at operational level of competitors' business models. These issues are not treated in the work of Toro-Jarrin et al. (2010). Structured methodologies for business model innovation are necessary even in the case of ubiquitous and profitable business models, as long as they are more and more challenged by disruptive businesses in emerging markets, which are capable to lower the costs for similar value delivery (Williamson, 2010).

This work is also a supporter of the necessity to consider business model innovation from a system perspective, considering the influences

of the upper systems on the lower systems. It strengthens the idea that the external business environment is a strong influencer in the process of business model innovation. A particular perspective of this statement is also given by Aspara, Lamberg, Laukia, and Tikkanen (2013), which demonstrate in their work that business models of business units are strongly influenced by the corporate business model. This is a very important observation for long term sustainability of corporate businesses, where the corporate business model might create strong barriers when designing the business models of various business units. In this respect, application of inventive problem tools to solve various conflicts between parent-child business models is essential. Existence of paradoxes and conflicts in the case of complex business models is recognized and documented by Smith, Binns, and Thusman (2010), too. Their work highlights the need to solve such paradoxes in a way that makes them to coexist rather than selecting one variant. This way of focusing business model innovation also supports the demarche of the current paper. Joyce and Paquin (2016) provide an extended perspective of the business model, by projecting it on three plans: economic, environmental and social.

This work puts into evidence a more complicated external environment from which business models have to be designed. Similar observations are done by Franca, Broman, Robert, and Basile (2016), Morioka et al. (2016) and Yang, Evans, Vladimirova, and Rana (2016), whose focus is mainly on the extension of business model's perspective by adding the environmental perspective to the economic one, too. This works reflect once more the challenges on business model innovation of various external regulatory constraints. Bolton and Hannon's work (2016) also highlights the influence of external factors such as governing context and socio-technical context on business model innovation. Beyond the relevance of external influence factors on business model innovation, reduction of effort and risks in defining an effective business model is another critical aspect in business model innovation. Research done by McGrath (2010) show that people tend to define the business model following many experimentations and discovery-driven approaches with no clear understanding at the outset of who the winners will be. Even if experimentation is good, avoidance of trial-and-errors approaches and consideration of a more convergent innovation process of the business model is desirable in a highly dynamic external business environment.

Despite the valuable contributions done by now on contextualizing business model innovation, there are no researches yet developed on how to approach in a systematic way the external influence factors during the design process of business models. Also, there is no research reported on how to think innovation of business models, such as the proposed solution

to ensure a competition with positive sum (e.g., by being unique). In line with these observations, the purpose of this paper is to introduce a structured approach to analyse a given business model and to innovate it acting simultaneously on two streams: formulating conflict-free solutions to various constraints generated on the business model by the influence factors from the outside/external business environment, and increasing its differentiation with respect to key competitors. The research question of this study is: How can a business model be properly designed such as its value creation formula overpasses various limitations imposed by regulations and other influence factors in the business environment in the best possible way, and how value creation can be achieved in a way that makes a visible difference in the market?

In this respect, the next section of the paper is dedicated to pass in review the perspective of business model from different angles, as well as of business model innovation. The section ends with a synoptic of the most relevant published research results on methodologies for business model innovation. It is concluded that most innovations of the business models (about 90% with respect to some survey-based investigations) are re-combinations of already known practices in the field (Gassmann, Frankenberger, & Csik, 2013, p. 3). In the third section of the paper, a roadmap for systematically tackling innovation of business models is proposed. It is based on the concept of directed evolution that emerged from the theory of technical system evolution. Therefore, a small space in the third section of the paper is dedicated to outline the concept of directed evolution. The section continues with the description of the roadmap and its related tools. The proposed methodology was applied for improving the business model of an IT company specialized in software services. It proves that the methodology has several strengths in identifying the core areas of intervention for innovating business models. A critical analysis of this research work is included in the section of conclusions. This section also reflects on areas where further researches could be done in the future. Key findings complement the content of conclusions.

Background

This part of the paper is dedicated to highlight several perspectives about business models and relevant studies up to this date about methodologies that support business model innovation or transformation. The subject is well-sustained by a recent survey performed by KPMG, which shows that over 90% of the US companies are changing their business models (KPMG, 2013). A reason for this course of actions is the fact that releasing new products is not sufficient to keep a competitive advantage onto the market (Gassmann et al., 2013, p. 1).

Business Model

Business model literature is diverse in defining this concept. This is well captured by Gassmann et al., which states that there is no 'common opinion as to which components exactly make up a business model' (Gassmann et al., 2013, p. 1). As Michael Lewis said, a business model 'is one of those things many people feel they can recognize when they see it (especially a particularly clever or terrible one) but can't quite define' (Ovans, 2015). The term 'business model' was first introduced in the literature by Peter Drucker and seen as 'assumptions about what a company gets paid for' (Drucker, 1994). According to Joan Magretta, a business model is the managerial equivalent of a scientific method – it is a hypothesis about the business, which is then tested and revised, if necessary (Magretta, 2002). In principle, a business model is the architectural arrangement of all elements of an organization needed to achieve its strategic goals and objectives (Al-Debei et al., 2008, p. 1). A more tangible perspective on business model definition is given by Johnson, Christensen and Kagermann (2011) in their work 'Reinventing Your Business Model.' They consider a business model the interlocking of customer value proposition, profit formula, key resources and key processes that, taken as an aggregate, produce and deliver value to customers (Johnson et al., 2011, pp. 45-47). A structured work for understanding the significance of a business model and its link with strategy and innovation is done by Teece (2010). He concludes that the 'essence of a business model is in defining the manner by which the enterprise delivers value to customers, entices customers to pay for value, and converts those payments to profit.' Baden-Fuller and Morgan (2010) has run a research to analyze business models from a model perspective. They provide a set of generic descriptors of how a company organizes itself to create and deliver value in a profitable way. This work promotes the idea that business models are a kind of receipt for creative managers to describe their businesses. But maybe the most intuitive way of formulating a business model is the canvas proposed by Strategyzer AG consulting company (<https://strategyzer.com/>). The canvas was actually invented by Alex Osterwalder within his PhD thesis and it encompasses nine building blocks of the business model: customer segments, value propositions, distribution channels, customer relationships, revenue streams, key resources, key activities, key partnerships and cost structure (Osterwalder & Pigneur, 2009). Another suggestive description of a business model is the one formulated by Gassmann and his colleagues. They see a business model conceptualized around four key pillars: who, what, how, and value (Gassmann et al., 2014). Generic 'who' actually describes target customers. Generic 'what' are all issues about offering. 'How' equals value proposition creation. 'Value' means revenue

creation. Between 'who' and 'what' a value proposition is formulated. The binome 'who' and 'how' germinates the value chain. 'Who' combined with 'value' builds the revenue model (Gassmann et al., 2013, p. 2). A last perspective introduced in this paper on business models is the one promoted by Boston Consulting Group. It considers business models as two blocks: value proposition and operational model, where each block has three elements at its turn, that is: value proposition comprises target segments, product and service offering, revenue model, whereas operational model comprises value chain, organization and cost model (Lindgardt, Reeves, Stalk, & Deimler, 2009, p. 2). More or less, all definitions introduced in this paper lead to the same perspective of a business model, but following different routes. This is well captured by Massa and Tucci, which refer to levels of abstraction from reality of the business models (Massa & Tucci, 2013, p. 433). According to this reference, the lowest layer of abstraction is the activity systems, followed by meta-models, then by specified graphic frameworks, and further by ontologies, ending on the highest layer of abstraction with archetypes.

By synthesizing business model literature, the authors of this paper have formulated a new representation of the business model, one that is linked to business strategy and displays quantitative measures of its value. This new representation is presented in Figure 1.

The model from Figure 1 suggests that for the same problem, more business models can be formulated. Some of them would be more competitive than others. The model from Figure 1 considers two type of values: the one for customers (the reason for going on the market) and the one for shareholders (the motivation for running the business). Both types of value are strongly linked to a business vision, which at its turn is linked both to a differentiation strategy and a development strategy. The key elements of the business model are linked to the two perspectives of strategy. In this representation, key resources are mainly responsible for customer value creation, whereas key processes are mainly responsible for shareholders value creation. It also shows that key processes are strongly influenced by key resources, and the development strategy is influenced by a differentiation strategy.

With the representation from Figure 1 in mind, decision makers would have better chances to assess the value of their business model by analyzing its quantitative and qualitative dimensions. In order to test the competitiveness of a given business model, the framework from Figure 2 is proposed.

According to the framework from Figure 2, a business model is competitive if the addressed need is more urgent than other needs, if the price for the value delivered is higher than the cost to produce and sell the re-

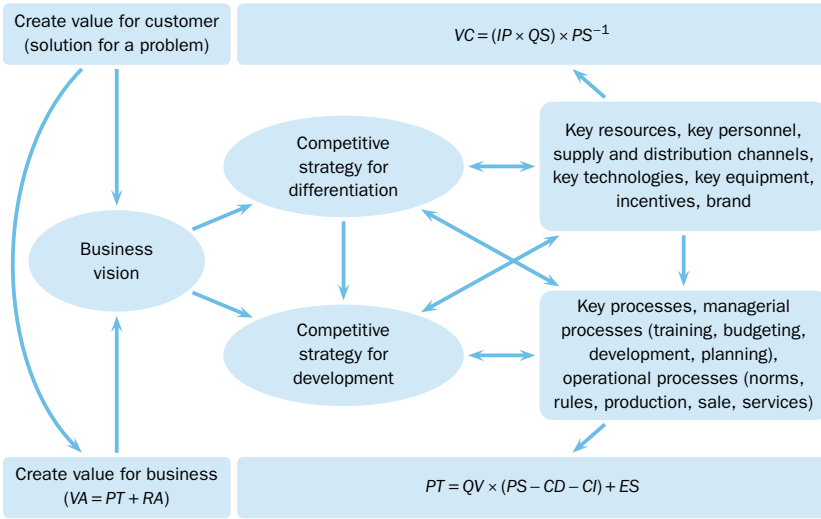


Figure 1. Business Model Conceptualization (VC – value for customer, IP – problem value weight, QS – quality solution, PS – price solution, PT – target profit, QV – sales volume, CD – unitary direct costs, ES – economies of scale, RA – return on assets)

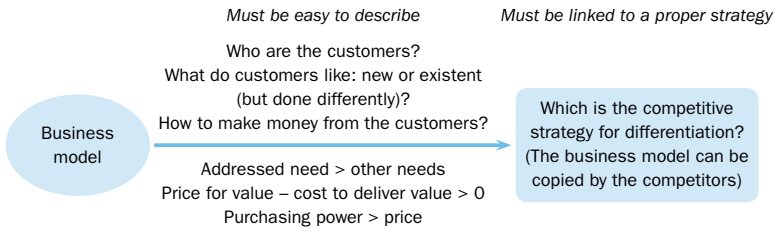


Figure 2. Framework for Testing Business Model Competitiveness

spective value, and the market segment has the economic potential to buy the value. In order to be effective, a business model should be simple and described in an easy way. However, to keep a longer term competitive advantage, a business model should be consolidated with a strategy that focuses resources and processes on becoming ‘unique’ in the market, where the synergies between the elements at operational level are the key ingredients for competitive protection.

Business Model Innovation

Scientific literature reveals many researches on business model innovation (Gambardella & McGahan, 2010; Zott, 2011; Baden-Fuller & Haefliger,

2013; Velu, 2015). Also, consulting companies promote plenty of roadmaps in this area. Innovation of business models is seen from various lenses. Because scholars do not agree on what a business model is, their researches on business model innovation are developed segregationally and in silos, thus being very difficult – if not impossible – to approach in a unitary way a critical analysis on the state-of-the art in this topic (Zott & Amit, 2010; Wirtz et al., 2010; Zott, 2011; Velu and Stiles, 2013). The same conclusion was reached by Schneider and Spieth after a systematic review of extant academic literature in the field of business model innovation (Schneider & Spieth, 2013). There are researchers that consider business model innovation as a trial-and-error approach (Sosna, Treviño-Rodríguez, & Velamuri, 2010). In resonance with this idea, researches done by Gassmann and his colleagues led to the conclusion that over 90% of current business model innovations are nothing else than recombinations of old models (Gassmann et al., 2014). They have identified 55 patterns of business model innovation, which are collected in a book as a source of inspiration for innovation in this area (Gassmann et al., 2014). Thus, instead of following a structured model for business model innovation, they propose as alternative the use of a library of models from where one can distinguish the best variant for the particular case. Other opinions are about the fact that technological innovation is the one that provides resources for business model innovation, thus companies must focus on the first type of innovation, whereas the second type will come up in a natural way (Calia, Guerrini, & Moura, 2007). These theories are not sustainable in all cases. A proof in this respect is the case of Nespresso (Matzler, Bailom, von den Eichen, & Kohler, 2013).

Consulting more references, this paper agrees with the position of Massa and Tucci that consider business model innovation a subset of business model design and reconfiguration (Massa & Tucci, 2013, p. 425). As this reference highlights, business model design deals with entrepreneurial choices on products-market mix, organizational processes and control systems, as well as the design of the boundaries for business, so as to link offerings to market. Business model reconfiguration is about extensive and complex innovations of the business model that require a systemic reconfiguration of existing technological and organizational capabilities. Usually, business model innovation follows after product innovation and process innovation over the life-cycle of market development (Massa & Tucci, 2013, p. 436). Business model innovation is usually necessary in times of instability or when dramatic structural changes in the market occur (Bouncken and Fredrich, 2016). According to Boston Consulting Group, business model innovation happens when two or more elements of the business model are transformed (re-thought, re-invented) at such levels that create more value to customers or the same value but in a different way (Lindgardt et al.,

2009, p. 2). This means that business model innovation does not imply creation of new technologies or brand-new markets. It focuses on delivering in a new way existing offerings, produced by existing technologies, to existing markets (Girota & Netessine, 2014). Thus, business model innovation consistently rethinks the current business around customer needs, followed by realignment of resources, processes and profit formula towards the new value proposition. In contrast with innovations that happen in technology, where most of them are incremental, business model innovation is in most of the cases radical and tends to produce disruption to the current business (Velu & Stiles, 2013; Velu, 2016). Therefore, the risk involved in business model innovation is high (Geissdoerfer, 2016, p. 1221). In this line, scholars like Henry Chesbrough and others highlight the fact that, even if companies may have intensive activities to explore new product ideas and technologies, they do not excel in terms of ability to innovate the business models that ground the paths through which offerings will pass (Chesbrough, 2010). Thus, a good balance between risk and returns in business model innovation is necessary. In this respect, knowledge management plays a crucial role in understanding where are the key priorities for rethinking business models (Malhotra, 2000, p. 4).

Beyond the debates around the meaning of business models, literature is still poor in methodologies for systematically leading innovation into business model reinvention. A highly mathematized formalism for business model innovation is proposed in a working paper from Harvard Business School, where business model is expressed under the form of profit functions (Casadesus-Masanell & Zhu, 2010). The formalism is based on the strategic innovation game theory. Even if it has some merits in terms of quantifying profitability for different options of the business model, it is very difficult to be understood by usual practitioners due to the abstract and hard mathematical formulations. Towards an empirical approach of business model innovation is the work of Johnson, Christensen and Kagermann. They do not necessarily provide a systematic framework to lead innovation, but instead formulate a set of items to check when a new business model is needed, as well as propose a set of areas where to look for innovations (Johnson et al., 2011). A combination of Case-Based Reasoning (CBR) and Theory of Inventive Problem Solving Method (TRIZ) (Altshuller, 2002) to support the innovation process of business model is proposed by Shao, Ding, Ding, and Liu (2012).

However, the approach is about adaptation of classical TRIZ to the field of business modelling and use of results under the form of a customized Contradiction Matrix (CM) to solve the conflicts identified within a given business model. Following the same stream is the research done by V. Souchkov, which uses a relationship diagram to visualize all links between

various elements in the building blocks of a business model canvas and, where conflicts are identified, TRIZ contradiction matrix is used to approach them (Souchkov, 2010). However, business model innovation is not only about conflict solving, as long as there are strong connections between business model, business strategy and influence factors, as diagram from Figure 1 highlights. A very recent research work about methodological approach of business model innovation is the one of Franca et al. (2016). Starting from the business model canvas of Osterwalder, Franca et al. propose a framework for strategic sustainable developed through which every block of the business model canvas is analyzed with respect to some sustainability criteria, and opportunities for innovation are identified. Without any critics on the value of this methodological framework, the challenge arises from the fact that it is only focused on bringing innovation into the business model from the narrower perspective of environmental sustainability. The current paper makes a step forward in this field of research and introduces a systematic roadmap for leading innovation within the process of business model reinvention.

A Systematic Roadmap for Business Model Innovation

The theory behind the roadmap proposed in this paper for business model innovation is that business models should evolve such as to reduce harmful functions or side effects in value proposition and to increase benefits, thus reaching closer levels to what are called ideal systems, where only benefits and no prejudices exist. In doing this, innovation must consider lessons from the past and must understand the major streams that made the business model to be as it is today. Evolution towards a superior form means better harmonization of the business model with the influence factors and attractors from its ecosystem (e.g., environmental, social, political, technological, economical, informational, etc.). This might require resolution of various conflicts. Solving conflicts without major compromises is seen as the right path towards business model innovation. However, an additional perspective has to be considered in the innovation process; that is, differentiation with respect to other similar businesses. In this respect, consideration of 'blue ocean' type business models is desirable. Building up such models requires supplementary efforts to innovate.

Directed Evolution

Directed evolution is mainly the prerogative of researchers in natural sciences, which try to mimic natural evolution in laboratory by acting at molecular level for diversification, selection and amplification. In this approach, the lack of detailed knowledge is compensated by the use of powerful screening and selection methods based on the concept of the 'survival of the

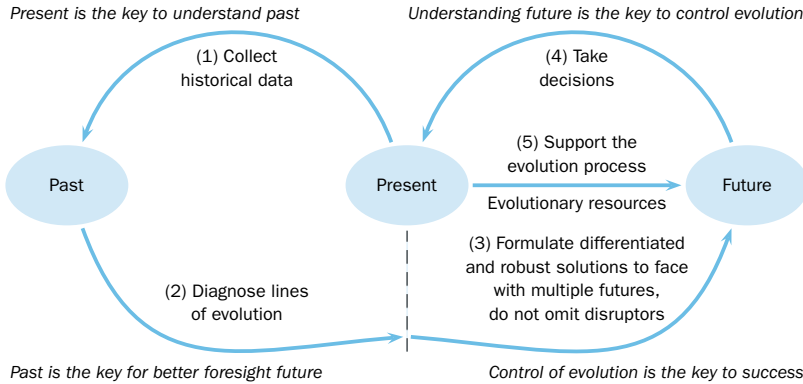


Figure 3 The General Rule of Directed Evolution (adapted from Zlotin & Zusman, 2004, p. 25)

fittest' (Dalby, 2011). However, directed evolution is a field of study in engineering, too. It deals with the laws of evolution of technical systems (Altshuller, 2002). Relevant contributions in this area are reported by scientists dealing with theory of inventive problem solving, where a reference work is (Zlotin & Zusman, 2004). Directed evolution considers several directions towards which a system can evolve, such as: better use of resources, deeper harmonization with other systems, higher integration into other systems, less harmful functions, more useful functions, more areas of applicability, higher autonomy, more efficiency at process level, closer to multi-level approach, less contradictions in the system, more dynamicity and controllability (Clarke, 2000; Zlotin & Zusman, 2004). The general rule of directed evolution is introduced in Figure 3.

According to the scheme in Figure 3, 'future' is influenced by 'past,' because 'present' is captured in a set of lines of evolution that are strongly embedded in the system and cannot be suddenly deviated very quickly. A practical tool for directed evolution is Nine Windows or System Operator Technique (Silverstein, Samuel, & DeCarlo 2013, pp. 125–130).

A Novel Architectural Construct for Business Model Innovation

In order to support business model innovation in a systematic way, researches from this paper led to a methodology that combines System Operator Technique (SOT) (Silverstein et al., 2013) with Blue Ocean Framework (BOF) (Kim & Mauborgne, 2005) and with a list of predefined areas of investigation (PAI) to identify major conflicts between the current business model and the future expected super-system (future influence factors), to which are added one or several tools of inventive problem solving (e.g. Contradiction Matrix (CM) (Altshuller, 2002), Ten Disruptive Rules Toolbox (TDRT)

(Brad, Mocan, Brad, & Mocan, 2015), Unified Structured Inventive Thinking (USIT) (Nakagawa, 2004), etc.).

The roadmap for business model innovation is presented in Figure 4 under a grid of Nine Windows (also called System Operator Technique), where the numbers in each box show the order for tackling issues within the innovation process. 'Past' could be about a situation back in time with 5 to 10 years. 'Future' means positioning 3 to 5 years forward. 'Present' is about the current situation and/or expected very near future situation. 'System' describes the business model at the block level (e.g., value for customer, value for business, business vision, differentiation strategy, development strategy, key resources, key processes), whereas 'sub-system' is the description inside each block (details about the content of each block of the business model). 'Super-system' describes the external environment and the context where business model exists, mainly by means of key influence factors.

'Patterns of evolution' are about the streams along which influence factors and business models have evolved from *past* to *present*, but also the estimates of future evolution of the influence factors. They are determined by collecting historical data and diagnosing the lines of evolution. 'Conflicts' occur at the intersection between the forecast future factors of influence and the current business model along the following Predefined Areas of Investigation (PAI): (1) Determinants leading to the development of the current business model that embed it in traditions; (2) Natural interdependencies that block the current model due to the concern of provoking instabilities; (3) Limitations that favour current consolidated mechanisms; (4) Strengths that intend to keep the status-quo. Blue Ocean Framework (BOF) analyzes the current business model at *system* level and formulates solutions in four directions: (1) Improve some strengths much above the peers; (2) Eliminate some weaknesses; (3) Lower some other weaknesses much below critical levels; (4) Add new features that make the model unique. To support the process of conflict resolution and 'blue ocean' creation, various tools for creativity and inventive problem solving can be used. This paper recommends three of them, such as: Contradiction Matrix (CM) (Altshuller, 2002), Ten Disruptive Rules Toolbox (TDRT) (Brad et al., 2015), and Unified Structured Inventive Thinking (USIT) (Nakagawa, 2004), etc.), but does not limit the pool of these tools. For example, some people might find enough to apply simple brainstorming tools.

Illustrative Example

To exemplify the methodology, a small size provider of project-based software development services (40 employees) located in an Eastern European country has been considered. The box *present-system* (see Figure 4) for the

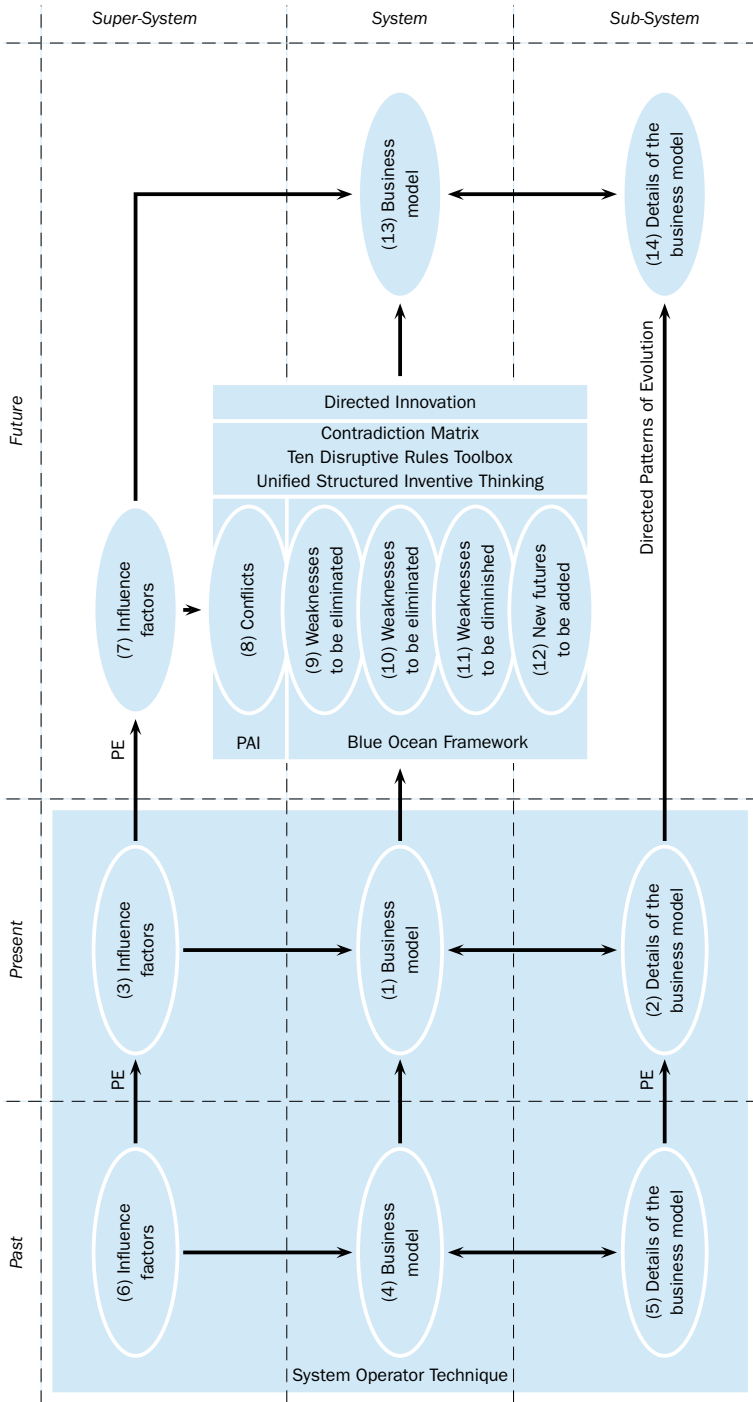


Figure 4 Roadmap to Directed Innovation of Business Models (PE – Patterns of Evolution, PAI – Predefined Areas of Investigation)

analyzed company is characterized by: (a) value for customer high quality services at lower costs; (b) value for business profit rate above 15% and revenue cycle below 60 days; (c) business vision sophisticated software services; (d) differentiation strategy high specialization on few business domains (not nominated in this paper); (e) development strategy more customers from different markets (not nominated in this paper) and longer term projects; (f) key processes software development; (g) key resources wide pool of highly skilled professionals. The box *present-sub-system* (see Figure 4) is mainly characterized by: (a) documented processes based on quality management standards (e.g., ISO 9001); (b) permanent training programs for employees; (c) structured and complete software development process based on a structured methodology (e.g. PRINCE 2); (d) clear communication procedures with customers and knowledge management supported by specialized software platforms; (e) quality cost management; (f) structured procedures and tools for project and product analysis, planning and optimization; (g) life-cycle approach of all projects, etc. The box *present-super-system* is characterized by the following crucial influence factors: (a) governmental incentives on professional human resources; (b) strong local, national and regional competition, with many competitors; (c) increasing rate of salary in a more accelerated way than man-day rate; (d) strong competition on human resources in the local market; (f) lower rate of new professionals than the required needs in the local market; (g) increasing rates of office spaces.

Past is positioned 15 years ago. The box *past-system* is characterized by: (a) value for customer good quality services at very low costs; (b) value for business profit rate above 20% and revenue cycle below 40 days; (c) business vision software development based on clear specifications; (d) differentiation strategy a bit lower prices than local competitors; (e) development strategy capturing any business opportunity; (f) key processes software development; (g) key resources core of highly skilled professionals. The box *past-sub-system* (see Figure 4) is mainly characterized by: (a) basic documentation of projects; (b) incident-based training of employees; (c) covering only some processes of the software projects (design, implementation, testing); (d) many iterations for bug-fixing, with extra-effort involved. The box *past-super-system* is characterized by the following major influence factors: (a) governmental incentives on professional human resources; (b) growing local and national competition; (c) growth rate of salary below the growth rate of man-day; (d) good accessibility of human resource; (e) attractive rates for office spaces.

The major patterns of evolution at *sub-system* level from *past* to *present* are: better use of resources (e.g., more specialized professionals), deeper harmonization with other systems (e.g., software development process),

higher integration into other systems (e.g., wider covering of software projects, including strategic planning, analysis, refactoring, maintenance, etc.), less harmful functions (e.g., reduction of poor quality costs), more useful functions (e.g., consolidation of strategic partnerships, higher sophistication of services), more efficiency at process level (e.g., optimized software development process, automated testing, wider pool of specialized professionals, specialization on fewer business application domains, etc.), more dynamicity (e.g., agile development process) and controllability (e.g., deeper integration with customer processes). The major patterns of evolution at *super-system* level from *past* to *present* are: more harmful functions (e.g., increasing local and national competition, increasing rates for office spaces, lowering ratio between salary rates and man-day rates, lowering labour productivity, etc.). *Future* is positioned 3 years from the *present*. The estimated patterns of evolution at *super-system* level from *present* to *future* are: (a) more harmful functions; (b) more dynamicity; (c) deeper harmonization with other systems. It is observed that most of the patterns are continuing from *past* to *future*, a fact that reflects the possibility of a crisis point in the future in relation with the sustainability of the current business model.

In conjunction with the expected patterns of evolution, future major influence factors will be: (a) increased influence of mobility; (b) more freelancers; (c) telework; (d) common legislation at European level; (e) governmental incentives for research activities; (f) increasing local, national and regional competition; (g) more development centres of multinational corporations in proximity; (h) continuation of depreciation of the ratio between man-day rate and salary rate. This evolution will impose at *sub-system* level the following directed patterns of evolution between *present* and *future*: (a) better use of resources; (b) higher integration into other systems; (c) more efficiency at process level; (d) closer to multi-level approach; (d) less contradictions in the system; (e) more dynamicity. Influence factors indicate the necessity to translate in the *future* from a project-oriented company to a product-oriented company. The question is how to do this with lower risks and higher impact.

With respect to the predefined areas of investigation, the first one is referring to the major determinants that keep the current business model embedded in local traditions. In this case, the lack of sufficient own venture capital to turn from a project company to a product company, inexperience on how to run a product-oriented company, as well as inexperience to attract large amount of external capital for developing and commercializing successful software products over long periods of time, are the major determinants for keeping the current business model. The second predefined area of investigation is about natural interdependencies that freeze the cur-

rent business model. In this case, they include the insufficiency of local and national venture funds and funding schemes for start-ups, the huge bureaucracy for attracting local funds, as well as the lack of resources to employ world-class experts on innovation. To these issues, some others are added, such as the cultural and historical patterns, which do not reflect a strong culture in product innovation in most of the national economic sectors. Looking at the third area of investigation – the limitations of the current business model – major issues are: lack or insufficiency of critical functions for product innovation and commercialization, such as marketing and sales functions, product documentation functions, as well as lack of R&D departments and IP management offices. The strengths that justify the preservation of the current model – which is the fourth area of investigation – consist of a mature and highly specialized software development process and a short revenue cycle.

A strong dependence of the business model from the influence factors can be seen from the information above. The crucial role of external factors on business model innovation is well-reflected by the roadmap from Figure 4. Business models can hardly evolve outside the so-called ‘plausible possible,’ which is dictated by the external influence factors. For example, a crucial element in this case study for turning business models from project-based to product-based is the existence of facile venturing schemes and innovation hubs at local level, with a critical mass of funds and a dynamics of investment as in the more advanced Western markets. Also, national programs that support innovation, as well as relevant governmental incentives for applied and experimental R&D would activate the transformation of the current business model. Many of these influence factors depend on national political will, as well as very probable on strategies regarding the flow and localization of big international venture capital (which are less visible).

With respect to the ‘blue ocean’ space creation, the first issue is about the current strengths that require higher valorization. In this case study, it is about: (1) use the increased efficiency of the software development process to allocate 10% of human resources on internal projects. The second issue is referring to weaknesses that require elimination. In this case study, actions are referring to: (1) develop a strategic alliance with a specialized partner on international marketing and sales (mainly for launching and commercialization of proprietary product-service systems); (2) set-up a mixed R&D team with a selected research group from a strong university. The third issue is about weaknesses that cannot be replaced so fast, but require significant reduction. The following action is proposed in relation with this case study: (1) use the high specialization in a given application domain to find a strategic customer for service provision with better chances to negotiate a more attractive man-day rate. The last issue is about new

features that might be added to increase differentiation. For this case study the following idea was elaborated: (1) focus on developing a proprietary software-hardware solution that targets a global market and whose value mainly stands in content and not in technology.

Combining the estimated *future* influence factors with the issues revealed in the four areas of investigation, the following major conflicts are revealed: (C1) 'need of a critical mass of local venture capital' versus 'limited possibilities/capabilities of the govern to create national venture funds and/or attract large international venture funds;' (C2) 'long revenue cycle' versus 'business risk;' (C3) 'highly specialized new organizational functions' versus 'low productivity of the current business model;' (C4) 'need a constant R&D activity' versus 'insufficient resources for development.'

In this case study, only the contradiction matrix (CM) was applied to tackle conflicts. Application of CM was supported by a software tool whose link is available at: http://193.226.17.76:8080/sts291-mvc/tool_cmx.do?aProject=1&aSet=1&aAct=1&aTarget=1&aActivityName=1. For the first conflict, the generic vectors of intervention dictated by CM are: (V1) re-configurable construction by replacing hard parts of the system with others that can change their 'volume' or 'shape;' (V2) make the immobile part of the system mobile; (V3) make a transition from a homogeneous structure to a heterogeneous one. For the second conflict, the generic vectors of intervention suggested by CM are: (V4) use an intermediary system to do some actions; (V5) use a multi-level connection; (V6) increase segmentation for the system. For the third conflict, the generic vector of intervention is: (V7) replace a traditional system with a softer one. For the last major conflict, the generic vectors of intervention are: (V8) replace an expensive system with several inexpensive systems; (V9) change the degree of flexibility.

The set of generic vectors of intervention are analysed in the context of the company from the case study. Vector V1 suggests strategic partnerships for translating the business from project-based model to product-based model (or product-service system), where specialized partners to be involved in tasks that are not the core competence of the company (e.g., marketing, sales). Vector V2 highlights the need to involve a completed new management team for doing the transition, as long as the current management of the company is already captured in the actual business model. Vector V3 indicates the possibility of coexistence for a period of time of two business models, one following the development, introduction and growth phases of its life-cycle (i.e., the product-oriented model), while the other trying to extend the maturity phase of its life-cycle by increasing specialization and sophistication, as well as attraction of strategic customers (i.e., the project-oriented model). For translating to the new business model, a company shall be divided into two separate units, one of them adopt-

ing the new business model, while the other one prolonging the current business model as long as it is profitable, but infusing resources in the first one to increase its market viability, including the variant of cannibalization, too (see the case introduced by Velu and Stiles, 2013). Vector V4 also highlights the necessity to collaborate strategically with external entities (e.g. R&D, sales). Vector V5 requires to investigate the possibility of attracting a strategic investor in the new business model, one that is capable of facilitating the entrance in the new market using his network and possible his current customers. Vector V6 leads to the idea of developing a wider portfolio of auto-sustained product-service systems in the new business model such as to minimize business risk. Vector V7 reveals the idea of using more intensively a network of freelancers. Vector V8 suggests the possibility to even outsource some tasks for developing the product portfolio to companies that have the same profile as yours, but which are much cheaper than you are (e.g., because they are located in more cost-effective geographical regions, because they are in a different period of the life-cycle). The last vector, V9, indicates the openness for joint venture with other companies such as to save time and other resources for developing those modules in the new product-service portfolio, which are not the core know-how, but which are a necessary part of the overall assemble.

Conclusions

This paper has introduced a methodology for supporting business model innovation in a structured way. It is based on the thesis that external influence factors are the major drivers for business model innovation. In this respect, these factors and their patterns of evolution must be well-known and understood before starting any effort of innovation. In contrast with other methodologies for business model innovation, the methodology from this paper awards the primary attention to the conflicts that occur between the external influence factors and internal components of the business model, putting on the backward layer the internal conflicts. In fact, internal conflicts mostly influence business model's efficiency and not its effectiveness. But what mostly counts for business competitiveness is its effectiveness, which subordinates efficiency, too. Another new perspective displayed by the methodology is the relation between business strategy and business model innovation. A key role in the strategic agenda is the differentiated position of the business with respect to competitors and substitutes, which must be a key driver of innovation. A third paradigm of the methodology is the connectivity *past-present-future-sub-system-system-super-system*. From this perspective, innovation should not omit historically-embedded elements in the business model in order to increase the chances of success.

In other words, the 'plausible possible' should be taken into account for grounding the innovation process.

It would be nice if innovations happen firstly to the level of external influence factors, which are nothing else than the outputs of the *super-system*. However, this is outside the control capacity of the company, except in the case when cluster associations are capable of creating effective bottom-up pressures on policy makers. The connectivity of the *system* with the *super-system* is an essential element for guiding the innovation process. Thus, an important issue is to identify the business model of the *super-system* and to act smartly on it for directing its evolution. For example, in the illustrative case study in the paper, most of the limitations of the current business model are dictated by the poor outputs in the *super-system*. Because, at a given moment in time, the outputs of the *super-system* are 'frozen,' the single chance for business model innovation is to approach in a smart way the conflicts these outputs generate in the *system* and further to try making a difference in the given competition environment.

Other important finding of this research is the fact that those ecosystems capable of generating healthier influence factors will provide stronger competitive advantages for their constitutive systems (e.g., business entities). Considering the case study, it is somehow clear that the national conditions are not any more favourable for continuing long time with ITO/KTO services.

The innovation framework of business models proposed in this paper is still incomplete in several aspects. It does not provide a mean for measuring the efficiency and effectiveness of the outputs in the innovation process. Any new innovation generates disturbances in the internal processes and the global balance is not yet assessed. A new concept called 'optimized business model innovation' has to be investigated in future researches. Another limitation of the proposed methodology is the fact that it does not entirely explore the wider space of manifestation suggested by Figure 1. But, it could represent an opportunity for future researches. Also, the evolutionary resources are not considered by the current methodology and no element was mentioned on how this type of resources should be built in a synergetic way with the business model innovation.

More researches between strategy innovation and business model innovation are necessary to better reflect the true potential of innovation at business model level. Also, simultaneous innovation of sub-system, system and super-system under the form of hyper-system or system of systems would reveal new facets that deserve supplementary researches. A meta-model formulation that comprises previous silos-based contributions in the professional literature of business model innovation could be another future area of investigation. Researches that combine methodologies of product innovation with business model innovation should also not be neglected.

References

- Achtenhagen, L., Melin, L., & Naldi, L. (2013). Dynamics of business models: Strategizing, critical capabilities and activities for sustained value creation. *Long Range Planning*, 46, 427–442.
- Al-Debei, M. M., El-Haddadeh, R., & Avison, D. (2008, August). *Defining the business model in the new world of digital business*. Paper presented at the 14th Americas Conference on Information Systems, Toronto, Canada.
- Altshuller, G. (2002). *TRIZ keys to technical innovation*. Worcester, MA: Technical Innovation Center.
- Aspara, J., Lamberg, J. A., Laukia, A. & Tikkanen, H. (2013). Corporate business model transformation and inter-organizational cognition: The case of Nokia. *Long Range Planning*, 46, 459–474.
- Baden-Fuller, C., & Morgan, M. S. (2010). Business models as models. *Long Range Planning*, 43, 156–171.
- Baden-Fuller, C., & Haefliger, S. (2013). Business models and technological innovation. *Long Range Planning*, 46, 419–426.
- Bolton, R., & Hannon, M. (2016). Governing sustainability transitions through business model innovation: Towards a systems understanding. *Research Policy*. Advance online publication. <http://dx.doi.org/10.1016/j.respol.2016.05.003>
- Bouncken, R. B., & Fredrich, V. (2016). Business model innovation in alliances: Successful configurations. *Journal of Business Research*, 69, 3584–3590.
- Brad, S., Mocan, B., Brad, E., & Mocan, M. (2015). Economic development of peripheral/lagging zones through smart innovation. *International Journal of Transitions and Innovation Systems*, 4(3/4), 201–220.
- Calia, R. C., Guerrini, F. M., & Moura G. L. (2007). Innovation networks: From technological development to business model reconfiguration. *Technovation*, 27(8), 426–432.
- Casadeus-Masanell, R., & Zhu, F. (2010). *Business model innovation and competitive imitation: The case of sponsor-based business models* (Working Paper 11-003). Boston, MA: Harvard Business School.
- Chesbrough, H. (2010). Business model innovation: Opportunities and barriers. *Long Range Planning*, 43, 354–363.
- Clarke, D. W. (2000). Strategically evolving the future: Directed evolution and technological system development. *Technology Forecasting and Social Change*, 64(2/3), 133–153.
- Dalby, P. A. (2011). Strategy and success for the directed evolution of enzymes. *Current Opinion in Structural Biology*, 21(4), 473–480.
- Demil, B., & Lecocq, X. (2010). Business model evolution: In search of dynamic consistency. *Long Range Planning*, 43, 227–246.
- Drucker, F. P. (1994). The theory of the business. *Harvard Business Review*, 72(5), 95–104.
- Franca, C. L., Broman, G., Robert, K. H., & Basile, G. (2016). An approach to business model innovation and design for strategic sustainable develop-

- ment. *Journal of Cleaner Production*. Advance online publication. <http://dx.doi.org/10.1016/j.jclepro.2016.06.124>
- Gambardella, A., & McGahan, A. M. (2010). Business model innovation: General purpose technologies and their implications for industry structure. *Long Range Planning*, 43, 262–271.
- Gassmann, O., Frankenberger, K., & Csik, M. (2013). *The St. Gallen business model navigator* (Working Paper). St. Gallen, Switzerland: University of St. Gallen. http://www.bmilab.com/fileadmin/images/home/The_St.Gallen_Business_Model_Navigator.pdf
- Gassmann, O., Frankenberger, K., & Csik, M. (2014). *The business model navigator: 55 models that will revolutionize your business*. London, England: Pearson.
- Geissdoerfer, M., Bocken, N. M. P. & Hultink, E. J. (2016). Design thinking to enhance the sustainable business modelling process – a workshop based on a value mapping process. *Journal of Cleaner Production*, 135, 1218–1232.
- Girota, K., & Netessine, S. (2014). Four paths to business model innovation. *Harvard Business Review*, 92(7), 96–103.
- Hall, S., & Roelich, K. (2016). Business model innovation in electricity supply markets: The role of complex value in the United Kingdom. *Energy Policy*, 92, 286–298.
- Hofmann, F. (2014, October). Keynote speech at the ETRIA TRIZ Future Conference, Lausanne, Switzerland.
- Johnson, M. W., Christensen, C. M., & Kagermann, H. (2011). Reinventing your business model. In *Rebuilding your business model* (pp. 39–65). Boston, MA: Harvard Business Review Press.
- Joyce, A., & Paquin, R. L. (2016). The tripled layered business model canvas: A tool to design more sustainable business models. *Journal of Cleaner Production*, 135, 1474–1486.
- Kim, C. W., & Mauborgne, R. (2005). The blue ocean strategy: From theory to practice. *California Management Review*, 47(3), 105–121.
- KPMG. (2013, 12 February). Over 90 percent of U.S. companies are changing existing business models: KPMG survey. Retrieved from <https://home.kpmg.com/us/en/home/insights/2013/12/over-90-percent-of-u-s-companies-are-changing-existing-business.html>
- Lindgardt, Z., Reeves, M., Stalk, G., & Deimler, M. S. (2009, December). Business model innovation: When the game gets tough, change the game. Retrieved from <https://www.bcg.com/documents/file36456.pdf>
- Magretta, J. (2002). Why business models matters. *Harvard Business Review*, 80(5), 86–92.
- Malhotra, Y. (2000). Knowledge management and new organization forms. In Y. Malhotra (Ed.), *Knowledge management and virtual organizations* (pp. 2–19). Hershey, PA: Idea Group Publishing.
- Massa, L., & Tucci, C. L. (2013). Business model innovation. In M. Dodgson, D. M. Gann, & N. Phillips (Ed), *Oxford handbook of innovation management* (pp. 420–439). Oxford, England: Oxford University Press.

- Matzler, K., Bailom, F., von den Eichen, S., & Kohler, T. (2013). Business model innovation: Coffee triumphs for Nespresso. *Journal of Business Strategy*, 34(2), 30–37.
- McGrath, R. G. (2010). Business models: A discovery driven approach. *Long Range Planning*, 43, 247–261.
- McNamara, P., Peck, S. I., & Sasson, A. (2013). Competing business models, value creation and appropriation in English football. *Long Range Planning*, 46, 475–487.
- Morioka, S. N., Evans, S., & Monteiro de Carvalho, M. (2016). Sustainable business model innovation: Exploring evidencies in sustainable reporting. *Procedia CIRP*, 40, 659–667.
- Nakagawa, T. (2004, November). *TRIZ operators for solution generation in TRIZ: Clearer guide to solution paths*. Paper presented at the ETRIA TRIZ Future Conference, Florence, Italy.
- Osterwalder, A., & Pigneur, Y. (2009). *Business model generation*. Amsterdam, The Netherlands: Author.
- Ovans, A. (2015). What is a business model? *Harvard Business Review*, 93(1/2), 52–59.
- Smith, W. K., Binns, A., & Thusman, M. L. (2010). Complex business models: Managing strategic paradoxes simultaneously. *Long Range Planning*, 43, 448–461.
- Schneider, S., & Spieth, P. (2013). Business model innovation: Towards and integrated future research agenda. *International Journal of Innovation Management*, 17(1), 1340001-1-1340001-34.
- Silverstein, D., Samuel, P., & DeCarlo N. (2013). *The innovator's toolkit: 50+ techniques for predictable and sustainable organic growth*. Hoboken, NJ: Wiley.
- Shao, M., Ding, J., Ding, M., & Liu, X. (2012, October). Research on business innovation model method based on TRIZ and CBR. Paper presented at the International Conference on Business Computing and Global Informatization, Shanghai, China.
- Sosna, M., Treviño-Rodríguez, R. N., & Velamuri, S. R. Business model innovation through trial-and-error learning: The Naturhouse case. *Long Range Planning*, 43, 383–407.
- Souchkov, V. (2010, November). TRIZ and systematic business model innovation. Paper presented at the ETRIA World TRIZ Future Conference, Bergamo, Italy.
- Souto, J. E. (2015). Business model innovation and business concept innovation as the context of incremental innovation and radical innovation. *Tourism Management*, 51, 142–155.
- Teece, D. J. (2010). Business models, business strategy and innovation. *Long Range Planning*, 43, 172–194.
- Toro-Jarrin, M. A., Ponce-Jaramillo, I. E., & Guemes-Castorena, D. (2016). Methodology for the building process integration of business model canvas and technological roadmap. *Technological Forecasting & Social Change*, 110, 213–225.

- Velu, C., & Stiles, P. (2013). Managing decision-making and cannibalization for parallel business models. *Long Range Planning*, 46, 443–458.
- Velu, C. (2015). Business model innovation and third-party alliance on the survival of new firms. *Technovation*, 35, 1–11.
- Velu, C. (2016). Evolutionary or revolutionary business model innovation through cocompetition? The role of dominance in network markets. *Industrial Marketing Management*, 53, 124–135.
- Yang, M., Evans, S., Vladimirova, D., & Rana, P. (2016). Value uncaptured perspective for sustainable business model innovation. *Journal of Cleaner Production*. Advance online publication. <http://dx.doi.org/10.1016/j.jclepro.2016.07.102>
- Zhao, X., Pan, W., & Lu, W. (2016). Business model innovation for delivering zero carbon buildings. *Sustainable Cities and Society*. Advance online publication. <http://dx.doi.org/10.1016/j.scs.2016.03.013>
- Zlotin, B., & Zusman, A. (2004). *Directed evolution: Phylosophy, theory and practice*. Retrieved from <http://www.ideationtriz.com/new/materials/directedevolutionbook.pdf>
- Zott, C. (2011). The business model: Recent developments and future researches. *Journal of Management*, 37(4), 1019–1042.
- Zott, C., & Amit, R. (2010). Business model design: An activity system perspective. *Long Range Planning*, 43, 216–226.
- Williamson, P. J. (2010). Cost innovation: Preparing for a ‘value-for-money’ revolution. *Long Range Planning*, 43, 343–353.
- Wirtz, B. W., Schilke, O., & Ullrich, S. (2010). Strategic development of business models. *Long Range Planning*, 43, 272–290.

Stelian Brad is a Full Professor in Engineering and Management of Innovation and in Robotics at the Technical University of Cluj-Napoca. His current and near future research interests are in economic competitiveness, smart specialisation of peripheral zones, new clustering models, poly-centric product innovation, product-service systems, blue-design, business innovations for social and circular economy, intelligent agents for smart city technologies, and intelligent robotics. stelian.brad@staff.utcluj.ro

Emilia Brad Emilia Brad holds a PhD in Industrial Engineering. She is an Associate Professor at the Technical University of Cluj-Napoca. Her research focus is on reconfigurable systems, flexible manufacturing, eco and ergo design, lean production, social and circular economy. emilia.brad@muri.utcluj.ro



This paper is published under the terms of the Attribution-NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0) License (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).