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# What is the role of design-led innovation and design-led prototyping in developing novel business models?

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## ABSTRACT

Recently, *'business model'* and *'business model innovation'* have gained substantial attention in management literature and practice. However, many firms lack the capability to develop a novel business model to capture the value from new technologies. Existing literature on business model innovation highlights the central role of *'customer value'*. Further, it suggests that firms need to experiment with different business models and engage in *'trail-and-error'* learning when participating in business model innovation. Trial-and error processes and prototyping with tangible artifacts are a fundamental characteristic of design. This conceptual paper explores the role of design-led innovation in facilitating firms to conceive and prototype novel and meaningful business models. It provides a brief review of the conceptual discussion on business model innovation and highlights the opportunities for linking it with the research stream of design-led innovation. We propose design-led business model innovation as a future research area and highlight the role of design-led prototyping and new types of artifacts and prototypes play within it. We present six propositions in order to outline future research avenues.

**KEYWORDS:** *design-led innovation, business models, business model experimentation, business model prototyping.*

## INTRODUCTION

Changes in today's global economic environment require firms to revisit traditional assumptions of the industrial era about how businesses create and capture value (Teece, 2010). Thus, business models and business model innovation have been focal elements of discussions in management practice and literature (Amit, Zott and Massa, 2010; Johnson, Christensen and Kagermann, 2008). A technology is of little value if it is not commercialised via a differentiated business model. However, developing a novel business model to capture the value from technologies is not a trivial task, neither for start-ups nor for established firms (Chesbrough, 2010). Existing practice-oriented case studies on business modelling highlight the central role of the 'value proposition' in order to link a technology to economic returns. In addition, the capability of business model experimentation is vital in order to identify radical new value propositions and business models, and to collect the data supporting it. However, the literature presents little understanding about how to facilitate business model experimentation (Chesbrough, 2010). In design-led innovation, the iterative process of proposing 'radical new meanings', the act of creating visual representations, and prototyping are central. However, existing work on design and design-led innovation is not sufficiently linked to the concept of business model and business model experimentation (Verganti, 2011). There is a significant gap between both streams of literature and practice. The role of design-led innovation in developing novel business models is unexplored and misunderstood.

To bridge this gap, the following conceptual paper aims to understand how design-led innovation can facilitate the development of novel business models; it explores the role of prototyping and artefacts in design-led business model innovation. The paper is structured as follows: in the following section, we review and critically discuss relevant literature pertaining to the concepts of business model innovation, experimentation, design and design-led innovation. Subsequently we discuss our research propositions and conclude with a hypothesised research agenda.

## **BUSINESS MODEL INNOVATION AND DESIGN LED-INNOVATION – EXISTING LITERATURE AND CONCEPTUAL FOUNDATION**

'*Business model*' and '*business model innovation*' have acquired generous interest in recent fields of research such as strategic management, innovation and entrepreneurship (Amit, Zott and Massa, 2010). Despite their recent popularity, these areas are not new. The concept of the business model has been around for quite some time, however what is a new concept is how a '*design-led innovation*' approach may facilitate the process of modelling novel business models for (new) technologies (Verganti, 2011). Both areas have not sufficiently been linked and studied before as a conglomerate. In the following section, both concepts are briefly introduced.

### **Business model innovation and new technologies**

Nowadays, the term '*business model*' is ubiquitous and seems to be central to today's management practice (Margretta, 2002; Johnson, Christensen and Kagermann, 2008). All businesses either explicitly or implicitly employ a particular business model that describes the value creation, delivery, and capture of the mechanisms it employs (Teece, 2010).

In existing literature, the concept of the '*business model*' has been defined and referred to in various ways; as a statement, a description, a representation, an architecture, a conceptual tool or model, a structural template, a method and so forth (Amit, Zott and Massa, 2010). Thus, there is no consistent definition of what a business model is. However, literature describes key components of a business model highlighting the notion of value (value stream, value proposition), monetary and financial aspects, and aspects related to a firm's exchange relationships (e.g. delivery channels) and competencies and activities (Chesbrough, 2006; Teece, 2010; Margretta, 2002; Zott and Amit, 2010).

All in all, it is widely agreed that the notion of *value* is central to any business model (Teece, 2010). A good business model needs to answer Peter Drucker's age old question: What does the (customer) value? (Margretta, 2002). As known from innovation research, answering this question is not a trivial task when developing a new business model. Further, scholars emphasize that '*designing*' business models is a crucial task for both entrepreneurs and managers and discuss tools and methods such as an activity system framework to conceptualize a new business model (Zott and Amit, 2010).

From a technology and innovation perspective, the business model takes a central element in creating and capturing value from investments in research and development (R&D); however, this is often neglected in reality (Chesbrough, 2010). The economic return a business can expect from taking a new technology to the market is dependent on the business model. That is, the business model is the heuristic logic that connects technical potential with the realization of economic return (Chesbrough, 2006). To profit from innovation, firms not only need to excel in technology development and product innovation but also in business modeling and business model innovation (Teece, 2010).

Chesbrough (2010) argues that a mediocre technology pursued with a great business model may be more valuable than a great technology exploited via a mediocre business model (Chesbrough, 2010). However, existing literature highlight that firms face significant barriers for business model innovation due to conflict with the business model already established within the firm or the industry, and the new one. The “dominant logic” represents a cognitive barrier for business model innovation. To succeed in business model innovation and to successfully link a new technology with economic success, existing literature in management science claims that business model ‘experimentation’ matters and refers to case examples of business model innovation in various industries – ranging from music industries to pharmaceuticals (Chesbrough, 2010; Sosna, Trevinyo-Rodríguez and Velamuri, 2010). Business literature argues that so called ‘*experimentation*’ helps to conceive a new business model and to generate the data needed to justify it. Case studies highlight how business model innovation is not a matter of superior ex-ante foresight; rather it requires significant trial and error, and quite a bit of ex-post adaptation (Chesbrough, 2010).

### **Business model experimentation and prototyping**

‘Experimentation’ represents a scientific method and is widely used in empirical science in order to test existing theories or new hypotheses in order to support or disprove it. Scientific experiments require rigorous research planning and implementation in order to verify and validate a hypothesis based on empirical data and observations. In social science, in particular, experiments are regularly quite difficult to implement as important variables can hardly be controlled (de Vaus, 2001).

The term ‘*experimentation*’ in the business model realm, has leant itself to the scientific notion of setting up experiments and controlling and manipulating of certain variables of the

business model to test a hypothesized outcome via empirical observations of data (e.g. such as usage data, market share, etc.). Existing literature on business model innovation also coins the term '*prototyping*' to emphasize the importance of the iterative learning and problem solving processes related to 'experimentation' when testing different solutions, and adapting them based on the results of an experiment.

For example, Biddle (2012) poses the question of how do you prototype a business model. He describes it as a quantitative description of the various interrelationships of the business model elements -in essence, a financial model. Despite this claim the idea of business model prototyping allows for assumptions to be made, which is why the business model prototype serves a dual purpose. First, the prototype helps explore various scenarios and stress test the viability (and profitability) of the venture so designed. As importantly, however, it forces the methodically calling out all assumptions.

Davenport (2009) claims that too many business innovations are launched on a whim. She claims to cure this with companies giving small investment in training, readily available software, and the right encouragement, an organization can build a "*test and learn*" capability. Companies that equip managers to perform small-scale yet rigorous experiments don't only save themselves from expensive mistakes - they also make it more likely that great ideas will see the light of day. The real payoff will happen when the organization as a whole shifts to a test-and-learn mind-set (Davenport, 2009). This test and learn mindset, is broadly defined as the company transforming to becoming design led, and requires a significant shift in the organisational cultural, leadership capability and internal process to enable such a mind set to be diffused within the organisation.

Kijl and Boersma (2010) have developed a business model engineering tool supporting business model management as a continuous design, validation and implementation cycle. But by focusing on the design, implementation and evaluation of the business model engineering tool it treats business model experimentation in the pure sense of the definition. In controlling and manipulating certain variables to test a hypothesized outcome the idea of '*experimentation*' in a business model is reached.

We believe that in discussions on business model innovation, one needs to make a clearer distinction between '*prototyping*' and '*experimentation*' of business models rather than mingling both concepts together. We propose that the concept of '*prototyping*' refers to the

unlocking a mindset representing many future possibilities not just those you plan to implement. It allows for more than one concept to be held abstractly at once while bringing the concepts into the concrete as they are needed, becoming more of a learning and exploration process. When prototyping, the iterative learning and exploration of new business model options rather than the testing of pre-defined set of hypotheses is in focus. Even though existing literature provides first insights into the importance of the trial and error process in the early stage of business model innovation, we argue that design and design-led innovation can significantly enhance a firm's capability in exploring and prototyping innovative business model options without restricting the firm to set of pre-defined alternative solutions.

### **Design and prototyping**

The significance and benefits of early prototyping have been long recognised in the field of design. To provide a deeper understanding of the notion of prototyping in design, we first need to clarify what is meant by design.

Indeed, the term '*design*' is used by many disciplines, to describe various activities. Over the years a plethora of authorities (Yazdani 1999; Cross, Christiaans and Dorst, 1996; Cross 2006) have documented its description in an attempt to constantly re-define it. Design can be used to describe a holistic and multi-disciplinary problem-solving approach that takes user needs, desires, and capabilities as its starting point and focus. Design is not a linear process (Brown, 2009). It is seen in the innovation field as the human-centered, prototype-driven approach, using designer's processes and frameworks to solve problems (Brown, 2009). Indeed, the value of design is a different way of thinking, doing things and tackling problems from outside the box (Bucolo and Matthews, 2011). Schön's (1983) reflection in action paradigm provides a useful foundation to better understand the nature of design practice.

*A designer makes things. Sometimes he makes the final product; more often he makes a representation... He works in particular situations, uses particular materials and employs a distinctive medium and language... There are more variables – kinds of possible moves, norms and interrelationships of these – that can be represented in a finite model. Because of this complexity, the designer's moves tend, happily or unhappily, to produce consequences other than those intended. When this happens the designer may take account of the unintended changes he has made in the situation by forming new appreciations and understandings and by making new moves. He shapes the situation, in accordance with his initial appreciation of*

*it, the situation 'talks back' and he responds to the situation's back-talk. In a good process of design, this conversation with the situation is reflective. In answer to the situation's back-talk, the designer reflects in action on the construction of the problem, the strategies of the action or the model of the phenomena, which have been implicit in his moves (Schön 1983, p.78).*

It is the nature of the discovery within the design process which Schön refers to as reflection which point to the value of prototyping. The work of Polanyi (1998) and Ehn (1988) provide a further foundation to consider early stage or conceptual design activity, where discovery is intensified and can be observed. Both works refer to design as a process of making new discoveries by constructing alternative futures. In all three approaches the interaction between the designer and their artifacts during this phase of design activity is seen as a contributor to discovery and new knowledge.

In Schön's (1983) initial description of the reflection in action paradigm he describes the sketch as talking back and revealing issues to the designer. He notes that the evolving physical prototype is a yet more active and evocative participant than the sketch as it responds through physical behaviour allowing the designer to obtain feedback through seeing, smelling and hearing the prototype. However within design, there is no common classification of prototypes. Stoll (1999) defines four types of physical models (artifacts)

- appearance models – communicating how the product might look;
- behavioural models – investigate how the design idea might be used or operated;
- functional models – how the concept may operate or perform its function; and
- design verification units – used to validate or confirm the final design.

Erickson (1995) further defines categories of physical models. He argues that to be most effective as a medium for interaction, prototypes should have two properties - accessibility and roughness. Any member of the team, regardless of location or skill level, should be able to modify the prototype. Roughness decreases the level of commitment to the design, therefore leaving the design team more open to considering change.



When prototyping business models, one may also categorize different prototypes. However, there is a lack of knowledge about appropriate prototypes dimensions and categories to prototype the business model, as opposed to products and services.

### **The strategic-value of design and design-led innovation**

Recent research indicates that companies who use design in their business perform better economically in the marketplace (Cox, 2005; Borja de Mozota, 2003; Dell'Era, Marchesi and Verganti, 2010; Moultrie and Livesey, 2009). Research by the UK Design Council on the performance of firms and the impact of design on firms' performance found that over a ten-year period of analysis, the benefits of effective use of design include an improved share price performance and therefore greater shareholder returns (UK Design Council, 2004). Design enhances the outcomes of numerous innovation activities, bringing benefits such as increased quality of goods and services, improved production flexibility and reduced material costs (Cox, 2005). Design is increasingly being viewed as a vital and important strategic business resource (Dell'Era, Marchesi and Verganti, 2010). Consequently companies worldwide look to design to help them innovate, differentiate and compete in the global marketplace.

According to Verganti (2008) *design driven innovation* is a strategy that aims to radically change the emotional and symbolic characteristics of products and services through a deeper understanding of broader changes in society, culture and technology. Rather than being driven by user needs or technological developments, design driven innovation is pushed by a firm's vision about possible new product meanings and languages that could diffuse in society (Verganti, 2008). Firms using design driven innovation are competing through products and services that have a radical new meaning: those that convey a completely new reason for customers to buy them (Dell'Era, Marchesi and Verganti, 2010). Dell'Era, Marchesi and Verganti (2010) identify design driven innovation as innovation where novelty of message and design language are significant and prevalent compared to novelty of functionality and technology. This is based on the idea that each product holds a particular meaning to consumers and that the style is just possible rhetoric that can be exploited to communicate it.

*Design led innovation* describes a managerial approach to culturally embed design within a business and to enable strategic and radical innovation. It is this difference that affords design led innovation a unique opportunity for radical innovation in business value propositions by using the designer's sensibility and methods to match people's needs with what is technologically feasible and what a viable business strategy can convert into customer value and market opportunity (Brown, 2009).

In order to create and foster strategic innovation designers continuously toggle back and forth between analysis and synthesis and operate both in the *concrete* and *abstract* world also known as prototyping (O'Mahony and Bechky, 2008). Instead of directly moving from *observations* to *solutions*, they make use of 'frameworks' and 'imperatives': *Observations* help to collect data about the real world. Further, design-led innovation relies on frameworks to *reframe* observations and develop a new problem statement. *Imperatives* translate the problem statement into a value proposition, but not the features or capabilities of the solution. These imperatives and ideas are then turned into *solutions* and *artefacts* (Beckman and Barry, 2008).



**Figure 1:** The Design –Led Innovation Framework  
(Bucolo and Matthews, 2011)

The framework (figure 1) acknowledges that within any business a continuum exists between operation and strategic activities and these activities that have an internal and external focus. Different organisational groups and staff are tasked with these different activities and have specific KPI's, dependant on their functional role within the organisation. Core to this

framework is that to achieve strategic impact any innovation should create change at all levels of the business and therefore a key objective of the model is to identify and design these changes at the time of conception rather than at launch. Within this design led innovation framework, the notion of the prototype take on a new and extended meaning to what has been described by Stoll (1999) and Erickson (1995). The prototype represented as the opportunity or proposition is the bridge between the operational and strategic activities within the firm and links internal and external stakeholders in the ongoing development of the opportunity. The business value proposition is central to the opportunity being considered, however the prototyping which occurs as part of this framework focuses how these macro dimensions both inform and are informed to challenge existing thinking. Design-led prototyping links the project as well as the business perspective, thus, enabling firms to brake with existing mental model, and common beliefs about how firms create and capture value. To sum up, design-led innovation as an approach may provide the conceptual background for further investigating the notion of business model prototyping. To do so, designers need to speak the same language and to become familiar with concepts of strategic management and business modelling.

## **NOVEL BUSINESS MODELS AND DESIGN-LED BUSINESS MODEL INNOVATION – A PROPOSITION AND RESEARCH AGENDA**

In order to create novel business models, prototyping is an imperative. When prototyping, the iterative learning and exploration of new business model options rather than the testing of pre-defined set of hypotheses is in focus. Design and design-led innovation may significantly enhance a firm's capability in exploring and prototyping innovative business model options without restricting the firm to a set of pre-defined alternative solutions. Design enables business model innovation to make new discoveries by constructing alternative futures. Further, business prototypes and artifacts in different forms and levels of abstraction may enable business model "designers" to toggle back and forth between the real and abstract world and explore radically new business model options.

To initiate a new research agenda, our propositions are as follows:

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- (1) Design-led innovation facilitates business model innovation by conceiving novel business model 'propositions' implying 'meanings' for the customers and thus linking it with the various dimensions of a business model

From a 'technology' and 'functional' world view, problem solving moves from technological functions and solutions directly to observations. However, we propose that design-led innovation will help to reframe the problems and propose business model 'propositions' that 'mean' value for the customer. Design-led innovation may facilitate constant back and forth movement between the abstract and real world, across all dimensions of business models such as markets, pricing, delivery channels, resources, business relationships and so on. Design-led innovation may start from the comprehension of subtle and unspoken dynamics in sociocultural models and may result in proposing radically new meanings for how a firm's creates and captures values (Verganti, 2010). Further, it may help to challenge the existing and dominant business model in a firm's industry by linking new technologies to new 'meanings' with customers and partners. Thus, design-led may enable new entrants in mature markets to 'disrupt' not just from a technology point of view but also from a business model standpoint. Future research may address questions such as: What factors influence the conception of business model 'propositions' that 'mean' value for customers and 'value' for partners? How can we describe in more detail 'meaningful' business model propositions which link meaning not just to a product or a service but to the business model including a firm's value chain partners, pricing models, etc.?

- (2) Design-led innovation facilitates business model innovation through the creation of new business prototypes both in the real and the abstract world, and by using artifacts to make both the novel business model and the process of business modelling more tangible

Thus, the conception and experimentation with novel business models is challenging. In business model literature, there are a variety of tools and frameworks used to describe and develop new business models (Zott and Amit, 2010); some of them do so by creating visual representations (Chesbrough, 2010; Osterwalder and Pigneur, 2010). Design-led innovation may significantly enhance existing tools used to create such representations of business

'What is the role of design-led innovation and design-led prototyping in developing novel business models?'

models. As pointed out above, designers make use of various types of prototypes and artifacts in both the real and the abstract world. Design-led innovation makes use of tools to create representations of observations, ideas and solutions. Throughout the process of design various tools help to create 'tangible' representations of *observations, frameworks, imperatives (or ideas) and the final solution*. They make the intangible tangible and help to move back and forth between the abstract and real world.

Future research may address such questions as: What are the categories of business prototypes and artefacts used for business model prototyping? What criteria help to describe and classify the role of different prototypes used in creating visual representations of novel business model ideas in the abstract world and prototypes of radical business model solutions in the real world? What tools are required to make the process of business prototyping more tangible?

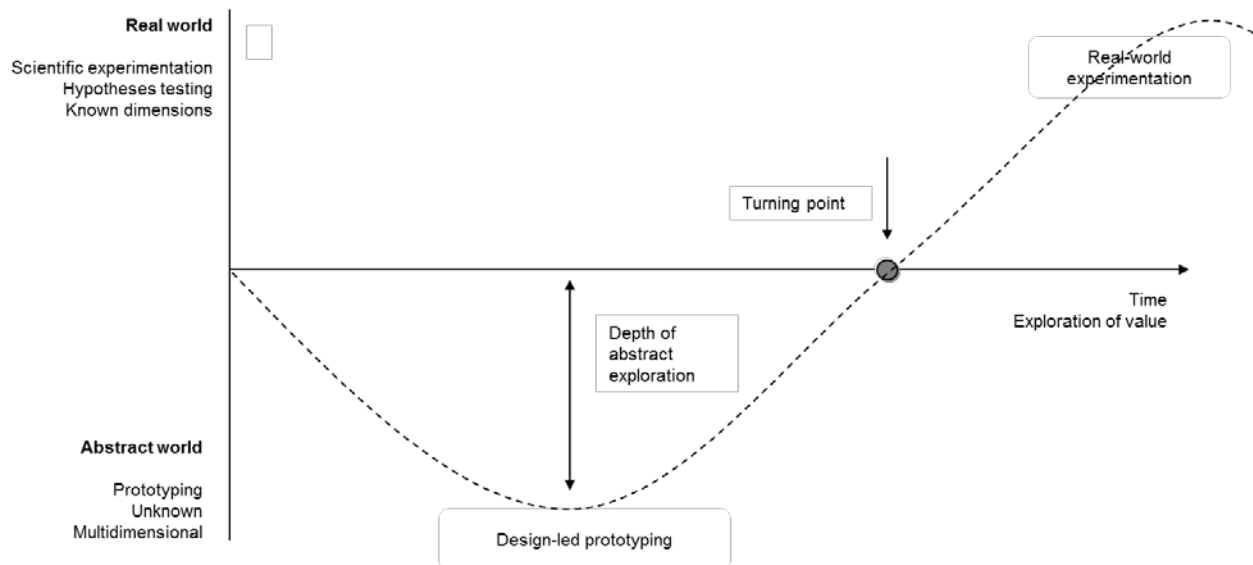
- (3) Design-led innovation facilitates and accelerates the process of prototyping and the exploration of 'disruptive' business models by engaging in 'deep' abstraction.

To explore 'novel' business models, firms need to challenge their existing beliefs about their business models; thus, prototyping is essential. As discussed above, design-led *'prototyping'* refers to the unlocking a mindset representing many future possibilities not just those a firm plans to implement. It allows for more than one concept to be held abstractly at once while bringing the concepts into the concrete as they are needed, becoming more of a learning and exploration process. To explore the 'unknown' firms should not restrict themselves to a set of pre-defined alternative solutions. Design-led innovation may facilitate the exploration of new business model option by moving far away from the concrete and real world (see figure 2) and prototype and test business model options in the abstract world. A 'deep dive' into the abstract world to explore unknown alternative solutions is essential in the early stages of the prototyping process and design-led innovation may facilitate this process significantly. However, in some stage designers have to move back into the real world and engage in what we call "experimentation' and testing of predefined solutions.

Future research may address questions such as: What is the appropriate 'depth' of abstraction for business model prototyping to accelerate the process of prototyping without moving too far away from the 'real world'? How does this vary across different types of firms and industries? What is the right turning point (see figure 2) when prototyping business model options? What

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is the relative role of artefacts for creating visual representations of radical business model ideas in the abstract world and prototypes of radical business model solutions in the real world throughout the process of conceiving and testing business model ideas? How does the 'maturity' of the business model prototype influence the success of business model prototyping?



**Figure 2:** Design-led prototyping in the abstract world and real-world experimentation

- (5) Design-led innovation facilitates business model innovation with a new design capability and new functional roles of designers

Designers and design-led innovation is about challenging existing beliefs, problems, and solutions, and thus, it is obvious that design-led innovation may support the conception and testing of novel business models. This highlights the need for designers to function in parallel with corporate decision makers. Thus, design-led business model innovation may build upon the next generation of designers equipped with new capabilities and skills. These new designers are familiar with models and concepts in strategy and business model innovation. Further, design-led business model innovation may require new organizational capabilities and functions. For example, Norman (2010) proposed the idea of “transitional engineering” –

a third discipline inserted in the middle of business and design – to translate between the abstractions and fuzziness of design through to the realities of business. However, we propose that design-led business model innovation may also imply a set of new organizational capabilities to overcome the gap between the validity focus of business people and the creation of tension of designers. Traditionally business people are rewarded when budgets are met, hitting financial targets and proving in advance incentives will succeed. Using analytical tools such as linear regression to help them substantiate reliability on the basis of past results; if this has happened in the past, therefore it will happen again. This contrasts with the notion of prototyping in the ‘abstract world’ and exploration of the unknown.

Thus, future research may answer the questions like: What are organizational capabilities required to engage in design-led business model innovation? What are appropriate tools to be used to close the gap between the traditional ‘business world view’ and the ‘design world view’? What new skills need designers learn to engage in design-led business model innovation? What new functions and roles – such as transitional engineering - are required to enable for design-led business model innovation?

- (6) Design-led innovation facilitates business model innovation by engaging with customers and stakeholders and conceiving future value co-creation options

To conceive and design novel business model value propositions, it requires firms to envisage future options of value creation and capture. However, in novel and meaningful business model innovations, value is not created by one single firm. It is created within the network of different stakeholders (Adner, 2006). Especially in services value is co-created by a large number of stakeholders collaborating in a service system and contributing tangible and intangible assets and resources to the value creation process. Further, the ‘meaning’ of business models is not delivered but is also ‘co-created’. Thus, designing novel business model propositions implies designing future ‘co-creation’ opportunities. Such opportunities may require the interaction and involvement with different stakeholders – including customers and complementary partners. Design-led innovation as a participatory and iterative process may facilitate this progression by proposing future value propositions to various stakeholders, communicating value through the co-creation processes and also prototyping them in a collaborative manner.

Future research may investigate questions such as: What tools and frameworks are required to design future 'co-creation' processes? How and at what point of time should design-led innovation involve different stakeholder groups in business model innovation to propose new business value propositions and future value co-creation processes? What are organizational contingencies for involving different stakeholders throughout the process of business model prototyping?

## **OUTLOOK**

Future research may investigate our propositions with qualitative and quantitative research methods in order to open the black box of design-led innovation. We assume that exploratory research may help to get a deeper understanding on how design-led innovation facilitates business model innovation. In the long run, longitudinal analyses of business model innovation case studies may enhance the understanding of design-led business model innovation and its impact on the successful adoption and growth of new business models. At this stage, we cannot draw any conclusions. We hope that this paper is the start of an explorative effort to come and paves the way for a new stream of research from scholars in areas of innovation and strategy, whether they come from design, management, technology, or engineering.

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