Factors for Success in Business Model Innovation

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The goal of this paper to identify the success factors for business model innovation, evaluate the theoretical hypotheses statistically with partial least squares, and give recommendations for managerial actions on the basis of a cluster analysis. A cross-industry management survey was done to collect the sample data. The study consists of ten constructs, that are all critical components of a business model. To assess the complex nature of business model innovation, we choose a second-order SEM-model. The contribution of this paper to the management literature is achieved by providing concrete and validated entrepreneurial action strategies for superior economic growth.

INTRODUCTION

In recent years, the topics around the development of changed business models have been the focus of both managers and researchers as well (Seidenstricker, Scheuerle, & Linder, 2014; Planing, 2018; Clauss, Kesting, & Naskrent, 2018; Ritter & Lettl, 2018). For instance, the IBM CxO studies (IBM Global Business Services, 2018) suggested that the awareness of top management has significantly increased due to business model innovation. It has been argued that innovation across traditional product and process development tends to have a higher possibility to create a competitive advantage in the long run, which was also mentioned by Reymen et al. (Reymen, Berends, Oudehand, & Stultiëns, 2017). Therefore, the reasons suggested are that it is nowadays more difficult to differentiate based only on products or services and, furthermore, business model innovation strategies tend to be harder for competitors to imitate than pure product innovations (Spieth & Schneider, 2016). This refers to the complexity of the business innovation process, which needs to fit the company´s culture, its core competencies and the corporate strategy. Furthermore, according to several authors, business model innovation tends to create a strategic flexibility, which refers to flexibility in resource allocation, coordination and capabilities (Clauss, 2017; Spieth & Schneider, 2016). Therefore, to overcome the new challenges (Planing, 2018) and to delay "the end of competitive advantage" (McGrath, 2013), it is necessary for enterprises to adapt to the new form of innovation. Therefore, it can be seen as a major priority for managers in business practice. Further, Hacklin, Björkdahl, and Wallin (2018) pointed out that especially when value is migrating e.g., through

the effect of industry convergence or digital disruption, firms continuous need to evaluate if the current business model is threatened, and if so, managers are advised to pro-actively update their business model to adapt it to the new value landscape.

An important field of interest, for this study, is the research area of innovation success factors. Major efforts have been expended to investigate and validate the critical success factors for innovation and, therefore, to create strategies and an information basis for future-oriented and successful entrepreneurial decision-making in general. With regard to quantified empirical analysis, the contribution in this area has been mainly focused on product development, which could be seen after extensive exploration. Therefore, this paper aims to extend the field of innovation success factors. In the first step, a literature review was done to identify already validated, and probably suitable, variables for success, which were primarily from the field of innovation. Based on this knowledge, theoretical hypotheses were derived. To operationalize the constructs, the literature review was extended to the sub-fields of the predefined dimensions and hypotheses. The goal was to identify the studies, which have statistically validated their results. Next, the Bureau van Dijk Orbis database was used to collect the necessary enterprise data for the business survey. To assess the cross-industry character of the topic, companies from six sectors, including the mechanical engineering industry, electrical industry, pharmaceutical and chemical industry, automotive industry, metalworking industry and the construction industry, were selected. The sample survey was based on a standardized questionnaire, which was sent out to members of top management in order to reach high quality results. To measure the validity of the reflective-formative second-order model, the partial least squares regression analysis (multivariate analysis) was chosen. In the last step, the two pre-defined clusters "successful companies" and "less-successful companies" were analyzed, due to their different average values per success item. This was performed to obtain information about "what actions do successful companies do better?" and, after all, "what managerial actions increase the success of the business model innovation?"

THEORETICAL BACKGROUND

Business Model Definition

The literature provides numerous definitions of the term business model (Wirtz, Pistoia, Ullrich, & Göttel, 2016; Planing, 2018) and, furthermore, the literature still provides no agreement on how to define it (Spieth & Schneider, 2016; Ritter & Lettl, 2018; Metallo, Agrifoglio, Schiavone & Mueller, 2018). Some researchers have argued that a business model can be seen as a framework of the essential objects and elements of activities, and their combination and interactions with each other (Ritter & Lettl, 2018). Several authors have followed this understanding, such as Johnson, Christensen and Kagermann (2008) and Mitchell and Coles (2003). To be more precise, Amit and Zott (2001), with their new sources of value creation, Osterwalder and Pigneur (2010, p. 16f.), with their nine building blocks, and Pateli and Giaglis (2004), with their new framework for e-business, provide concrete insights into that abstract logic of the business model elements. Wunder (2016) describes a business model as "a simplified expression of the anticipated mechanisms how the business is supposed to be successful in its competitive arena", and furthermore, "it can be considered as a refinement of strategy on a business level." (Wunder, 2016, p. 222). The goal of the declared interaction is to create, deliver and capture customer value, with the company's offerings (Amit & Zott, 2010; Chesbrough, 2010, Ritter & Lettl, 2018). Further, customer/partner interaction, communication and the creation of a unique selling proposition are mentioned. To sum up, there are three basic pillars of business model innovation, which can be found: the value proposition defines which value is offered to a specific customer group, the value creation and delivery defines how the value proposition is realized and delivered to the customer and, lastly, how the company creates a profit with it, which is defined as the value capture (Wunder, 2016, p. 222f.). These three elements are also the basis of the common business model frameworks, which are known as the Business Model Framework (Abdelkafi, Makhotin, & Posselt, 2013), Magic Triangle (Gassmann, Frankenberger, & Csik, 2014), the Four-Box Business Model (Johnson, Christensen, & Kagermann, 2008), and the Business Model Canvas (Osterwalder & Pigneur, 2010).

Business Model Dimensions

To identify suitable variables for business model innovation success, the identification and understanding of the various dimensions and sub-elements is essential. In order to obtain a holistic framework of business model innovation, which includes all elements, we concentrated on the work of Clauss (2017). In his study, he reviewed papers from 2002 to 2014, in order to identify the most commonly named dimensions and elements. He identified 115 factors, which can be assigned to the already named three basic pillars of business model innovation: value proposition, value creation and value capture (Clauss, 2017; Serrat, 2017; Clauss, Kesting, & Naskrent, 2018). In the following, several innovation components are named and aggregated to develop a suitable framework for this study. Due to the value proposition innovation, four sub-elements are named: new offerings, new customer segments/markets, new channels and new customer relationships. The dimension value creation consists of new capabilities, new technologies and equipment, new processes and structures and new partnerships. The third basic dimension, the value capture, is clustered into new revenue models and new cost structures (Cantamessa & Montagna, 2016; Clauss, 2017). To assign the potential success factors of business model innovation, we choose to cluster it into six main dimensions. Firstly, the customer value proposition defines which values are offered towards the customer, with a view to the competitor's actions (Cantamessa & Montagna, 2016; Clauss, 2017; Wirtz, Pistoia, Ullrich, & Göttel, 2016; Clauss, Kesting, & Naskrent, 2018; Ho, Nguyen, Adhikari, Miles, & Bonney, 2017). Therefore, it includes the identification and formulation of customer value and the design of the specific product advantage, which solves the customer's problems in new, or even better, ways (Johnson, Christensen, & Kagermann, 2008). The second dimension, the competencies and technologies, firstly defines the aggregation of technological resources, which are required to realize the business model innovation (Clauss, 2017). It should be noted, however, that the alignment of new technological possibilities and business models, has been argued as an important success factor for business model innovation (Wei, Yang, Sun, & Gu, 2014). Secondly, the company's competencies and capabilities are also integrated in this dimension. It defines the development and use of unique capabilities, which allows one to identify, capture and use the potential opportunities of the external environment (Clauss, 2017; Cantamessa & Montagna, 2016). Therefore, it can be seen as the specification of the important internal and external input factors of the business model (Wirtz, Pistoia, Ullrich, & Göttel, 2016). Seidenstricker and Linder (2012) pointed out the potential of this dimension for technical entrepreneurs. The next dimension was argued to be of special importance in the literature and is defined as channels and customers. This dimension should clarify which customers a company wants to address with its specific offerings, which communication and distribution channels should be used to reach the highest efficiency and which relationships towards the customer are suitable for the creation of customer loyalty. The networks and partners element deals with the design of the mostly external relationships and interactions. The integration of partners and the development of networks has important strategic value for a company, because it is possible to extend their own knowledge base and, furthermore, it has a significant impact on the value creation (Cantamessa & Montagna, 2016; Clauss, 2017; Wirtz, Pistoia, Ullrich, & Göttel, 2016). The value creation structure and processes dimension defines the business model processes and their connection with each other, which are crucial for the sustainable realization of the value proposition (Clauss, 2017; Seidenstricker, Rauch, & Battistella, 2017; Clauss, Kesting, & Naskrent, 2018). Further, Zott and Amit (2010) have argued that this dimension should include the processes needed for internal value creation, as well as the processes for integrating customers and partners. In the last dimension, which is named as the financial dimension, the development of new revenue models and new cost structures are of importance (Cantamessa & Montagna, 2016; Clauss, 2017). Therefore, firstly it defines how, and in which way, costs through business model activities emerge and, secondly, how the company can create revenue when delivering value to the customer.

To sum up, the identified success factors are assigned, in the later stages, to the following dimensions:

- Customer value proposition
- Competencies and Technologies
- Channels and Customers

- Networks and Partners
- Value Creation Structure and Processes
- Financial

Empirical Innovation Success Factor Research

The empirical research field of critical success factors, nowadays, is a far-reaching sector in the management literature and a recognized area in science. It originates from the organizational theory approach and is referred to the 1960`s with the, from General Motors initiated, PIMS study. The goal was, firstly, to identify the variables, which are critical for business success, and, therefore, to generate knowledge about the factors that influence the success or failure of innovation and, secondly, to derive recommendations for managers (Heilmann, n.d.). The fundamental hypothesis (in other words, the raison d'être of this research area) was that, despite of the multidimensional nature and the multiple causes of business activities, a few variables still exist that are critical for the successful realization (Ram & Corkindale, 2014). As can be seen, the studies differentiate strongly both thematically and methodically (Craig & Hart, 1992). One reason is, that the contribution, especially to new product development, comes from various research areas. These include: the management, marketing, R&D and engineering, which shows the "interdisciplinary nature of NPD" (Craig & Hart, 1992). It is also mentioned that this complex network leads to a "confusing body of literature". Furthermore, the authors argue that the studies differentiate, based on the object of investigation. These can be clustered into studies, which explore: successful innovations (Cooper & Kleinschmidt, 1993, 1995), studies that investigate unsuccessful innovations (Calantone & Cooper, 1979, Crawford, 1977), which are mostly studies of the earlier stage of research, and a combination of both (Cooper, 1979). The methodological approach and the type of innovation (e.g., product or process innovation, incremental or radical innovation), are also important differentiation criteria. Methodologically, they differ between the use of quantitative or qualitative (exploratory or confirmatory) empirical methods and in terms of the population, which is being studied (e.g., cross-industry and transnational research). This context leads us to a first point of criticism on success factor research. A number of authors have argued that the predominant use of exploratory methods is a major problem, which leads, in many cases, to an insufficient empirical foundation. According to Dömötör (2011), the criticism of success factor research can be clustered into three topics. Firstly, he refers to the principle of multiple causality. Many authors have argued that the complex networks of internal and external interdependent variables, which represent the business success, cannot be reduced to single factors. March and Sutton (1997) supported this statement and extended it with criticism of the retrospective sample basis. In contrast, Brown and Eisenhardt (1995) argued that the success factor research field is very important, because it has contributed by creating an extensive understanding of the controllable factors for success. The second point refers to the content-related factors, particularly, in this context, the dominance of the marketing perspective, and, thus, the substantive imbalance has been named. Furthermore, the authors argue, that the use of various different independent variables leads to an insufficient comparability of the studies. In terms of methodological criticism, Dömötör (2011) firstly named the data collection. In this context, he listed the "self-selection bias" that occurs if there is an imbalance of "innovative" and "less-innovative" sample participants. Therefore, to overcome this bias in this study, care has been taken to keep this balance. The "key informant bias", which is also named, occurs if the questionnaire is not answered by competent persons. The last cluster refers to the analysis of the collected samples. The difference in operationalization of constructs is an often-mentioned problem (Ernst, 2002; Henard & Szymanski, 2001), as well as the inconsistency of the applied data analysis methods. This is given if univariate and bivariate methods are used instead of the required multivariate methods, to describe complex dependency structures.

THEORETICAL FOUNDATION AND HYPOTHESES

The empirical innovation success factor research is characterized by a high number of published articles. To give an overview regarding the large variety of studies, a significant number of meta-analyses

were initiated. It should be noted that the innovation research field has shifted, in the mid 1990s, from the project level to the enterprise level. This was initiated by Maidique and Zirger (1985), who mentioned that the identification of innovation success factors on a project level is not useful, because of the lack of consideration of the learning curve and further success factors, which are not taken into account. This can be seen as an important aspect for this study, because business model innovation cannot be seen as a project, rather, as a "refinement of strategy on a business level" (Wunder, 2016). To identify major success factor topics and to identify potential studies, which could include potential determinates for business model innovation, we analyzed the often-cited meta-analysis. In the following, the meta-analysis studies are presented.

The meta-study of Evanschitzky et al. (2012) examined the previous work on the success factors of product innovation. This study referred to Henard and Szymanski`s meta-analysis and updates and, in addition, extended their findings by analyzing 233 studies from 1999 to 2011. The identified predictors were categorized into product characteristics, strategy characteristics, process characteristics, marketplace characteristics and, finally, organizational characteristics. The authors discovered that process and strategy aspects especially had the most significant impact on new product success, whereas organizational aspects and the marketplace characteristics could be seen to be less important, but were also significant. Compared to the original study, it can be seen that the fixed effects were, in most cases, significantly lower. Further, the question arises, why was the predictor "product meets customer needs" especially identified as non-significant, whereas in Henard and Szymanski`s study, it had one of the most significant impacts.

Song et al. (2008) studied the success factors in new technology ventures. The authors identified 24 variables, which were analyzed with Hunter and Schmidt´s methodology. They clustered them into the following dimensions: market and opportunity, entrepreneurial team and resources. The authors found eight meta-factors, which had, due to their evaluation, significant positive and homogeneous effects on the performance of new ventures. They also named three moderators, whose positive impact depends on the given new venture situation. These were: product innovation, R&D alliances and the enterprise type.

In his study, Ernst (2002) concluded the empirical work in new product development, with an extensive focus on the papers of Cooper and Kleinschmidt. The considered success factors were categorized into the new product development (NPD) process, organizational aspects of new product development, cultural aspects, the role and commitment of senior management and the new product development strategy. He showed that a formal or informal development process is the basis for a successful realization of new products. Furthermore, the intensive initial planning, as well as the clear alignment of the process on the market requirements, positively affects the success. The customer integration into the development process, especially in the early and late stages, were also considered as a positive aspect. Further, the organization of the project, which refers to the separation of new product project teams from the daily work routine, cross-functional teams, autonomy and communication are presented. The management support, in addition to a suitable resource provisioning and the utilization of synergies (marketing and R&D – cooperation), are also variables for success.

Henard and Szymanski (2001), with their meta study "Why some new products are more successful than others", examined 41 studies with a correlation analysis. The 24 considered variables were allocated to the clusters: product characteristics, company strategy characteristics, company process characteristics and marketplace characteristics. Ten of these variables could be identified as dominant factors. These included: the market potential, dedicated human resources, marketing task proficiency, product meeting customer needs, product advantage, predevelopment task proficiency, dedicated R&D resources, technological proficiency and the launch proficiency. From the tested variables, the product advantage, compared to competitor's products, and the use of technological synergies, had the most significant influence on success.

The meta study of Montoya-Weiss and Calantone (1994), aimed to identify and validate the success factors of 47 empirical studies. The authors categorized them into four dimensions, which were named as: strategic factors, development process factors, market environment factors and organizational factors. Of the 18 considered factors, four major success factors could be selected. Like Henard and Szymanski's

study (2001), this study selected the product advantage as the major performance variable, with further factors, including strong marketing activities, technological knowledge and internal process skills. The consideration shows the parallels of the categorization of success factors among several authors. These factors can be clustered mainly into the following groups: ***strategy, market, culture, organization, product and process.***

In the following step, specific variables that relate to these clusters, and which are probably suitable for business model success are identified and the theoretical hypotheses are derived. In order to ensure the actuality of this paper, and to find suitable variables, the literature review on potential factors was extended to studies, which had considered an innovation project as a basis.

The organizational culture is a well-known field of research, especially in management, marketing and organizational behavior, and it comes from cultural anthropology (Hogan & Coote, 2014). It relates to the shared value systems, norms and beliefs of an organization and its individuals (Jassawalla & Sashittal, 2002), which can lower the coordination effort of the structural mechanisms, through supporting it as guidelines for decision-making and acting, and leading to the required behavior, which supports innovation (Hall, 1993; Hogan & Coote, 2014). Furthermore, it has been empirically confirmed, that culture significantly impacts market-oriented behavior, financial performance and organizational performance (Hogan & Coote, 2014). As has been mentioned, some aspects of the corporate culture can support the innovativeness and can be seen as key for successful innovation (Frohman, 1998; Ismail & Abdmajid, 2007). Therefore, if innovation itself and the willingness to change is embedded in the organizational culture, it can also support and enhance the innovativeness of the company (Frohman, 1998; Jassawalla & Sashittal, 2002). In this context, many studies refer to product or process innovation. Thus, it is reasonable to suggest that a few of the validated success factors of the specific innovation fields are also suitable for business model innovation. Therefore, especially generally factors, like the openness towards new ideas (Isaken & Lauer; 1999; Kademir & Hult, 2005), the willingness for change (Frohman, 1998; Isaken & Lauer; 1999), and a risk-taking behavior are taken into account (Ernst, 2003; Isaken & Lauer; 1999). Specific product innovation variables, like the existence of product champions, the often-mentioned top management support, cross-functional teamwork, etc. were excluded. Therefore, the first hypothesis can be derived:

H1*: An innovation-friendly management culture positively affects the success of the business model.*

The product advantage can be seen as a crucial factor for the success of new products/services (Evanschitzky, Eisend, Calantone, & Jiang, 2012; Montoya-Weiss & Calantone, 1994) and is, according to Langerak, Hultink, and Robben (2004), supposed to lead to new organizational performance. It can be defined either with a view on customers, or with a focus on competitors (Ho, Nguyen, Adhikari, Miles, & Bonney, 2017). Song and Montoya-Weiss (2001) argued that it is a product's perceived advantage relative to the competitor's products, whereas other authors refer to it as the benefits the customers get from the offerings. The elaboration of benefits for the customer, with a focus on the competitor's offerings can, therefore, be seen as an essential prerequisite for the success of the innovation and, thus, it can be presumed that the clear formulation of the value proposition forms the basis for successful business model innovation (Serrat, 2017). Companies that analyze their competitive situation and their potential customers are supposed to better react to their needs. A value proposition, which is directed to the company philosophy and its goals, was also mentioned as a critical point (Frauenhofer MOEZ, n.d.). Furthermore, the product design and the orientation of the value proposition, due to the customer's perceived value, can be done by various means (Sweeney & Soutar, 2001) and, therefore, needs to be defined, specifically for the target group. When defining and formulating the value proposition, it is furthermore necessary to verify, and if necessary, to adjust, the new offering with regard to its relative advantage, the perceived complexity, it´s compatibility and the visibility of the advantage in the eyes of the customer (Tornatzky & Klein, 1982). Also, we assume that the continuous analyzation of the environment is critical to identify any potential trends or future product advantages. If this is done in combination with the development of a long-term, clearly defined, positioning strategy, it can be assumed

that it will affect the success of the new business model positively. From this, two separate hypotheses can be derived:

H2: *The more clearly the value proposition is formulated, the greater is the positive impact on the success of the business model innovation.*

H3: *The more clearly the product and service advantage is visible, the greater is the positive impact on the success of the business model innovation.*

To realize a planned innovation, firstly, the acquisition of new resources and technologies is necessary. Authors have argued that a strong impact relationship exists between the degree of openness, due to external knowledge sources, and the performance of the innovation (Saebi & Foss, 2015). A company has various possibilities, for example, by leveraging their own research and development division, or the use of R&D-collaboration and technology alliances (West & Bogers, 2014). Furthermore, new technology trends or new fields of competence can be identified by technology scouting activities (Rohrbeck, 2010; West & Bogers, 2014). To increase their technology portfolio, a company also has the possibility to invest in licenses and patents (Ramani & Kumar, 2008). In order to absorb the acquired knowledge, the competence base of a company needs to be strong. Due to the dynamic capability view, effective learning processes consisting of new knowledge, which relates and ties to the already excising knowledge is necessary (Teece, Pisano, & Shuen, 1997). Sammerl (2006, p. 192) argued that the competence base of a company determines the ability to integrate new knowledge and, thus, is an indicator for the possibilities and limits of new learning processes. To do so, first it is necessary to provide adequate resources for the relevant innovation departments (Balbontin, Yazdani, Cooper, & Souder, 1999; Yap & Souder; 1994). Furthermore, market and business environmental analysis should be done to identify upcoming trends and, for example, new arising technological knowledge and market information (Cooper, 1990). The development of the employees can also be a source to increase the internal knowledge base. But, in this context, it should be ensured that the knowledge carriers are bound to the company. Due to this, the fourth and fifth hypothesis can be derived:

H4: *A professional acquisition of technologies and knowledge positively affects the success of the business model innovation.*

H5: *A distinctive innovation competence positively affects the success of the business model innovation.*

To increase the success probability of innovation projects, several authors have argued that the various process steps need to be passed systematically and formalized. Further, the innovation management literature describes the need for coordination of the activities and the involved persons. An innovation process can be seen as a sequence of successive activities, which includes, for example, various steps, like the problem identification, idea generation, analyses, development and introduction (Sammerl, 2006, p. 205-207). According to several authors, for successful innovation activities, the existence of a formal innovation process and a structural innovation management are necessary (Ernst, 2002). A step-by-step realization process and the development of phase-specific targets are also elements of a process management, and, therefore, should be taken into account (Sammerl, 2006, p. 205ff.). Further, it has been argued that the chance of success increases if the early stages of the innovation project are planned professionally and diligently (Ernst, 2002). Therefore, we assume that an early and clear project definition of the target markets, customer needs, value proposition and the positioning are critical points for business model innovation success. As has been mentioned, a competitor's actions are an important variable for defining the product advantage, because the goal is to create advantages for customers, compared to competitors' offerings (Ho et al., 2017). We, therefore, assume that the analyzation and observation of competitors, as part of the structural business model innovation process, can contribute to the success of the innovation. This leads us to the next hypothesis:

H6: *A structural business model innovation process positively affects the success of the innovation.*

In the innovation process, customer orientation and customer integration are often mentioned as critical success factors, especially in new product development and innovation (Ho et al., 2017) and are also significantly related to an increase of business performance (Appiah-Adu & Singh, 1998; Maidique & Zirger, 1990). Furthermore, the work of Jaw et al. (2010) confirmed this aspect as an important success variable. Ramani & Kumar (Ramani & Kumar, 2008) validated that it is initially important to attract and retain the most valuable customers, in order to avoid a large number of unprofitable customers. To do so, first a company needs to analyze the value that each customer contributes to the company's profit and, in the second step, to develop a strategy for those to increase the retaining rate. Frambach, Fiss, and Ingenbleek (2016) saw the following aspects as factors of customer integration. Firstly, the determination of the company's strategic goals on the basis of customer satisfaction and, thus, the creation of value for the customer should get major attention. Also, after sales service is seen as another important point. As well as customer orientation, the creation of customer loyalty is associated with an increase of business performance (Smith & Wright, 2004). In order to increase the customer loyalty, Coelho & Henseler (2012) explained the importance of service customization. Furthermore, the company's image can have a significant impact on the loyalty and satisfaction of the customer. Therefore, we derive the following two hypotheses:

H7: *The stronger the business model is aligned toward the customer, the greater is the positive impact on the success of the business model.*

H8: *The stronger the customer is bound to the business model, the greater is the positive impact on the success of the business model.*

Nowadays, especially in times of digitization, the interaction with outside partners and the development of partner networks is increasingly important. A longitudinal study between 1987 and 1996 identified that supply-chain functions and the innovation degree of a company correlates positively (Jajja, Kannan, Brah, & Hassan, 2017). In addition, authors stated that suppliers are especially crucial for developing and launching product innovations (Jajja, Kannan, Brah, & Hassan, 2017). The body of literature provides numerous success factor studies, which explore the performance impacts of external partners and networks on product and service innovation (Tripsas, Schrader, & Sobrero, 1995). For example, an analysis of project managers of engineering and research and development examined the relationship between knowledge exchange, new product development performance and the market performance (Thomas, 2013). The results showed that knowledge exchange is a major source of new product development and, therefore, affects it positively, which leads further to an increase in market performance (von Haartman & Bengtsson, 2015). The impact of R&D collaboration, as well as the collaboration with universities, customers and competitors, were also objects of the authors' research in this field. In building these networks, companies aim to extend their resources and knowledge portfolio and, in addition, to diversify and, thus, to lower the new product innovation risk (Nieto & Santamaría, 2007; Ettlie & Pavlou, 2006). In order to observe the positive impact of collaboration in product innovation, we assume that it also can increase the performance of new business model innovations. We, therefore, derive the next hypothesis:

H9: *An intensive collaboration with external partners positively affects the success of the business model innovation.*

With a view on our business model dimensions, one important aspect has not been taken into account. Therefore, our last hypothesis refers to the value capture dimension. This aspect is one of the main pillars and, thus, determines the financial success or failure of a business model innovation. This point should shed some light on the impact of an active and early design of the financial returns on the success of the

new business model. According to Montoya-Weiss and Calantone (1994), early financial analysis of the product innovation and, thus, the assurance of the financial feasibility, is a determinant of the later innovation success. Furthermore, we assume that an early and predefined pricing strategy has a positive impact on the innovation success. In addition, Ingenbleek et al. (2010) argued that the pricing should be done with a view to the customer's perceived value of the product, which is named as value-informed pricing. In order to do this, it is first necessary to analyze and identify the price sensitivity of the customer (Mishra, Kim, & Lee, 1996). With a view to this aspect, the final hypothesis has been derived:

H10: *An active and early design of the financial returns, positively affects the success of the business model.*

In the following table, the predefined hypotheses are concluded and assigned to the business model dimensions:

TABLE 1
HYPOTHESES OVERVIEW AND ASSIGNMENT

H1	An innovation-friendly management culture positively affects the success of the business model.	-
H2	The more clearly the value proposition is formulated, the greater is the positive impact on the success of the business model innovation.	Customer value proposition
H3	The more clearly the product and service advantage is visible, the greater is the positive impact on the success of the business model innovation.	Customer value proposition
H4	A professional acquisition of technologies and knowledge positively affects the success of the business model innovation.	Competencies and technologies
H5	A distinctive innovation competence positively affects the success of the business model innovation.	Competencies and technologies
H6	A structural business model innovation process positively affects the success of the innovation.	Value creation structure and processes
H7	The stronger the business model is aligned toward the customer, the greater is the positive impact on the success of the business model.	Channels and customers
H8	The stronger the customer is bound to the business model, the greater is the positive impact on the success of the business model.	Channels and customers
H9	An intensive collaboration with external partners positively affects the success of the business model innovation.	Networks and partners
H10	An active and early design of the financial returns, positively affects the success of the business model.	Financial

RESEARCH METHODS

Measures

In this study, a total number of 55 measures in the standardized questionnaire were used to represent the ten constructs. Therefore, all constructs in the model were measured with multiple-item scales. As can be seen in Tables 2-11, 14 items were adopted from the already validated models of previous research, the others were self-developed measurements on the basis of an intensive literature review. The degree of approval per item was measured with a five-point Likert scale from 1 "strongly agree" to 5 "strongly disagree". All indicators of the first order constructs were designed as reflective items.

TABLE 2
OPERATIONALIZATION OF INNOVATION CULTURE

Innovation Culture		
Code	**Item**	**Adopted from:**
IKu01	Our top management is characterized by openness towards new ideas.	(Sammerl, 2006)
IKu02	Our top management culture can be seen as resourceful.	
IKu03	Our top management is characterized by a high willingness to change.	
IKu04	The values and norms of our organization promote innovation.	
IKu05	We are willing to take risks in new innovation activities.	

TABLE 3
OPERATIONALIZATION OF INNOVATION COMPETENCE

Innovation Competence		
Code	**Item**	**Adopted from:**
IKo01	To acquire new external knowledge for innovation, we specifically analyze our business environment.	The Authors
IKo02	We provide adequate resources for our innovation management.	The Authors
IKo03	We have implemented practices for employee development and improving worker retention.	The Authors
IKo04	The processes in our company can be quickly and effectively adapted to changes.	The Authors
IKo05	We continuously perform market analysis to identify new arising trends at an early stage.	The Authors
IKo06	We are focused on the advancement of the company's core competencies.	The Authors

TABLE 4
OPERATIONALIZATION OF TECHNOLOGY AND KNOWLEDGE

Acquisition of Technology and Knowledge		
Code	**Item**	**Adopted from**
TW01	We continuously conduct technology-scouting activities to identify future arising fields of competency.	The Authors
TW02	To efficiently extend our technology portfolio, we invest in licenses and patents.	The Authors
TW03	We acquire new technological knowledge through our own R&D.	The Authors
TW04	We acquire new technological knowledge through R&D-collaboration.	The Authors

TABLE 5
OPERATIONALIZATION OF BUSINESS MODEL INNOVATION PROCESS

Business Model Innovation Process		
Code	**Item**	**Adopted from**
IP01	Our business model innovation processes pass a step-by-step implementation process (idea-generation, feasibility analysis, decision making).	(Sammerl, 2006)
IP02	In our innovation project, we develop phase-specific target systems (e.g., state-gate-process).	(Sammerl, 2006)
IP03	Our innovation process is clearly structured and understood by every participant.	(Sammerl, 2006)
IP04	We observe and analyze the value-added-structure of our direct competitors.	The Authors
IP05	We work out our project definition (target markets, product advantages, positioning) at an early stage of the business model innovation process.	The Authors

TABLE 6
OPERATIONALIZATION OF NETWORK AND PARTNER COLLABORATION

Network and Partner Collaboration		
Code	**Item**	**Adopted from**
NP01	We use collaboration with customers during innovations.	The Authors
NP02	We use collaboration with research institutions during innovations.	The Authors
NP03	We use collaboration with suppliers during innovations.	The Authors
NP04	We use collaboration with competitors during innovations.	The Authors
NP05	Our cooperative relations are designed for long-term partnership.	The Authors
NP06	Our company runs a joint network management with partners.	The Authors

TABLE 7
OPERATIONALIZATION OF CLEAR PRODUCT ADVANTAGE

Clear Product Advantage		
Code	**Item**	**Adopted from**
LV01	We periodically initiate analyses to identify potential product advantages.	The Authors
LV02	Before market entry, we examine our new portfolio due to the relative advantage.	The Authors
LV03	Before market entry, we examine our new portfolio due to the perceived complexity.	The Authors
LV04	Before market entry, we examine our new portfolio due to its compatibility.	The Authors
LV05	Before market entry, we examine our new portfolio due to the visibility of the perceived advantage.	The Authors
LV06	We develop and use a long-term positioning strategy for our new portfolio.	The Authors

TABLE 8
OPERATIONALIZATION OF CLEAR VALUE PROPOSITION

Clear Value Proposition		
Code	**Item**	**Adopted from**
NF01	We build our value proposition on the basis of competitive and substitutional products.	The Authors
NF02	We build our value proposition on the basis of requirement and need analyses.	The Authors
NF03	We build our value proposition on the basis of the customer environment.	The Authors
NF04	Our value proposition is aligned to the corporate philosophy and their goals.	The Authors
NF05	We focus on the functional dimension when formulating the value proposition and designing new products and services (i.e., the customer's perceived quality of products).	The Authors
NF06	We focus on the economical dimension when formulating the value proposition and designing new products and services (i.e., the customer's perceived price performance).	The Authors
NF07	We focus on the social dimension when formulating the value proposition and designing new products and services (i.e., the customer's perceived enhancement of the social status).	The Authors
NF08	We focus on the emotional dimension when formulating the value proposition and designing new products and services (i.e., triggering affective behavior).	The Authors

TABLE 9
OPERATIONALIZATION OF CUSTOMER ORIENTATION

Customer Orientation		
Code	**Item**	**Adopted from**
KO01	This company has an excellent idea of what each individual customer has been contributing to its profits.	(Ramani & Kumar, 2008)
KO02	We determine our objectives on the basis of customer satisfaction.	(Frambach, Fiss, Ingenbleek, 2016)
KO03	After sales service occupies an important position in our organization.	
KO04	We understand customer needs and align our business model accordingly.	
KO05	The creation of customer value may be seen as a daily activity.	

TABLE 10
OPERATIONALIZATION OF CUSTOMER RETENTION

Customer Retention		
Code	**Item**	**Adopted from**
KB01	We achieve customer loyalty through our products.	The Authors
KB02	We achieve customer loyalty through our prices.	The Authors
KB03	We achieve customer loyalty through our communication.	The Authors
KB04	We achieve customer loyalty through our distribution.	The Authors
KB05	Our corporate image significantly impacts the customer loyalty.	The Authors
KB06	In addition to our main products, we offer the customers individualized services.	The Authors

TABLE 11
OPERATIONALIZATION OF PRICE MANAGEMENT

Price Management		
Code	**Item**	**Adopted from**
PM01	We initiate detailed financial analyses at the beginning of the innovation project to ensure the financial feasibility.	The Authors
PM02	Our pricing is based on price analyses.	The Authors
PM03	We build our prices on the basis of the product value, which is perceived from the customer (value-informed-pricing).	The Authors
PM04	We analyze the price sensitivity of our customers and use this knowledge for pricing.	The Authors

Sample and Data Collection Procedure

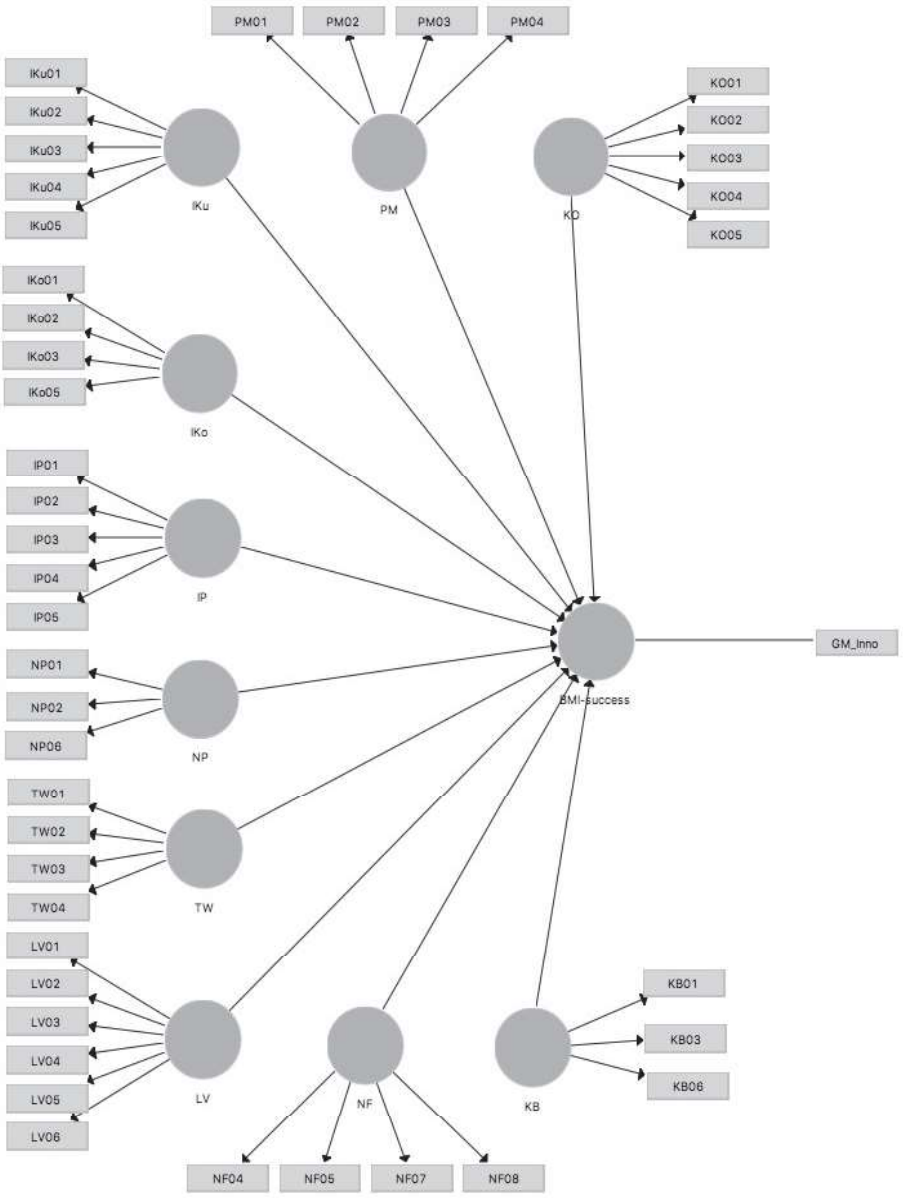
We distributed standardized online questionnaires to members of the top management. In order to collect the necessary amount of sample data, we used the "Bureau van Dijk" – Orbis database. We decided to collect data from six sectors, including the mechanical engineering industry, electrical industry, pharmaceutical and chemical industry, automotive industry, metalworking industry and the construction industry. The selection criteria for the evaluation of the companies, were as follows. On the basis of the revenue figures of 2011 and 2015, the average change in revenue was calculated to cluster the companies into two groups. The criteria for the first cluster, that was called "successful", were given if companies achieved, in the given time horizon, an average increase in revenue of greater than or equal to 5%. Companies that recorded less than five percent, a stagnation, or a negative revenue rate, were assigned to the second cluster "less-successful". This was done to differentiate the identified success factors between the clusters and, thus, to get insights into the significance of those variables. There was a total of 58 respondents and out of these, 26 participants could be assigned to the mechanical engineering sector. Due to the defined clusters, 14 could be clustered into "successful" and 12 into "less-successful". The electrical industry reached second place in the number of respondents, with 15. Of these, seven could be assigned to the first cluster and 8 to the second cluster. The pharmaceutical and chemical industry reached a total of six, with a dispersion of three per cluster. The same result can be seen in the construction industry, where there were six participants with a dispersion of three per cluster. The automotive industry reached only three respondents in total, which were all assigned to cluster one. In the metalworking industry sector only two companies participated. Those could be clustered into the "successful" category.

Model Specifications and PLS-SEM Approach

In order to measure the significance of our hypotheses, we choose to develop a hierarchical component model (HCM), or in other terms, higher-order constructs or hierarchical latent variables, using PLS-SEM. These models can be seen as representations of multidimensional constructs of a higher level of abstraction, which are related to other constructs at the same stage of the abstraction level, and completely mediate the impact to, or from, their underlying dimensions (Becker, Klein, & Wetzels, 2012; Tehseen, Sajilan, Gadar, & Ramayah, 2017). According to Becker et al. (Becker, Klein, & Wetzels, 2012), a theoretical concept is not by itself characterized to be a multidimensional or unidimensional model, it rather depends on the researcher's operationalization. To characterize HCM, first, the number of levels or stages within a model are of interest. In this context, Becker et al. (Becker, Klein, & Wetzels, 2012) further argued that the models are often restricted to second-order models. Secondly, the relationship between the latent constructs and the constructs and their indicators are characteristics of these models. These can be either reflective or formative (Jarvis, MacKenzie, & Podsakoff, 2003). In this context, reflective relationships function as representatives by their dimensions, whereas formative relationships function as a constitution of the dimensions. According to Becker et al. (Becker, Klein, & Wetzels, 2012), second-order models can be designed in four ways. In the Type 1 Model, the constructs are designed and measured with reflective lower order and reflective higher order relationships. In the Type 2 Model, which is a reflective-formative HCM, the first order constructs are measured reflectively and the second order, formatively. According to Tehseen, Sajilan, Gadar, and Ramayah (2017), this type, "form a general concept that mediate the impact on corresponding endogenous variables but do not share a common cause among themselves". Type 3 Models are measured, at the first order level formatively, and on the second order level, reflectively. Finally, the Type 4 Model is measured on both abstraction levels formatively. In our study, we chose to form the business model innovation success as a Type 2 reflective-formative second-order model. We choose to build the ten first-order constructs with formative relationships towards business model innovation success. This was done because innovation culture, innovation competence, business model innovation process, network and partner collaboration, acquisition of technology and knowledge, clear product advantage, clear value proposition, customer orientation, customer retention and price management were designed to explain different themes. Therefore, they all represent separate concepts and, thus, cannot be unified. The result is, if one construct is dropped, the conceptual theme of innovation success might change. These aspects are in conflict with the reflective type of measurement, and, thus, we choose to formatively measure the relationship between the first-order latent constructs and second-order latent constructs. The partial least squares regression analysis was used according to Benjamin and Gaskin (2014). The reasons were that: it is first easier to deal with formative factors; PLS instead of covariance-based-methods (CB) should be preferred, if the model includes more than 40-50 variables; PLS works with a lower sample size compared to CB (Benjamin & Gaskin, 2014). In order to measure the validity of the second-order construct, in the first step, the latent variable scores were calculated and were used, in the second step, as an indicator for the business model innovation success. To assess the quality of the measurement model and the significance of the hypotheses, the SmartPLS factor analysis, bootstrapping procedure and blindfolding were used.

The following picture shows the developed PLS-SEM with SmartPLS:

FIGURE 1
DEVELOPED PLS-SEM



RESULTS

To validate a higher-order structural equitation model, with regard to the causal relationships, first it is necessary to assess the quality of the measurement model (outer model). Therefore, the minimum requirements of the quality criteria were analyzed. In the second step, the structural model (inner model) and, thus, the significance of the theoretical hypotheses were examined. Finally, we considered the validated hypotheses due to the differences of the cluster analyses, in order to identify those specific success factors that cluster one companies performed with higher awareness than cluster two companies.

Quality Assessment of the Measurement Model

In order to analyze the reflective constructs, in the first step, we examined the indicator reliability with a view to the item loadings of the first-order constructs. Items that were greater or equal to 0.5 reached the threshold value, whereas items with less value were removed from the model to enhance the quality of the model (Chin, 1998). Those items were also excluded in the following consideration. Also, we examined the significance of the outer loading with a two-tailed t-value test at a 5% significance level. These values need to be greater or equal to 1.96. To test the convergence criteria, we used the average variance extracted (AVE), which needs to be greater than 0.5, and the composite reliability, which needs to be greater than 0.6 (Hair, Ringle, & Sarstedt, 2011). The construct reliability was assessed with the Cronbach´s Alpha test. The opinions of the alpha significance differ strongly in the literature. Some authors have stated that significant values are reached at a level of 0.7, whereas others have set the border somewhat lower (Taber, 2017). Therefore, we took alpha values at a level of 0.6 into account. For full assurance of the reliability and validity of the measurement model, the analysis of the discriminant validity is also necessary. To assess this criterion, we used the Fornell-Larcker-Criterion. This is achieved if the "average variance extracted of each latent construct is higher than the constructs highest squared correlation with any other latent construct" (Hair, Ringle, & Sarstedt, 2011).

TABLE 12
QUALITY CRITERIA MEASUREMENT MODEL

Quality criteria	**Significance level**
Item (outer) loading	≥ 0.5
T-value of outer loadings	≥ 1.96 (5%-significance level)
Composite reliability	> 0.6
Average value extracted	> 0.5
Cronbach`s alpha	≥ 0.6
Discriminant validity	Fornell-Larcker-Criterion

In the following, the tables XIII-XXIII show the first-order constructs with their specifically reached values.

TABLE 13
QUALITY ASSESSMENT CONSTRUCT "INNOVATION CULTURE"

Innovation Culture		
Code	**Items**	**Item loadings (t-value)**
IKu01	Our top management is characterized by openness towards new ideas.	0.84 (21.37)
IKu02	Our top management culture can be seen as resourceful.	0.84 (24.31)
IKu03	Our top management is characterized by a high willingness to change.	0.80 (13.20)
IKu04	The values and norms of our organization promote innovation.	0.81 (15.32)
IKu05	We are willing to take risks in new innovation activities.	0.72 (8.24)
Removed Items		
None		
Cronbach´s Alpha: 0.86 Composite Reliability: 0.90 Average Variance Extracted: 0.64		

TABLE 14
QUALITY ASSESSMENT CONSTRUCT "INNOVATION COMPETENCE"

Innovation Competence		
Code	**Items**	**Item loadings (t-value)**
IKo01	To acquire new external knowledge for innovation, we specifically analyze our business environment.	0.79 (16.26)
IKo02	We provide adequate resources for our innovation management.	0.77 (11.74)
IKo03	We have implemented practices for employee development and improving worker retention.	0.71 (8.38)
IKo05	We continuously perform market analysis to identify new arising trends at an early stage.	0.77 (11.85)
Removed Items		
IKo04, IKo06		
Cronbach´s Alpha: 0.75 Composite Reliability: 0.84 Average Variance Extracted: 0.57		

TABLE 15
QUALITY ASSESSMENT CONSTRUCT "ACQUISITION OF TECHNOLOGY AND KNOWLEDGE"

Acquisition of Technology and Knowledge		
Code	**Items**	**Item loadings (t-value)**
TW01	We continuously conduct technology-scouting activities to identify future arising fields of competency.	0.75 (10.61)
TW02	To efficiently extend our technology portfolio, we invest in licenses and patents.	0.78 (12.34)
TW03	We acquire new technological knowledge through our own R&D.	0.73 (8.94)
TW04	We acquire new technological knowledge through R&D collaboration.	0.76 (11.39)
Removed Items		
None		
Cronbach´s Alpha: 0.75 Composite Reliability: 0.84 Average Variance Extracted: 0.57		

TABLE 16
QUALITY ASSESSMENT CONSTRUCT "BUSINESS MODEL INNOVATION PROCESS"

Business Model Innovation Process		
Code	**Items**	**Item loadings (t-value)**
IP01	Our business model innovation processes pass a step-by-step implementation process (idea-generation, feasibility analysis, decision-making).	0.86 (20.08)
IP02	In our innovation project, we develop phase-specific target systems (e.g., state-gate-process).	0.82 (16.36)
IP03	Our innovation process is clearly structured and understood by every participant.	0.71 (8.31)
IP04	We observe and analyze the value-added-structure of our direct competitors.	0.65 (6.04)
IP05	We work out our project definition (target markets, product advantages, positioning) at an early stage of the business model innovation process.	0.76 (11.07)
Removed Items		
None		
Cronbach´s Alpha: 0.82 Composite Reliability: 0.87 Average Variance Extracted: 0.59		

TABLE 17
QUALITY ASSESSMENT CONSTRUCT "NETWORK AND PARTNER COLLABORATION"

Network and Partner Collaboration		
Code	**Items**	**Item loadings (t-value)**
NP01	We use collaboration with customers during innovations.	0.73 (8.15)
NP02	We use collaboration with research institutions during innovations.	0.82 (14.88)
NP06	Our company runs a joint network management with partners.	0.67 (5.40)
Removed Items		
NP03, NP04, NP05		
Cronbach´s Alpha: 0.59 Composite Reliability: 0.79 Average Variance Extracted: 0.55		

TABLE 18
QUALITY ASSESSMENT CONSTRUCT "CLEAR PRODUCT ADVANTAGE"

Clear Product Advantage		
Code	**Items**	**Item loadings (t-value)**
LV01	We periodically initiate analyses to identify potential product advantages.	0.72 (11.05)
LV02	Before market entry, we examine our new portfolio due to the relative advantage.	0.89 (24.26)
LV03	Before market entry, we examine our new portfolio due to the perceived complexity.	0.82 (17.04)
LV04	Before market entry, we examine our new portfolio due to its compatibility.	0.83 (13.49)
LV05	Before market entry, we examine our new portfolio due to the visibility of the perceived advantage.	0.86 (20.06)
LV06	We develop and use a long-term positioning strategy for our new portfolio.	0.63 (7.41)
Removed Items		
None		
Cronbach´s Alpha: 0.88 Composite Reliability: 0.91 Average Variance Extracted: 0.63		

TABLE 19
QUALITY ASSESSMENT CONSTRUCT "CLEAR VALUE PROPOSITION"

Clear Value Proposition		
Code	**Items**	**Item loadings (t-value)**
NF04	Our value proposition is aligned to the corporate philosophy and goals.	0.69 (10.21)
NF05	We focus on the functional dimension when formulating the value proposition and designing new products and services (i.e., customer perceived quality of products).	0.59 (5.93)
NF07	We focus the value proposition and designing new products and services (i.e., customer perceived enhancement of the social status).	0.85 (18.99)
NF08	We focus on the emotional dimension when formulating the value proposition and designing new products and services (i.e., triggering affective behavior).	0.77 (9.61)
Removed Items		
NF01, NF02, NF03, NF06		
Cronbach´s Alpha: 0.70 Composite Reliability: 0.82 Average Variance Extracted: 0.53		

TABLE 20
QUALITY ASSESSMENT CONSTRUCT "CUSTOMER ORIENTATION"

Customer Orientation		
Code	**Items**	**Item loadings (t-value)**
KO01	This company has an excellent idea of what each individual customer has been contributing to its profits.	0.73 (9.10)
KO02	We determine our objectives on the basis of customer satisfaction.	0.76 (10.19)
KO03	After sales service occupies an important position in our organization.	0.63 (5.75)
KO04	We understand customer needs and align our business model accordingly.	0.86 (21.58)
KO05	The creation of customer value may be seen as a daily activity.	0.81 (10.68)
Removed Items		
None		
Cronbach´s Alpha: 0.81 Composite Reliability: 0.87 Average Variance Extracted: 0.58		

TABLE 21
QUALITY ASSESSMENT CONSTRUCT "CUSTOMER RETENTION"

Customer Retention		
Code	**Items**	**Item loadings (t-value)**
KB01	We achieve customer loyalty through our products.	0.75 (3.01)
KB03	We achieve customer loyalty through our communication.	0.84 (9.32)
KB06	In addition to our main products, we offer the customers individualized services.	0.58 (3.46)
Removed Items		
KB02, KB04, KB05		
Cronbach´s Alpha: 0.56 Composite Reliability: 0.77 Average Variance Extracted: 0.53		

TABLE 22
QUALITY ASSESSMENT CONSTRUCT "PRICE MANAGEMENT"

Price Management		
Code	**Items**	**Item loadings (t-value)**
PM01	We initiate detailed financial analyses at the beginning of the innovation project to ensure the financial feasibility.	0.69 (7.18)
PM02	Our pricing is based on price analyses.	0.58 (4.43)
PM03	We build our prices on the basis of the product value, which is perceived from the customer (value-informed-pricing).	0.74 (9.16)
PM04	We analyze the price sensitivity of our customers, and use this knowledge for pricing.	0.85 (20.28)
Removed Items		
None		
Cronbach´s Alpha: 0.68 Composite Reliability: 0.81 Average Variance Extracted: 0.52		

TABLE 23
DISCRIMINANT VALIDITY ASSESSMENT WITH FORNELL-LARCKER-CRITERION

	Iko	**Iku**	**IP**	**KB**	**KO**	**LV**	**NF**	**NP**	**PM**	**TW**
Iko	0.76									
Iku	0.41	0.80								
IP	0.57	0.15	0.77							
KB	0.29	0.34	0.13	0.73						
KO	0.47	0.46	0.50	0.66	0.76					
LV	0.55	0.45	0.58	0.36	0.61	0.80				
NF	0.27	0.54	0.37	0.35	0.52	0.59	0.73			
NP	0.49	0.45	0.38	0.21	0.37	0.56	0.42	0.74		
PM	0.48	0.40	0.36	0.33	0.45	0.53	0.60	0.38	0.72	
TW	0.65	0.31	0.45	0.09	0.31	0.62	0.36	0.65	0.45	0.75

CONCLUSION OF THE MEASUREMENT MODEL ASSESSMENT

As can be seen, the quality criteria of the constructs reached the required level, except for "Customer Retention" and "Network and Partner Collaboration". In these two cases, the Cronbach´s Alpha was lower than the value of 0.6. With a slightly lower value of 0.59 due to the "Network and Partner Collaboration", the construct reliability was low but within the tolerance range. Whereas the construct reliability of "Customer Retention" with 0.56 was insufficient and, therefore, not given. The Fornell-Larcker-Criterion showed that the square root of the AVE of the latent variables was greater than its correlation with the other variables and, thus, the discriminant validity was given. To sum up, except for the construct "Customer Retention", the reliability and validity of the measurement model is satisfactory. Therefore, in the next step, the second-order construct will be assessed.

Assessment of the Structural Model

To assess the structural (inner) model, first we examined the R2-value of the endogenous construct (business model innovation success). A value of 0.75 is argued to be substantial, especially in marketing research, whereas values of 0.5 or 0.25 are moderate or weak (Hair, Ringle, & Sarstedt, 2011). Furthermore, the bootstrapping procedure was used to evaluate the significance coefficient of weights of the formative indicators of business model innovation success.

Theseen et al. (2017) set the threshold value to > 0.1 for an indicator. In our study, we choose to set the value of significancy to > 0.15, in order to emphasize the significancy of the results. These values were also analyzed with a view to the t-values and p-values. Another assessment criteria of the structural model is the Stone-Geisser´s Q2 value (Hair, Ringle, & Sarstedt, 2011). It evaluates the predictive relevance of the model and, therefore, shows "how well the empirically collected data can be reconstructed with the help of a model and the parameters of PLS-SEM" (Theseen, Sajilan, Gader, & Ramayah, 2017). This was done with the SmartPLS Blindfolding procedure. Models have predictive relevance if Q2 is above 0. Furthermore, values of 0.02, 0.15, 0.35 have been argued with small, medium and large prediction relevance. Furthermore, Theseen et al. (2017) suggested that the evaluation of an indicator´s collinearity is necessary for formative models. Thus, the value of the Variance Inflation Factor (VIF) was analyzed to evaluate if a high correlation between the formative indicators existed, which has been argued to be problematic. In the context of our reflective-formative second-order construct, we viewed the inner VIF values. The threshold value for inner VIF was less than 5.

TABLE 24
STRUCTURAL MODEL CRITERIA

Second-order Construct	**R square**	**R square adjusted**
Business Model Innovation Success (**BMI-success**)	0.91	0.89

The following tables XXV-XXVIII show the results of the defined criteria:

TABLE 25
R^2 ASSESSMENT

Second-order Construct	**R square**	**R square adjusted**
Business Model Innovation Success (**BMI-success**)	0.91	0.89

TABLE 26
Q^2 ASSESSMENT

	SSO	SSE	Q^2 (=1-SSE/SSO)
BMI-success	58.00	12.59	0.78
Iko	232.00	232.00	
Iku	290.00	290.00	
IP	290.00	290.00	
KB	174.00	174.00	
KO	290.00	290.00	
LV	348.00	348.00	
NF	232.00	232.00	
NP	174.00	174.00	
PM	232.00	232.00	
TW	232.00	232.00	

TABLE 27
VIF ASSESSMENT

Formative Constructs	Inner VIF Values
IKo	2.84
IKu	1.96
IP	2.30
KB	2.07
KO	3.07
LV	2.89
NF	2.52
NP	2.04
PM	1.94
TW	2.85

TABLE 28
ASSESSMENT OF SIGNIFICANCE OF RELATIONSHIPS

Relationship	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
IKo → BMI-success	0.13	0.12	0.08	1.67	0.09
IKu → BMI-success	0.06	0.05	0.07	0.78	0.44
IP → BMI-success	0.11	0.11	0.07	1.50	0.13
KB → BMI-success	0.07	0.06	0.10	0.07	0.49
KO → BMI-success	0.00	0.00	0.09	0.04	0.97
LV → BMI-success	0.41	0.40	0.09	4.48	0.00
NF → BMI-success	0.16	0.16	0.08	2.01	0.04
NP → BMI-success	-0.03	-0.01	0.09	0.33	0.74
PM → BMI-success	0.20	0.20	0.06	3.38	0.00
TW → BMI-success	0.16	0.16	0.08	2.06	0.04

CONCLUSION OF THE STRUCTURAL MODEL ASSESSMENT

The analysis shows that the R2 value of the second-order (endogenous) construct fulfilled the given threshold value and, therefore, the quality of the structural model can be classified as good. The value of 0.91 can be described, according to the definition, as substantial. The Stone-Geisser Q2 criterion had a value of 0.78, which exceeded the threshold value greatly and, thus, the model has large prediction relevance. Furthermore, all VIF values of the formative constructs were less than five, thus, no high correlation between the formative latent constructs exists. The results of the assessment of the significance of relationships, compared to the other criteria, were not particularly pleasant. With a threshold value of 0.15, only the relationship clear product advantage and business model innovation success (LV -> BMI-success), clear value proposition and business model innovation success (NF -> BMI-success), price management and business model innovation success (PM -> BMI-success), and acquisition of technology and knowledge and business model innovation success (TW -> BMI-success) can be considered as significant. The t-values and p-values support these results. Only the named relationships reached the threshold t-value of 1.96 at a 5% significance level and the p-value of less than 0.05. The following table concludes the results of the significance test and shows which hypotheses are significant, and, thus, have a positive impact on business model innovation success, or vice versa. Those, which are not significant, are refused in the following consideration.

TABLE 29
HYPOTHESES STATUS

Hypotheses:	**Code**	**Status**
H1: Innovation Culture	IKu	**Not significant**
H2: Clear Value Proposition	NF	**Significant**
H3: Clear Product Advantage	LV	**Significant**
H4: Acquisition of Technology and Knowledge	TW	**Significant**
H5: Innovation Competence	IKo	**Not significant**
H6: Business Model Innovation Process	IP	**Not significant**
H7: Customer Orientation	KO	**Not significant**
H8: Customer Retention	KB	**Not significant**
H9: Network and Partner Collaboration	NP	**Not significant**
H10: Price Management	PM	**Significant**

Cluster Analysis of Validated Success Factors

In the following step, only the significant hypotheses are considered, and of those, only the items that reached the item loading were taken into account. The cluster comparison was done to analyze the validated success factors due to their differences of the defined clusters. As mentioned in the Introduction and Sample and Data Collection Procedure, we categorized the identified companies into two clusters. From 2011 to 2015, companies that reached an average revenue growth rate of greater or equal to 5% were categorized as "successful", whereas those with less than 5%, stagnation or negative growth rate where clustered as "less-successful". In the next step, the mean value per question (item) per cluster was calculated to identify if the clusters differentiated significantly due to the success factors, with the goal to give specific statements about the factors, which are decisive for the difference between "successful" and "less-successful".

The following table XXX shows the results of the mean value comparison of the clusters:

TABLE 30
RESULTS CLUSTER ANALYSIS

Code	Item	Cluster 1 (1.) "Successful" n= 32	Cluster 2 (2.) "Less-successful" n= 26
NF04	Our value proposition is aligned to the corporate philosophy and goals.	2.00	2.23
NF05	We focus on the functional dimension when formulating the value proposition and designing new products and services (i.e., customer perceived quality of products).	1.63	2.04
NF07	We focus on the social dimension when formulating the value proposition and designing new products and services (i.e., customer perceived enhancement of the social status).	3.59	4.15
NF08	We focus on the emotional dimension when formulating the value proposition and designing new products and services (i.e., triggering affective behavior).	3.25	4.12
LV01	We periodically initiate analyses to identify potential product advantages.	2.47	3.04
LV02	Before market entry, we examine our new portfolio due to the relative advantage.	2.13	2.77
LV03	Before market entry, we examine our new portfolio due to the perceived complexity.	2.63	3.08
LV04	Before market entry, we examine our new portfolio due to its compatibility.	2.25	2.77
LV05	Before market entry, we examine our new portfolio due to the visibility of the perceived advantage.	2.13	2.69
LV06	We develop and use a long-term positioning strategy for our new portfolio.	2.28	2.69
TW01	We continuously conduct technology-scouting activities to identify future arising fields of competency.	2.91	3.81
TW02	To efficiently extend our technology portfolio, we invest in licenses and patents.	2.59	3.50
TW03	We acquire new technological knowledge through our own R&D.	2.41	2.58
TW04	We acquire new technological knowledge through R&D collaboration.	3.06	3.15
PM01	We initiate detailed financial analyses at the beginning of the innovation project to ensure the financial feasibility.	2.69	3.00
PM02	Our pricing is based on price analyses.	2.44	2.77
PM03	We build our prices on the basis of the product value, which is perceived from the customer (value-informed-pricing).	2.50	3.46
PM04	We analyze the price sensitivity of our customer, and use this knowledge for pricing.	2.44	3.19

Findings

Firstly, it should be noted that all mean values of the considered items due to Cluster 1 were higher than those of the Cluster 2 companies, which supports the results of the PLS analysis. Therefore, all of

these factors can be seen as significant success factors, due to our PLS validation and the cluster analysis, but with regard to the limitations of this study. For the following consideration, the significance level was set to a mean difference of 0.5, in order to identify and describe the most significant factors.

With mean values of 3.25 (1.) and 4.12 (2.), the focus on the emotional dimension of the customer's perceived value of the company's products and services, had the most significant

difference within this construct. This factor, with a mean difference of 0.87, can therefore, be seen as a very important differentiation criterion for the successful value proposition definition, because successful enterprises attach far more importance to the emotionalization of their new products or services. Also, the focus on the social dimension, with a value of 0.56, can be identified as significant factor. We assume that this aspect mainly refers to OEM manufacturers, because this aspect refers to the enhancement of the customers' perceived social status and, therefore, is of a subordinate role, especially in the business-to-business sector. In general, due to the formulation of the value proposition, all validated items are performed with a greater awareness of the successful Cluster 1 companies. Furthermore, it can be identified that successful companies focus more on the functional, social and emotional dimensions when formulating the value proposition, whereas Cluster 2 companies focus more one the economical dimension. This can be seen in the negative mean difference of -0.40 (2.44 (1.), 2.04 (2.)), due to the item, NF6. This item was not included in the results of the cluster analysis because of the low factor loading, but is still worthy of mention.

Four significant differentiation criteria can be identified due to the definition and evaluation of the product advantage. With a value of 0.57, it shows that successful companies attach more importance to the continuous initiation of market and business environment analysis, in order to identify potential product advantages at an early stage. Furthermore, the evaluation of the relative product advantages compared to competitor's offerings can be seen as significant differentiation criterion, with regard to the value of 0.64. As third and fourth factors, with a mean difference of 0.52 and 0.56, the examination of the new portfolio due to its compatibility and the visibility of the customer's perceived advantage were identified and, thus, can also be seen as important differentiation criteria of "successful" and "less-successful". With regard to the acquisition of technology and knowledge, two major differentiation criteria can be seen. Firstly, technology-scouting activities, to identify arising technological trends or, as mentioned, fields of competency, with a mean difference of 0.90, can be seen as a strong differentiation criterion. Roughly the same result (0.91) can be identified with respect to the investment in licenses and patents, in order to increase the technological knowledge base. Further, with mean differences of 0.17 and 0.09, both cluster companies attach nearly the same importance to internal R&D – knowledge sourcing and the use of R&D collaborations.

The dimension of active and early design of the financial returns also shows two significant differences. Firstly, in the use of the value-informed-pricing approach (0.96), which shows that Cluster 1 companies spend more time on analyzing the customer's perceived product value, in order to build their prices on the basis of this. Secondly, they attach more importance to the identification of the customer's price sensitivity with regard to pricing activities (0.75).

MANAGERIAL RECCOMENDATIONS, CONCLUSION AND LIMITATIONS

The results of the PLS-SEM analysis and the cluster analysis have validated several variables, which can be influenced through managerial actions. With regard to the limitations of this study, we identified these variables as significant success factors for business model innovation. Therefore, in this section, a summary description is given in order to give managers concrete actions that will increase the success of their business model innovations.

Managerial Recommendations

Firstly, we found that a clearly formulated value proposition is the basis for a successful business model innovation and, therefore, positively affects the success. Through the PLS analysis and the cluster comparison, we identified that it is particularly important for companies to understand the customer's

perceived value of the new products or services to be able to focus their attention on those. In this context, three variables are mentioned. First, the functional dimension defines which function is offered towards the customer. In this context, for a company, it is essential to identify and select those functional benefits for the customer, which make the difference to their competitors' offerings and, therefore, strengthen the market position. Furthermore, the focus on the social dimension can be identified. We assume that in the business-to-customer area it is especially crucial, when defining the value proposition and designing the products, to focus on the provision of self-expressive benefits for the customer. With a highest mean difference, the emotional dimension can be identified as the most important differentiation between "successful" and "less-successful" companies, within this dimension. Thus, it is important, in the initial status of the business model innovation, to understand the various product or service features that are necessary for triggering affective behavior of the customer target group, and, after this, it is logically important to focus on those factors when defining the value proposition, as well as in the design of the offerings. Furthermore, our results show, that the value, which is delivered to the customer should, in all cases, be aligned with the company's philosophy.

Our second validated hypothesis ties directly to the definition of the value proposition and describes that a clear visibility of the product advantage for the customer positively affects the success of the business model innovation. In this context, all six defined items can be validated. The cluster analysis shows that, in practice, four of these are mentioned as having a high significance. These include, firstly, the continuous analysis and observation of the business and customer environment in order to identify potential product advantages at an early stage. Further, the examination of the developed advantage has been identified as a crucial aspect. In this context, the verification of the relative advantage has the most significant value. Therefore, for managers it is especially important to examine, in the initial idea generation phase of the business model innovation, the various ideas with regard to their relative advantage compared to other possibilities, in order to choose the most valuable idea for implementation. Further, the examination of the visibility of the customer's perceived advantage is also identified as critical aspect, as well as the verification of the compatibility towards "existing values, past experiences, and the needs of the receivers" (Tornatzky & Klein, 1982) and, therefore, managers should attach special importance to these. The factor "examination of the perceived complexity" and "development of a long-term positioning strategy" have not reached the mean difference of 0.5 due to the cluster analysis, but are also manifestations of the validated hypothesis and, thus, are significantly related to the business model innovation success. Therefore, managers should verify the degree of complexity of new innovations. This aspect is of importance especially in technological innovations, because a high degree of complexity is negatively related to innovation adoption and implementation (Tornatzky & Klein, 1982).

The third hypothesis, which has been validated, describes that a professional acquisition of technology and knowledge, which is necessary for the innovation project, positively affects the success of the business model innovation. In this context, all four reflective items could be verified. Two of these are of special importance. These are, firstly, with the highest mean difference, the "continuous conduct of technology scouting activities" and secondly, the "investment in licenses and patents to efficiently extend the technology portfolio". Due to technology scouting, the company has two possibilities, either by providing internal resources (employees) for scouting or by engaging consultants. The goal should be to systematically collect information in the area of science and technology to identify knowledge for a specific innovation project, as well as in general to identify newly arising technological possibilities. Therefore, the scouting process should be, in our context, directed to a specific technological area, when searching for explicit suitable innovations and, furthermore, it is necessary to initiate continuous undirected scouting procedures (Rohrbeck, 2010). This hypothesis also includes the items "acquisition of new knowledge through the own R&D – division" and "acquisition of new knowledge through R&D – collaborations". The mean differences of 0.17 and 0.09 showed that Cluster 1 and 2 companies performed these aspects with nearly the same enthusiasm. But both cases are validated manifestations of a professional acquisition of new technologies and knowledge and, therefore, have a positive impact on the business model innovation success, due to our results.

The last validated hypothesis describes that an active and early design of the financial returns positively affects the success of the business model innovation. In this case, all four defined reflective items could be validated. Two of them have a strong significant impact on success in practice. With a mean difference of 0.96, successful companies attach far more importance on the value-informed-pricing approach. As an implication for the management, it can be said that it is first important to analyze the customer's perceived value of the products and services and, then, this knowledge should be used to design the prices, in order to ensure that the prices match the perceptions of the benefits. The second significant differentiation criteria of successful and less successful in practice, is the analysis of the customers' price sensitivity, for determining the prices. Therefore, this procedure should be integrated into the business model innovation process and, further, the pricing activities should be based on price analyses. In addition, we showed that detailed financial analyses at the initial phase of the business model innovation are important to ensure the feasibility.

Conclusion and Limitations

This study presents concrete managerial recommendations on the basis of predefined hypotheses, which were validated through a PLS-SEM analysis and were tested with a cluster comparison, to identify the significant differences between "successful" and "less-successful" companies in practice. It is the first kind of success factor study, which was aimed to statistically validate the success factors of business model innovation in combination with a cluster analysis and, thus, it provides an important contribution to this field of research.

Despite the results, the study has some limitations. We could only validate four of the six hypotheses. Aspects, such as customer orientation, innovation culture and competence, which are associated as important success factors in practical qualitative analysis, could not be validated. Therefore, further studies should focus on developing the present measurement instrument, in order to improve the quality of the operationalization and to overcome the limitations of this study, which are named as follows. Firstly, the number of survey respondents, 58, is too low, in order to give a representative sample size. At the initial data collection phase, we invested extensive efforts to reach a greater sample size. We contacted about 6000 companies for the survey, but with a response rate of less than 1%, the support was very low. The major goal for future research should be, therefore, to increase the sample size. Further, we included six industry sectors, which are named in the "Sample and Data Collection Procedure". We assumed that the focus on one sector could increase the quality of the results, because the understanding of business model innovation is probably not the same in all of these branches. Furthermore, we think that it is important to differentiate between medium-sized and larger companies, because business model innovation in medium-sized enterprises rises mainly over time through a combination of customer and market requirements, whereas large companies have the possibilities and resources to actively change or develop their business models. But despite these limitations with this study, the necessary first step has been achieved, in order to develop the area of success factor research and to give managers a concrete framework for decision making in business model innovation.

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