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Strategic directions on innovation management – a conceptual framework

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Received 16 June 2012
Revised 16 June 2012
Accepted 24 August 2012

Abstract

Purpose – The purpose of this paper is to identify forthcoming fields of innovation management themes with an outline for the most important areas and directions of academic research and management practice.

Design/methodology/approach – Key trends in innovation research are derived from an extensive literature review. In addition, major macroeconomic trends and new technologies were identified to finally develop a conceptual framework.

Findings – The paper identifies seven major fields for future research in innovation management theory and practice. These areas are namely customer orientation, network organisation, sustainability, frugality, intellectual property, business model and global innovation. Based on the paper literature review, the paper develops a conceptual framework built on intra-firm and external openness as well as the short- and long-term strategic perspective. Future research areas are finally introduced.

Originality/value – The paper shows a new conceptual framework and establishes a holistic view of innovation management themes in the next years. Based on the framework, future research areas may be identified and managers can identify important concepts.

Keywords Strategy, Management, Innovation, Open innovation, Frugal, User centeric

Paper type Research paper

Introduction and purpose

Over the last few decades, there has been growing interest to do research on innovation management as many authors have been discussing an immediate effect on the competitive edge of companies worldwide (Albach, 1989; Wheelwright and Clark, 1992; Cooper, 2001). Starting with the R&D literature of the 1980s (Cooper and Kleinschmidt, 1986), a solid ground of theoretical and empirical literature has already been set for the use of innovation theories in management. Innovation concepts have more and more been adopted and applied in actual business practice. This is true for small and medium-sized enterprises (SMEs), where innovation tools (von Hippel, 2001) such as toolkits (Prügl and Schreier, 2006) and networked organizational structures have been established and widely used. Bigger organizations are even more successful with the integration of innovation management, and especially open innovation (Brem, 2008), mostly due to their higher activities in R&D in most examples (Orlander *et al.*, 2011). Ahlstrom (2010, p. 11) furthermore refers to the macro-economic importance of innovation management, stating that its main goal is "to generate growth and deliver important benefits to an increasingly wide range of the world's population", following Schumpeter's ideas of the macro-economic importance of innovations.

Management Research Review
Vol. 36 No. 10, 2013
pp. 939-954

2040-8269
DOI 10.1108/MRR-06-2012-0142

Hence, innovation management has come to be recognized as a most actively researched field, giving management an even more solid theoretical foundation. While several articles have dealt with the concept of open innovation since Chesbrough (2003) introduced the term in 2003 and brought it to a wider audience in 2006 (Chesbrough *et al.*, 2006), a holistic approach to the future disciplines of innovation management has yet to be developed by the scientific community.

Since 2006 when Chesbrough *et al.* (2006) revealed several critical areas of innovation management research, there have been very few concepts for a holistic agenda for research and strategic directions in management practice that go beyond open innovation. Academic discourse has focused strongly on this concept, some of it critically, like Trott and Hartmann (2009). Many less-recognized concepts and articles in this field suggest interesting and valuable directions for research, mainly in marketing, organization, R&D research (Lichtenthaler, 2011a, b) as well as several rather technological papers that gave an insight in this topic from academic journals like "R&D Management".

This article suggests a conceptual framework and a systematic analysis of future directions in innovation management research. It helps to put the different streams of innovation management research into categories and give an overview for research as well as for managerial practice as to which areas of innovation management can be applied to management topics. Finally, we analyze which aspects of the concept will need further attention in research as well as in management.

With this paper, we give a strategic outlook on the fields of innovation management and build a conceptual framework to name fields and categorize them into new branches and streams of research, namely we give an outlook on aspects such as marketing, sustainability and value chain, organizational behavior and design as well as technology management. With respect to corporate strategy, we give directions to which field the different concepts can be attached, from short-term, operational aspects to long-term, strategic fields. Also, we categorize from intra-organizational to rather interactive and open concepts and show dependencies of the different subjects.

Methodology

The theory of innovation management is frequently characterized as a theory that matches one's prerequisites (Baharach, 1989; Sutton and Straw, 1995; Zhara and Newey, 2009). Our approach can be seen as a more detailed characterization and extension of this theory. It follows Teece's criteria of a framework in terms of accepted standards (Teece, 2007, p. 1138): "A framework is less rigorous than a model as it is sometimes agnostic about the particular form of theoretical relationship that may exist." In that sense, our concept gives an overview and characterization of the most important streams of research and offers new fields which need to be looked at more closely. In fact, the issue is a more strategic view on the topics that will gain importance for a strategic time span of the next five to ten years and have not been sufficiently addressed so far. The decisive point in strategic management is that it does not restrict itself to only one direction, it strives to overview the best theories and to choose – and focus on – the most important concepts, not only for a short-term success, but in order to add sustainable value for the organization's stakeholders.

Common mistakes regarding the research on the future of innovation management are the lack of scientific methods and evidence or the lack of a full scale framework that offers a synopsis of further developments.

For our research, we examined several market studies dealing with future trends in innovation management research as well as theory based studies and papers. Literature reviews and qualitative meta-analysis are applied in scientific articles that are published in top-ranked journals dealing with future aspects of management and widely accepted (Lehmann, 1996). Examples are Prosser and St. James (2003), Hauser *et al.* (2006), Krishnan and Ulrich (2001) or Montoyaweiss and Calentone (1994).

Several steps were taken to analyze and categorize our researched articles. The studies and papers were screened with the help of electronic databases such as *EBSCO* and *Web of Science*. A total of 294 relevant publications could be identified by searches with combinations of keywords and boolen operators such as "innovation management" and "future" or "research agenda". Criterion for step one of the selection of articles was the ranking of the journal the article has been published in. For our research, only peer-reviewed articles were selected to ensure the validity. Only innovation-related articles from top-ranked journals with impact factors, ranked "A" to "C-" were taken into consideration. The ranking used was the VHB-Jourqual Ranking 2.1 which is also widely accepted (Schrader and Henning-Thurau, 2009). Few exceptions from this rule, for basic and fundamental articles or for book chapters were made. The next step was to analyze the contents of each article. Papers that contained future aspects of innovation management or an outlook on further fields of research in innovation management were taken into consideration. Hence, 31 articles matching these criteria could be found and analyzed in depth. These articles were used to find the most important fields and set a foundation for our conceptual framework. Based on that, we identified seven major challenges and fields in this area literature focused on.

Our above-mentioned conceptual framework will sum up the most important fields for managers, as well as fields of research in innovation management. Our tentative characterization of existing fields of research on innovation management reveals a high degree of mutual connections and interdependences. Like many other concepts, this systematization is neither exhaustive, nor closed for the addition of future aspects; however, it shows the most important streams and concepts we found in recent innovation management literature, and it offers a basis for further developments.

Literature review

Accelerating global innovation and NPD

The first future field we identified is global innovation and new product development. This is an effect from the rise of global competition, especially in the R&D-intense industries, challenges former industry leaders, particularly in the technology industries, to face a stronger and more difficult competitive environment. Another topic is the pressure to come to market fast and adapting to shorter product life cycles. Although this concept has been criticized by Trott and Hartmann (2009), this is still true for many examples. Also, there is a need to bring break-through innovations to market before competitors do (Crawford, 1997; Lüthje, 2007). Samsung, Apple and Nokia give evidence in the market for smart phones, Procter & Gamble is an example for FMCG-markets. A number of technologies and techniques are worth being watched carefully, as they have direct implications for managerial practice to face these problems.

One strategy to overcome these problems is the use of new technology such as rapid prototyping, the use of 3D-printers as intra-organizational ways, and an involvement of early adopters to use them as product testers. The rising number of the "beta"-Versions

that find their way to the customer and remain with "beta"-status for years serves as evidence for that. Examples for that are Google Mail (beta status for more than three years) or Yahoo Mail for more than four years after the original launch.

Another aspect of this concept is the improvement of products that have already been launched and are, step-by-step, enriched with functionality and features. This phenomenon can be seen especially in the software industry. But also for mobile phone manufacturers, the improvement of products with updates is a common way to make development cycles shorter.

Network organization and organizational design

Another major trend is the concept of global innovation networks. Kim and Park (2010) stated that a firm's innovativeness is positively influenced by its international R&D network, as well as international gatekeepers. Both, internal and external research, are affected by these influences. The installation of network structures within the company is strongly linked to the already-mentioned concept of new aspects in product design and can be useful for mainly two reasons.

First, the network character of the organization simplifies communication and exchange of ideas. The use of latest information and communication technology helps to improve companies' ability to innovate. Tools such as video conferencing and worldwide chat let virtual teams work together more effectively. Hence, it helps companies to exchange important ideas worldwide and is strongly connected to all concepts of knowledge management. At the beginning of innovation research, this stream of scientific research was not seen as a part of innovation management at all in most cases (Afuah, 2001; Lichtenthaler, 2011a, b).

The second aspect is the internationalization of knowledge. An international network can, on the one hand, be closer to the market and improve its performance in customer-centered innovation, as described later. On the other hand, international human resources and experts from all over the globe can be addressed more easily. Researchers, scientists and other hard-to-get talents can be accessed more freely and can become a part of the firms' network organization as they offer chances to work and research, also with less international or intercontinental mobility. These companies have a substantial advantage acquiring the above mentioned talents and experts, as the combination of internal and external knowledge management referred to can help to increase profits (Cassima and Veugelers, 2006).

Third, it helps companies to leverage effects of international differences in innovation environment in terms of market strength, market responsiveness and product innovation. Especially internationally active companies can benefit from a leveling of differences, e.g. in market demand or in times of turbulent markets and bad conditions for product development in different parts of the world (Lee, 2010).

Intellectual property

These concepts can also lead us to a further point which is mainly dominated by the open innovation concept, but still has some important aspects beside that. Internal capabilities of NPD and innovativeness are of importance. So far it has been already widely accepted that an opening of the company for innovations to come in and also find their way out can help firms tremendously to improve their innovation capabilities (Jones *et al.*, 2001; Bader, 2008). Chesbrough *et al.* (2006) and others such as Grönlund *et al.* (2010) described

this as one of the main aspects of open innovation, and many extensions have been made, including research on specific issues of this topic. Cohen and Levinthal (1990) describe the advantages of a combination of internal and external knowledge. Hence, also this concept should be a part of our framework and helps us to come to the externalization of innovativeness. One of the major challenges after decades of intellectual property (IP) research on the management of IP assets (Grindly and Teece, 1997). Asset protection and protection management is one of the biggest topics though, as it is a cross-functional matter and involves many innovation-related departments from marketing and strategy to legal department. Integration into the organization's innovation strategy is therefore a challenging objective (Germeraad, 2010). As described above, a firm's innovativeness is not only limited to use inside the organization, but can also be externalized. One main stream of research is the use of IP and the use of external innovation networks as described above (Lerner, 2009; Lichtenthaler, 2010).

Another field that will attract attention is trading with IP. What seems at first glance contrary goals, namely protecting IP and making IP successfully usable for external partners, actually always goes together. IP can also be an object of trades on virtual markets and can make a substantial contribution to a firm's financial performance. Hence, corporate strategy makers should always be aware of these concepts in order not to underestimate contacts with contractors, intermediaries or the usage online-marketplaces for IP to fully use the potential of the firm's R&D resources (Arora and Gambardella, 2010; Howells, 2006; Lichtenthaler, 2011a, b).

Business model innovation

Dealing with IP can be a substantial part of a company's core business and help to directly improve financial performance (Jones *et al.*, 2001). Thus, it leads us to another topic, the use of new business models and innovativeness in business models.

Also, other aspects of business model innovations are becoming more relevant for the competitive environment. Teece (2010, p. 172) states that "without a well-developed business model, innovators will fail to either deliver – or to capture value from their innovations." Also, Chesbrough (2010) confirms that a lack of ability to find new business models to commercialize on new products and technologies can be a serious threat to companies.

The concept of the "born globals" shows that innovative, scalable business models tend to be applicable virtually anywhere on the globe and therefore can harness their rivals, mainly multinational companies (Kim *et al.*, 2011). Internationalization is therefore an integral part of a scalable business innovation (Knight and Cavusgil, 2004). Also, concepts as the flexibility and scalability of business models play an important role for innovation driven business models (Bock *et al.*, 2010) and are especially important for strategic responses to rapid changes of the firm's environment. Finally, business model innovation has to be customer based, creating more sustainable value for the customer, not only for the company (Zott *et al.*, 2011).

Frugality

The concept of frugal innovation aims at modifying and adopting products to foreign, emerging markets on the one hand, and the establishment of R&D capacity and product development centers on the other hand. Thus, it is also strongly linked to the new concepts of NPD and global innovation. Consumers tend to differ strongly in

innovativeness from market to market (Tellis *et al.*, 2009) and seem to be asking more and more for products meeting their needs more precisely. The logical consequence is to put R&D centers closer to the customer and use their knowledge of the local market. Therefore, multinational companies such as general electric and bayer have also founded development centers in India, China or Malaysia and do not remain in their old, conventional strategy of developing products only for their home-markets, mainly in the western world. Local structures of societal support of innovation management are being established or are already showing first success in coming back to the markets of the western knowledge economies.

It turns out that societies that do not support innovation will lower the increase of wealth over time (Barro and Sala-i-Martin, 2004; Baumol, 2004). Those concepts have proved successful.

Sustainability

The concept of frugality leads on to the sixth step, the concept of sustainable innovation. The scarcity of resources and the enormously growing population in most countries leads us to the conclusion that innovations should be developed with respect to these facts. Frugality postulates a concept of products being easier to produce and be more adapted to the use of consumers in emerging economies. Due to the rising demand on the customer side in those countries, and the willingness to reach levels of wealth of the countries in the western world, it seems obvious that innovations have to be developed with a maximum level of sustainability, little needs in resources and with less hazardous emissions. Pressure to act as a environmentally responsible company can be brought by society as well as individual customers (Le Menestrel and de Bettignies, 2002). Thus, innovations that take respect to integrated, sustainable value chains can help to increase financial performance (Clemens and Bakstran, 2010; Zhu *et al.*, 2007, 2008) and also it drives profit to integrate suppliers into the innovation process (Hagedoorn, 1993, 2002), and thus to integrate them to achieve the goal of sustainable innovation. An example for the fundamental need to innovate can be the production of palm oil in Malaysia. Process innovation helps to reduce the clearing of rainforest areas to improve the output of palm oil production (Ahlstrom, 2010; *The Economist*, 2010). Also, customers and society are usually interested in a socially and ecologically oriented firm strategy, especially in consumer markets (Basu and Palazzo, 2008). Obviously, it is only a question of how to integrate sustainability into the process of innovation, not whether to integrate at all (Snider *et al.*, 2003). A higher focus especially on ecological fields in innovation management is set by the field of eco-innovations (Berkhout, 2011; Jansson *et al.*, 2010).

Customer-oriented innovation

Customer-oriented innovation is the last but not least important aspect for our view on the future of innovation management and rounds up the explanation of our frameworks components. Mainly through new technologies and the merging of several fields in information processing, it becomes easier to collect data and know more about customer needs than ever before. In contrast to most recent literature in the past years, our concept also takes into consideration theories and aspects other than only the open innovation concept to integrate the customer into our framework. First, we show the concept of users as helpers to innovate, then we take a closer look at user innovativeness and the customer's goodwill derived from innovation.

Lead user concept. Of course, for our classification, also the lead user concept has to be categorized. This model tries to integrate the customers as early as possible and to capitalize on the integration of users as problem solvers. This is another example of the leading role that user-oriented innovations play, not only in terms of customer experience and service innovations, but also in the process of the generation of those. The concept plays an important role in open innovation literature (von Hippel, 1986; Brem and Voigt, 2007; Herstatt, 1991). The traditional way of implementation is to make use of it in B2B markets, such as the medical industries (Lettl *et al.*, 2006) or consumer markets as Bilgram *et al.* (2008) show. Especially with the use of Web 2.0 (O'Reilley, 2005) tools such as social networks and the ability for huge parts of consumers to produce content these aspects have become more important.

Marketing science has contributed methods and concepts to gain a deeper understanding of product innovations enriched with new kinds of services as seen above. A new phenomenon that has hardly been addressed so far are prediction markets (Bruggen *et al.*, 2010; Spann and Skiera, 2009). This concept uses virtual markets; crowd sourcing and swarm intelligence concepts are combined to predict future developments. It can be seen as a complementary concept to the prediction markets concept.

Generally speaking, the power of customer-connected innovation applied in firms is not only in the bigger generation of profits, but also in the general ability of innovation management to help satisfy customers' needs. Several studies show the great potential use on the customer side (Christensen and Raynor, 2003; Nordhaus, 1997). Some special aspects of this part of the customer-oriented innovation management need to be given bigger attention in the future to better meet customers' needs and thus increase profit, but also to see possible threats of general customer integration (Enkel *et al.*, 2005; Gassmann *et al.*, 2010a, b).

Customer experience. The enormous diversification of the customer base, new communication technologies and customer empowerment are main drivers for a new, customer-oriented view of innovation management. Beside several other concepts, the following two concepts are likely to play an important role in the near future of innovation management.

First, the "ownership experience" concept is becoming more and more popular among consumer products, whereas it was only used for B2B-marketing before. A recent example in a study by Eagar *et al.* (2011) focuses on all the customers' contacts with a company of car manufacturers. BMW, Infiniti, Mercedes Benz or Bentley try to offer more than just the product, but also events, special information or additional mobility concepts such as bikes or public transport services.

Second, the examples also match the need to take product design not just as a means, but as a unique differentiation criterion which consumers especially ask for. Needs a customer has not realized, even recognized yet can be identified by several forms of intense marketing research and are objects of future research. A good example is the "design-in" approach itself. Customers' needs for luxury, fashionable Mp3 players and phones that are designed in a special way were not on the customers' minds, but intense market research helped Apple recognize this need and set up a whole new market for fashion-like, luxury consumer electronic devices. This concept offers consumers an added value that fits also to the above-mentioned trend of total customer experience.

A good example for added services combined with extended design is again Apple with its combination of cloud computing, social music and unique product design.

Recent comparisons of performance show that it is necessary to have innovation implemented in several organizational units of the firm. Cross-functional configurations of customer orientation lead to a significantly higher ability to innovate (Hortinha *et al.*, 2011).

Conceptual framework

Finally, we will introduce our conceptual framework based on our synopsis of literature. In Figure 1 we show the interrelations of the fields of interest we have identified and described so far. All of the topics discussed above are set into relationship to each other. These concepts affect different parts of a firm's strategy, whilst some of them are close to each other or even partly in the same area. On the one hand, it is clearly visible that innovation management is a cross-functional, multi-level framework. It is clear that from marketing to operations, from human resources to operations management different departments and disciplines with higher or lower strategic impact have to take part in innovation management. Extent of strategic orientation versus operational orientation are criteria suiting most businesses and are noted on the abscissa. The ordinate axis shows the degree of openness towards its environment. The concept of open innovation can be seen as omnipresent in current innovation management research. Also in our analysis we could not find any article that was not dealing to at least a certain degree with this concept, regardless if following the concept or criticizing it. Following the widely accepted articles of Trott and Hartmann (2009), we see open innovation as an integral part of all innovation concepts and the term of "innovation management" is always influenced by open innovation. Thus, in our framework, open innovation always influences the identified concepts and all streams of research and management practice, and is therefore not identified as a special field of future research as those streams of research identified above, as it is always an underlying concept for every innovation management activity.

The dimensions in our framework can be derived from the literature we based our fields of interest on. It turns out that our seven fields have a more or less

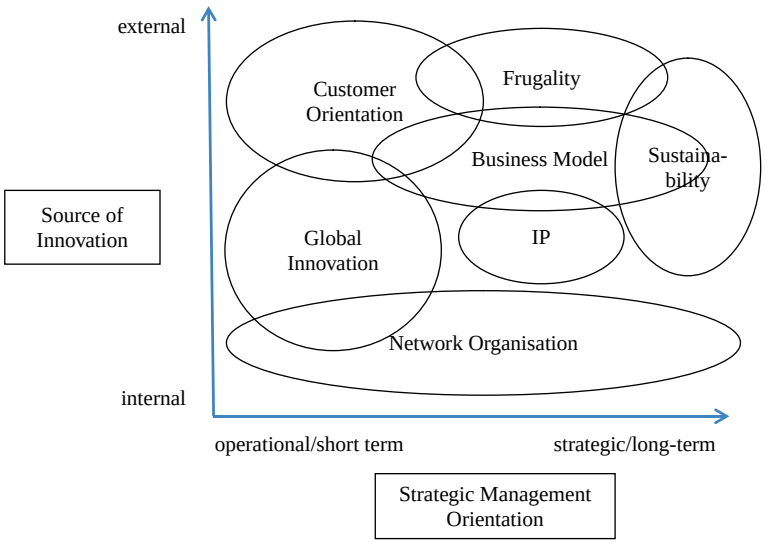

Figure 1.
Conceptual framework

strategic perspective, whilst some of them can be seen with both attributes. Network organization is a part of our framework that can be seen as both a topic for short-term actions and a strategic field for re-configuration, which is closely connected with organizational design and the use of efficient communication technology. Global innovation in contrast can clearly be seen as a field that turns out to be a rather operational concept, as it takes immediate effect on companies' daily business. On the other axis, it can be seen that customer integration in contrast to global innovation is a concept that rather affects interacting with customers and external partners and requires, e.g. extensive market research, generally a closer look on the customer in order to innovate as described above. Hence, IP requires mainly intra-organizational procedures for an implementation and frugal innovation, for instance, needs to meet more external sources and has points of intersection with customer orientation or business model innovation and sustainability. The last-mentioned field, of course, has a huge overlap with business model innovation and is also the most strategic field of innovation in future development. Thus, our framework helps on the one hand to get a detailed insight to the mentioned concepts of future importance, on the other hand it gives a clear characterization and classification of these fields of innovation research and practice.

Further research

Our framework introduces concepts for both, managerial practice and academic research.

Hence, the conceptual framework and our discussion of future areas of examination may help other researchers to identify future paths of innovation management research which are worth focusing on, as some of them can also be found in recent studies (Eagar *et al.*, 2011). These areas are, especially in the field of customer orientation, the subjects of marketing and marketing research and also NPD-innovation fields of study such as creativity methods and psychographic methods in marketing. Crowdsourcing also seems to be a promising area of studies, however in our studies we could not find enough data to make it an autonomous field of research. For global innovation, the field of international management research can help overcome gaps in research of innovation management and overcome the breaks we found in this area. Networked organization can also be addressed by international management, but also by research on organizational behavior and design as well as human engineering. For frugal innovation, international management can contribute in innovation management research, too. Also, in this field the disciplines of NPD research are applicable. Especially the field of business model innovation is a cross-discipline field of research; it can meet all of the above-mentioned sciences, but additionally also strategic management research. In terms of IP, business strategy and technology management are promising disciplines The most strategic field, sustainable innovation, can especially be driven by research in strategic management, but as well with research on value chains or corporate social responsibility and business ethics. Also, the above mentioned topics could be used not only with literature from databases with English as language, but also with literature databases from other countries to identify regional differences. Hence, the sample size could be enlarged.

We suggest to further research these dimensions, especially with quantitative empirical methods with high numbers of business cases and to give empirical evidence

with the help of larger sample sizes, as our sample size is not too big. For example, business model innovation is a subject to be regarded especially with respect to international and regional differences in patterns and in different business environments. Thus, comparative quantitative research of business cases, e.g. in this area is a promising field for further research. For this, a focus on SMEs may offer an interesting subject for detailed insights, as publications often use larger enterprises as subjects of research.

As mentioned, our framework is helpful for business practice to identify the right streams for innovation management of firms to drive innovation strategies. Hence, for managers, our framework may help to succeed in business practice, as well as individually selecting fields of activity giving the chance for a positive future career. As an example for use in business practice, the framework can be useful for innovation workers. Innovation management departments and innovation managers can be found in many companies nowadays. For them, the right allocation of resources and the right fields to invest in are shown in our article, so the article provides a framework to follow the right trends in innovation management and be successful with business strategy in long term. For example, investing into a networked organization in combination with global innovation is useful for a company to be on a stream of innovation management that will still be useful in the future. Many management trends, such as varieties in quality management or business process re-engineering turned out to be important in their time, but are nowadays known as management techniques that had their highest impact and importance in management practice some time ago. Our frameworks orientation is towards future applications and trends that will be important in the short- or in the long-run.

Also, our framework can be useful in organizational environments where innovation as a management task is not functionally differentiated much and not assigned to special posts or groups, but is done in a less professional way, as found in smaller enterprises. Smaller enterprises with less knowledge can decide with the help of our framework in which area of innovation management a long-term investment is useful.

Limitations

Innovation management theories have been widely implemented, but a comprehensive framework that takes basic concepts into consideration has been missing so far. Our framework offers fields for further studies, as in each of our topics, much information about interdependencies and further empirical research is still needed.

Obviously, our research faces some limitations as well. First of all, it is based on literature review only, and not enriched with qualitative or quantitative data. The sample size from literature databases is of course comparably large, but still limited. Also, some concepts could be found clearly distinguishable; others could be found and identified, though less clearly than others.

It should also be mentioned that in managerial education, the fields our framework consists of should also be seen under the implications of our agenda and innovation theory. Giving an overview of fields and disciplines having high potential in contributing to innovation management research, we still want to take a look on management education. The fields mentioned in the paragraph above also show important subjects that innovation management educators should take a look at and focus on, in university as well as in professional education.

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