UNIVERSITY OF LJUBLJANA
FACULTY OF ECONOMICS

DISSERTATION PROPOSAL
(Draft)

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INDEX

1 PROPOSED TITLE .......................................................................................................................... 1

2 DESCRIPTION OF THE DISSERTATION TOPIC AREA AND THE ISSUES THAT
THE DISSERTATION ADDRESSES .......................................................................................... 1

  2.1 Broad scope of research .................................................................................................. 1

  2.2 Narrow scope of research ............................................................................................. 2

3 RESEARCH TOPIC, QUESTIONS AND GOALS .................................................................. 7

  3.1 Research questions ....................................................................................................... 7

  3.2 Research goals ............................................................................................................. 8

4 RESEARCH METHODOLOGY .............................................................................................. 8

  4.1 Research methodology of the first paper ..................................................................... 8

  4.2 Research methodology of the second and third paper .............................................. 9

5 CONTRIBUTION TO THE FIELD OF KNOWLEDGE ...................................................... 10

6 PROPOSED STRUCTURE OF THE DOCTORAL DISSERTATION ...................... 11

7 LITERATURE USED IN THE DISSERTATION PROPOSAL .......................................... 12

8 PROPOSED LITERATURE FOR THE DOCTORAL DISSERTATION ..................... 15
1 PROPOSED TITLE

English: Open innovation proclivity: Construct development, determinants and outcomes

Slovenian: Nagnjenost k odprtemu inoviranju: Razvoj konstrukta, determinante in rezultati

2 DESCRIPTION OF THE DISSERTATION TOPIC AREA AND THE ISSUES THAT THE DISSERTATION ADDRESSES

The field of my doctoral dissertation is entrepreneurship, which is a part of business and organizational science.

2.1 Broad scope of research

In the past, most technology-oriented companies focused on developing new technologies within the company, which were applied only in their products and services (Chesbrough, 2003c). Companies followed a closed approach to innovation, in which their interaction with the environment was strictly limited (Lichtenthaler, 2008). In view of a closed innovation model “successful innovation requires control” (Chesbrough, 2004), therefore all research and development (R&D) activities are performed internally with little or no inclusion of other employees or external partners (Praest Knudsen & Botker Mortensen, 2011). Companies that innovate in the closed model are strongly self-reliant, they generate, develop, build, market, distribute, service, finance and support all their ideas on their own (Chesbrough, 2004). However, the complexity and increasing costs of R&D activities, the shortening of the technology life cycles, the presence of highly qualified and educated suppliers and customers, raising number and mobility of experienced workers, the growth and accessibility of venture capitalists and the worldwide distribution of knowledge from universities and research labs make the innovation process more and more difficult and hard to manage (Vanhaverbeke, 2006). Consequently, the inhouse R&D laboratory is no longer the main source of ideas, commercialization can also occur outside the traditional markets of the enterprise and the role of the protection of the intellectual property (IP) is losing its importance (Teirlinck & Spithoven, 2008). Even though in reality not many firms use completely closed approach to innovation, the complexity of the development within and outside the innovation field forces companies to direct the innovation processes towards the openness (Huizingh, 2011). Companies have to team up to develop and absorb novelties, commercialize new technologies as well as to follow the latest improvements and developments (Vanhaverbeke, 2006).

In contrast to vertically integrated model where internal R&D activities lead to internally developed products, open innovation also includes the use of external sources of innovation and creates the ability to make a profit despite the support of external partners (Almirall & Casadesus-Masanell, 2010; Chesbrough, 2003b; Lee, Park, Yoon, & Park, 2010; van de
Open innovation paradigm assumes that useful knowledge of high quality is widely distributed and even the most capable and sophisticated companies cannot develop technologies without the help of external sources (Chesbrough, 2006). Open innovation suggests that the companies should use broad range of knowledge sources, including customers, suppliers, universities, national labs, consortia, consultants, start-ups (Chesbrough, 2003b), spin-offs from large established firms, individual inventors (Chesbrough, 2006) as well as firms in unrelated industries or even competitors (Wallin & von Krogh, 2010) and at the mean time creative exploit firm’s IP (Chesbrough, 2003b). Following open innovation approach makes the boundaries between company and surrounding environment more porous (Wallin & von Krogh, 2010) and enables the knowledge flow and ideas to move easily inside and outside the boundaries for co-creation of new and improved technologies (Gassmann & Enkel, 2004; Minshall, Mortara, Napp, & Slacik, 2009). Companies operate as part of a larger network, which creates added value for customers (Vanhaverbeke, 2006). They buy or license technologies from others and at the same time take their inventions outside the company through licensing, joint venture and spin-offs (Chesbrough, 2006). Additionally to traditional commercialization at the existent markets companies applying open innovation concept can commercialize ideas through channels outside their current businesses (e.g. establishment of startup company, licensing agreements) and in this way create additional value (Chesbrough, 2006). Furthermore, company can also in license ideas generated outside of firm’s boundaries for commercialization (Chesbrough, 2003a). Some companies are searching for external knowledge, which they want to incorporate internally; others are looking for external markets for their existing technologies (West & Gallagher, 2006b).

2.2 Narrow scope of research

Although there is an increasing number of studies in the field of open innovation, several gaps exist in the literature. Prior studies are mostly dedicated to the theoretical explanation of the concept (e.g. Almirall & Casadesus-Masanell, 2010; Chesbrough, 2006; Chesbrough & Garman, 2009; Mäkipää, Ahonen, & Mäntymäki), or representation of case studies (e.g. Chesbrough, 2003b; Di Gangi & Wasko, 2009; Langvardt, 2010; Pontiskoski & Asakawa, 2009; Rohrbeck, Holzle, & Gemunden, 2009). A handful of studies analyze issues in large-scale studies (e.g. Lichtenthaler, 2008; van de Vrande et al., 2009). Most of the studies so far have been focused either on external technology acquisition or external technology exploitation, and did not consider joint perspective (Lichtenthaler, 2008). Additionally, the intangible nature of this construct makes it difficult to conceptualize and define all dimensions that form it. Despite the fact that absorptive capacity is a vital component for successful implementation of inbound open innovation, little attention is paid to connection between this concept and open innovation (Spithoven, Clarysse, & Knockaert, 2010). Besides, only few articles analyze management in open innovation, although there is a clear emphasis on the role of the managers to support people striving to be innovative (Elmquist, Fredberg, & Ollila, 2009). In order to narrow the literature gap the dissertation will focus on construct
development of open innovation proclivity and empirical testing of proposed hypothesis related to absorptive capacity and personal characteristics of managers.

The research of the first paper will focus on the development of a valid and reliable measure of open innovation proclivity.

Despite the fact that number of scholars and practitioners emphasize the importance of open innovation for firm performance, the literature in this field still lacks the conceptualization and measure of open innovation. Additionally, a variety definitions and focal points for open innovation have been used, which do not cohere into a suitable analytical framework and this makes it difficult to evaluate the influence of open innovation on firm’s performance (Dahlander & Gann, 2010). West et al. (2006) state that with new paradigm also new operationalizations for measuring open innovation construct should be developed, whereas Enkel et al. (2009) claim that the open innovation processes are difficult to evaluate because only first measurement approaches are identified.

To my knowledge only van de Vrande et al. (2009) systematically describe the practices of open innovation. They distinguish between technology exploitation and technology exploration, but the measure is neither clearly defined nor conceptualized operationalized or measured. Additionally, their practices should be more narrowly defined in order to acquire more precise view on open innovation (van de Vrande et al., 2009). The first survey that attempts to empirically examine the proclivity of open innovation was published by Hung and Chiang (2010). The construct introduces some of the steps recommended for development of the measure. Hung and Chiang (2010) base the open innovation proclivity on the theory provided by Chesbrough; more detailed on his open innovation principles. The scale consists of eight questions that are answered on a 1 (highly disagree) to 5 (highly agree) Likert items. Although Hung and Chiang (2010) conducted several exploratory and follow up interviews with their expert panel to improve and verify their primary scale of open innovation proclivity, in my opinion the scale is not entirely sufficient, since it only contains some parts of the open innovation proclivity such as collaboration and selling/buying of IP, whereas it does not measure anything connected to venturing, external participation, employee and customer involvement, which are all important elements of open innovation. Besides, collaboration with people outside the company is only mentioned and the scale does not distinguish between different types of partnerships. It does not take into account that the nature of most companies is such that they have to cooperate with at least one partner. Additionally, the survey is only conducted in one country and only among electronic products manufacturers.

Open innovation can be presented in many forms, therefore these multi-dimensions of the concept should be kept in mind when forming open innovation measurement (Huizingh, 2011). The open innovation process requires also taking into consideration the complex social interactions between several participants (Sorensen, Mattsson, & Sundbo, 2010).
Lichtenthaler (2011) claims that it is “unrealistic to expect immediate performance increases as a consequence of opening up the innovation process”, because managers first have to identify the need and develop organizational capabilities for managing open innovation. Furthermore, this concept may be an important approach to help managers identify new opportunities (Lichtenthaler, 2011). Open innovation proclivity assesses the extent to which a firm adopts the open innovation approach (Hung & Chiang, 2010). Therefore, in my opinion, the measure of open innovation proclivity is appropriate proxy of company’s innovation direction.

In order to fill the gaps in previous research, refined multidimensional measure of open innovation proclivity will be developed in the first paper. The basis for the conceptual framework is research provided by van de Vrande et al. (2009) where elements will be supplemented and presented in detail, according to the theory and case studies.

The theoretical findings point out that the open innovation proclivity is a second-order factor construct composed of 8 items.

Figure 1: The conceptual model of open innovation proclivity


The research topic of the second paper will focus on the relationship between open innovation proclivity and absorptive capacity and their influence on business performance.

To gain additional benefits from external sources of information company has to identify relevant knowledge and integrate it into its innovation processes (West & Gallagher, 2006a). Therefore, the key pre-condition for internalizing external knowledge is the firm’s ability to recognize and adapt externally acquired technologies (Spithoven et al., 2010; van de Vrande, Lemmens, & Vanhaverbeke, 2006). This is known as absorptive capacity which is defined as a “set of organizational routines and processes by which firms acquire, assimilate, transform, and exploit knowledge to produce a dynamic organizational capability” (Zahra & George, 2002).
Absorptive capacity is critical to its innovative capabilities and is related to the firm’s level of former knowledge (Cohen & Levinthal, 1990). Thus, internal technology development can strengthen the firm’s ability to recognize and adapt external knowledge (Lazzarotti, Manzini, & Pellegrini, 2010; van de Vrande et al., 2006). Firms that operate under open innovation principles are expected to invest in their absorptive capacity (Tether & Tajar, 2008). Escribano, Fosfuri, & Tribó (2009) show that firms with higher levels of absorptive capacity identify and exploit external knowledge flows more efficiently, stimulate innovative outcomes and consequently gain competitive advantage. According to van de Vrande, Vanhaverbeke, & Gassman (2010) absorptive capacity is a concept that has a strong potential to be coupled to open innovation.

Although several scholars (e.g. Hughes & Wareham, 2010; Laursen & Salter, 2006; Lichtenthaler & Lichtenthaler, 2009; Spithoven et al., 2010) emphasize that there is a relationship between absorptive capacity and open innovation no empirical examination has been done to prove this relationship. Therefore the second paper of the doctoral dissertation will examine the influence of absorptive capacity on open innovation proclivity of the firm and their impact on business performance.

Figure 2: The relationship between open innovation proclivity, absorptive capacity and business performance

The third paper will focus on the relationship between open innovation proclivity and personal characteristics of managers and their influence on innovation performance.

Gassmann, Enkel, & Chesbrough (2010) state that implementation of open innovation starts with a mindset. Mindsets of managers that need to realize that external ideas and expertise can create significant value for the company and should be brought internally (Wallin & von Krogh, 2010). Firm has to establish specific management mechanisms and develop different
tools, processes and structures for successful management of diverse open innovation processes (Lichtenthaler, 2011).

One of the most important tasks of the managers is to promote innovation and entrepreneurial culture across the organization (Igartua, Garrigos, & Hervas-Oliver, 2010). Traditional management thinking causes serious problems to most managers trained in this manner at introducing the new concept of open innovation into the business practice, which makes the implementation of open innovation so challenging (Wallin & von Krogh, 2010). The direction of the company development generally depends on the set of biases, beliefs, and assumptions that managers built on their previous experiences (Pontiskoski & Asakawa, 2009). Adapting open innovation concept requires new decisions in developing and exploiting innovation activities embraced by managers (Huizingh, 2011). If managers are able to effectively manage the open innovation activities the open innovation may positively affect firm’s innovation success and performance (Lichtenthaler, 2011). Managers must pay particular attention also to softer, non-technical issues of motivation, different knowledge types and adjusted governance (Wallin & von Krogh, 2010).

Chiaroni et al. (2011) emphasize the critical role of top management in implementing the concept of open innovation. In their view the implementation of open innovation requires the innovating firm to act upon a number of managerial levers which cause the changes towards openness. Elmquist et al. (2009) raise the question about the new role and charisma of the managers in changing organizations to become more oriented towards open innovation, as well as a need to understand the individuals that participate in the open innovation scheme. They also emphasize the role of managers to motivate not only their employees but also other actors participating in their innovation processes. The importance of the top management in implementing the open innovation concept is also stressed in the case of P&G where all novelties and changes are made by the leaders (Huston & Sakkab, 2007).

Although there is a clear emphasis on the role of the managers to orient towards the open innovation only few articles actually analyze the influence of the top management on introducing and implementing this concept. Therefore the third paper of the doctoral dissertation will examine the influence of personal characteristics of managers on open innovation proclivity and their impact on innovation performance.
3 RESEARCH TOPIC, QUESTIONS AND GOALS

The dissertation will involve open innovation as a central topic and will be written in the form of publishable papers. First paper will deal with the problem of the open innovation measurement. My intention is to define, conceptualize and measure the open innovation proclivity. The proposed measure will be empirically tested in at least two countries. I will also examine how open innovation proclivity influences firm’s innovation and business performance. The measure of open innovation proclivity is the first research area of my doctoral dissertation, while remaining two papers will focus on the influence of absorptive capacity and personal characteristics of managers on open innovation proclivity as well as on the firm’s innovation and business performance.

3.1 Research questions

In my dissertation I will try to answer the following research questions:

- Research question 1: Which items constitute the open innovation proclivity?
- Research question 2: How open innovation proclivity influences firm’s performance?
- Research question 3: How firm’s absorptive capacity influences open innovation proclivity?
- Research question 4: How firm’s absorptive capacity influences firm’s performance?
- Research question 5: How personal characteristics of managers influence open innovation proclivity?
- Research question 6: How open innovation proclivity influences innovation performance?
- Research question 7: How personal characteristics of managers influence innovation performance?
3.2 Research goals

The goal of my research is the development of refined multidimensional measure of open innovation proclivity which will be cross-culturally generalizable and empirical testing of the influence of absorptive capacity and personal characteristics of managers on open innovation proclivity as well as their influence on firm’s business and innovation performance.

4 RESEARCH METHODOLOGY

The doctoral dissertation will be structured in the form of collection of scientific papers. The methodology of the papers is presented in this section.

4.1 Research methodology of the first paper

This section discusses development of the open innovation proclivity scale. I will follow DeVellis (2003) procedures for developing reliable and valid measure of open innovation proclivity. DeVellis (2003) procedures comprise of clear definition of what we want to measure, generation of an item pool, determination of the format for measurement, initial review by experts, inclusion of the validation items, administration of the items to a development sample, evaluation of the items and optimization of the scale length.

Firstly the critical literature review in the field of open innovation will be carried out. The basis for data collection will be online bibliographic databases, such as Science Direct, Proquest, EBSCOhost, Emerald Fulltext, Google Scholar, Google Books and others. Furthermore all the latest issues of the most important journals in the field of innovation and entrepreneurship, such as Technovation, Research Policy, Journal of Business Venturing, Entrepreneurship and Practice, Academy of Management Journal, will be reviewed. That will present the basis for the determination of the main items of the open innovation proclivity.

The following step is generation of the item pool which reflects the field of open innovation proclivity. The items will be validated by structured interviews with entrepreneurs and expert judges. The format for measurement will be the seven point Likert scale. Furthermore the questionnaire will be validated by foreign expert judges in the field of open innovation, which will enable international validity of the scale. Afterwards, I will carry out a focus group, where participants will take part in a discussion of each item in terms of suitability, uniqueness and ability to convey the intended meaning. The questionnaire will be prepared in English, translated into Slovenian language and later back translated (Van de Vijver & Hambleton, 1996). After that the pilot study will be carried out on a sample of 30 Slovenian entrepreneurs to collect their opinion and feeling about the questions.
On this base the final version of questionnaire will be prepared for final validation of the measure of open innovation proclivity. The questionnaire will include all relevant questions that indicate the proclivity towards open innovation. It will be distributed to 3000 randomly chosen entrepreneurs via e-mail. To enhance the response rate the reminder will be send to recipients after a week, and again after two weeks (Dillman, 2007). The questionnaire will be carried out in Slovenia and in at least one foreign country which will ensure the cross-culture validation. After the data collection, the reliability and validity of the measure will be evaluated. The analysis will identify the most appropriate number of factors, explained by different number of items. The final step will consist of discriminant validity, which will show that open innovation proclivity is a distinct construct in relation to other entrepreneurial constructs and confirmatory factor analysis in order to test the factorial validity of the results that were conducted by exploratory factor analysis. On this base the final measure of open innovation proclivity will be prepared. Above discussed detailed description of the scale development is presented in the Figure 4.

Figure 4: Development of the scale for open innovation proclivity

4.2 Research methodology of the second and third paper

Due to the related concepts of the study, the structure of the second and third paper will be very similar.

Firstly the critical literature review in the field of absorptive capacity and personal characteristics of managers will be carried out. I will follow the same steps for literature review as described under research methodology of the first paper. Based on the literature review, a survey instrument for absorptive capacity and personal characteristics of managers will
The questionnaire will be prepared in English, translated into Slovenian language and later back translated (Van de Vijver & Hambleton, 1996). After that the pilot study will be carried out on a sample of 20 Slovenian entrepreneurs to collect their feedback. Their comments will be considered in the final questionnaire. The final questionnaire will be distributed to 3000 randomly chosen entrepreneurs via post. To enhance the response rate the reminder will be send to recipients after a week, and after two weeks an electronic version of the survey (Dillman, 2007). The questionnaire will be carried out in Slovenia and in at least one foreign country which will ensure the cross-culture validation.

The data gathered will be analyzed using descriptive statistics, correlations analyses, ANOVA, reliability tests, exploratory factor analysis, confirmatory factor analysis and structural equation modeling.

5 CONTRIBUTION TO THE FIELD OF KNOWLEDGE

The contribution to the field of knowledge will be twofold. From a theoretical perspective, the dissertation addresses the problem of measuring and identifying the practices that shape the concept of open innovation. It will present a comprehensive literature review in the field of open innovation and develop refined multidimensional measure of open innovation proclivity. The research will culminate in the first multidimensional measure of open innovation proclivity which will be cross-culturally generalizable. The scale will be appropriate for examination in wide variety of industries, from manufacturing to service firms and will not be limited only to large corporations, but will also be relevant for smaller firms. Additionally, research will also show how absorptive capacity and different personal characteristics of managers influence open innovation proclivity as well as how these constructs impact on firm’s business and innovation performance.

From a practical point of view, the construct developed in the first paper and empirical testing of proposed hypothesis from the second and third paper can help managers at incorporating open innovation in their company. The study will present in detail several possibilities of implementing open innovation practices. Using the proposed model, companies will be able to identify the abilities they possess for exploitation of internal knowledge and exploration of the knowledge and technology from outside.
6 PROPOSED STRUCTURE OF THE DOCTORAL DISSERTATION

Introduction

1. Development and validation of a scale for measuring open innovation proclivity
   1.1. Introduction
   1.2. Theoretical background
   1.3. Methodology and data collection
   1.4. Findings
   1.5. Conclusion, limitations, implications and future research
   1.6. References

2. The influence of absorptive capacity on open innovation proclivity
   2.1. Introduction
   2.2. Theoretical background
   2.3. Methodology and data collection
   2.4. Findings
   2.5. Conclusion, limitations, implications and future research
   2.6. References

3. The role of personal characteristics of managers in the orientation towards open innovation
   3.1. Introduction
   3.2. Theoretical background
   3.3. Methodology and data collection
   3.4. Findings
   3.5. Conclusion, limitations, implications and future research
   3.6. References

Conclusion

4. References
7 LITERATURE USED IN THE DISSERTATION PROPOSAL


8 PROPOSED LITERATURE FOR THE DOCTORAL DISSERTATION


Christensen, J. F. (2006). Whither core competency for the large corporation in an open
innovation world? In H. W. Chesbrough, W. Vanhaverbeke & J. West (Eds.), *Open innovation: researching a new paradigm* (pp. 35-61).


researching a new paradigm (p. 285).


