



LAHDEN AMMATTIKORKEAKOULU
Lahti University of Applied Sciences

Practices in Cooperation between Universities and Businesses

Case: Lahti University of Applied Sciences

LAHTI UNIVERSITY OF APPLIED
SCIENCES

Degree Programme in International
Business

Bachelor's Thesis

Spring 2015

Le, Ngoc Xuan Hao

Lahti University of Applied Sciences
Degree Programme in International Business

LE, HAO: Practices in Cooperation between
Universities and Businesses
Case: Lahti University of Applied
Sciences

Bachelor's Thesis in International Business 72 pages, 5 pages of appendices

Spring 2015

ABSTRACT

The cooperation between universities and businesses in Research & Development projects has been especially encouraged since the last century. It refers to a relationship in which knowledge transfer occurs between institutions and industries. The cooperation aims at solving business problems, motivating innovations or supporting academic research projects. UBC is transforming from a duo university-business relationship to a trio university-industry-government relationship, contributing to social and economic improvement at a local or national levels.

Throughout this study, an inductive method was employed with the assistance of a qualitative approach. For instance, primary data was collected through observation and interviews, while secondary data was obtained from reliable publications and online sources. Additionally, regarding the thesis scope and its limitations, desk-research method was intensively employed and proved to be useful for the research purposes. Furthermore, a benchmarking method was applied throughout this study.

The research aims at assisting Lahti University of Applied Sciences in improving its university-business cooperation performance. The findings and recommendations have managed to achieve the research objectives and become a beneficial study source for similar research projects. Based on the findings, an improvement plan has also been developed together with a timeline and a contingency plan.

Key words: university-business cooperation, benchmarking, innovation, research and development, case study, improvement plan

CONTENTS

1	INTRODUCTION	1
1.1	Background Information	1
1.2	Thesis Objectives and Research Questions	2
1.3	Research Methodology and Data Collection	2
1.4	Thesis Scope and Limitations	7
1.5	Thesis Structure	8
2	BENCHMARKING AND INNOVATION MANAGEMENT	10
2.1	Benchmarking	10
2.2	Innovation Management	14
2.3	Decision-Making Process	20
2.4	Evaluation Method: Force-field Analysis	21
3	FORMS AND DRIVERS OF UNIVERSITY-BUSINESS COOPERATION	24
3.1	Introduction to University-Business Cooperation	24
3.2	University-Business Cooperation in Finland	25
3.3	University-Business Cooperation at Lahti UAS	28
3.4	University-Business Cooperation Programs	31
3.4.1	Cambridge – Silicon Fen	31
3.4.2	Steelcase	32
3.4.3	Google - Academic and External Research Support	33
3.5	Benefits of University - Business Cooperation	33
3.6	Drivers of University - Business Cooperation	36
3.7	Challenges for Business - University Cooperation	37
4	EMPIRICAL RESEARCH AND ANALYSIS	39
4.1	Benchmarking Process	39
4.2	Lahti University of Applied Sciences: Objectives and Current Challenges in UBC	40
4.3	Case 1: University of Utah (Utah, USA)	42
4.4	Case 2: Cogswell Polytechnical College (California, USA)	47
4.5	Case 3: University of Guelph (Ontaria, Canada.)	50
4.6	Case 4: University of British Columbia (Vancouver, Canada)	54
5	DETAILS OF UNIVERSITY-BUSINESS-COOPERATION PRACTICES	56

5.1	Improvement Plan: Action Plan	56
5.2	Timeline	61
5.3	Contingency Plan	63
6	CONCLUSION AND SUGGESTIONS FOR FURTHER RESEARCH	66
6.1	Answers for Research Questions	66
6.2	Validity and Reliability	70
6.3	Suggestions for Further Research	70
7	SUMMARY	71
	REFERENCES	73
	APPENDICES	84

LIST OF FIGURES

FIGURE 1. Research Methodology.....	3
FIGURE 2. Inductive Approach Model	4
FIGURE 3. Thesis Structure.....	8
FIGURE 5. Benchmarking Process (modified from Johnson and Scholes 2001).	13
FIGURE 6. Innovation Formats (modified from Ahmed and Shepherd 2010, 7).	15
FIGURE 7. The coupling model of innovation (Ahmed and Shepherd 2010, 170)	17
FIGURE 8. Closed Innovation versus Open Innovation (Chesbrough 2003, 37-38)	18
FIGURE 9. Open Innovation vs. Crowdsourcing vs. Co-creation (Wazoku 2014)	19
FIGURE 10. Decision-Making Process (modified from Department for Communities and Local Government: London 2009).....	20
FIGURE 11. Force-Field Analysis Model (Accel Team 2014).....	21
FIGURE 12. Force-Field Analysis (modified from Proctor 2005, 220)	23
FIGURE 13. R&D Expenditure by Sector in 2007 – 2014 (Statistics Finland 2014).....	26
FIGURE 14. Extent of UBC in Finland (Davey et al. 2013, 9).....	27
FIGURE 15. Strategic Focus and Areas at LUAS (LUAS 2013)	29
FIGURE 16. Benchmarking Process in the Thesis.....	39
FIGURE 17. Ecosystem Partners (modified from University of Utah 2014b, 6) .	43
FIGURE 18. Commercial Research Process (modified from University of Utah 2012b).....	46
FIGURE 19. University of Guelph Research Funding (University of Guelph 2014c)	51
FIGURE 20. SPARK Process (modified from University of Guelph 2014f)	52
FIGURE 21. Proposed Commercial Research Process	59
FIGURE 22. Improvement Plan: Timeline.....	62

LIST OF TABLES

TABLE 1. Benefits of University – Business Cooperation.....	34
TABLE 2. Recommended Practices: Goals and Actions	57
TABLE 3. Improvement Plan: Contingency Plan	64
TABLE 4. Answers to Research Questions.....	68

ABBREVIATIONS

CRP	Commercial Research Process
EUBIC	European University – Business Cooperation
HEI	Higher Education Institution
IM	Innovation Management
LUAS	Lahti University of Applied Sciences
OMAFRA	Ontario Ministry of Agriculture, Food and Rural Affairs
R&D	Research & Development
RDI	Research, Development & Innovations
SPARK	Students Promoting Awareness of Research Knowledge
TVC	Technology and Venture Commercialization
UBC	University-Business Cooperation
UG	University of Guelph
USA	United States of America
UU	University of Utah

1 INTRODUCTION

1.1 Background Information

The thesis topic was suggested by Ms Milla Laisi, a Business Lecturer at LUAS with a background in both Business Studies and Innovation Management, when the author is in her final year of Bachelor's study.

University-Business Cooperation (UBC) is a relationship, which encourages the process of exchanging knowledge among educational institutions and industry, therefore, to support universities in developing learning activities and offer businesses opportunities to foster innovations (European Commission 2014a). In order to achieve these mutual benefits, Lahti University of Applied Sciences (LUAS) has set its target to be a potential partner in the field of Research, Development & Innovations (RDI), establishing close cooperation with regional businesses and providing students with real industry-related projects. (LUAS 2013.)

Moreover, the city of Lahti is considered the city of carpenters, which is a home for many companies in the woodworking industry. Lahti has become a centre of the Finnish furniture industry since the 1950's. Isku and Asko, two of the biggest furniture businesses in the nation, were founded in Lahti. The Lahti Sibelius Hall, located next to Lahti Passenger Harbour, is a well-known example of modern wooden architecture and a famous site for visitors. (Lahden Kaupunki 2014.)

On 16th October 2014, the workshop Finland's Furniture National RDI-unit was organized by LUAS and participated by local furniture manufacturers' representatives. Potential benefits as well as obstacles, that LUAS is facing in its UBC, have been realized.

Eventually, this raised the question of finding practices that could be applied to the case of LUAS so the university would be able to make good use of UBC, which is the main purpose of the thesis.

1.2 Thesis Objectives and Research Questions

The thesis aims to study the cases of other universities for their UBC using benchmarking method, especially UBC in Canada and the United States of America (USA) so as to come up with suggestions of good and relevant practices for the case of LUAS. As a result, a following research question is formed.

Research question: How can Lahti University of Applied Sciences improve its university-business cooperation performance?

In order to achieve the objective and build a relevant answer to the research question, the following sub research questions are considered:

- What are the purposes of UBC and its characteristics?
- How is UBC in Finland?
- How do universities in Canada and USA cooperate with businesses?
What are their achievements in UBC?
- To what extent has LUAS supported businesses?
- What practices can LUAS learn from benchmarking cases?

1.3 Research Methodology and Data Collection

Figure 1 illustrates the research methodology of this thesis. A detailed explanation is given in the following sections.

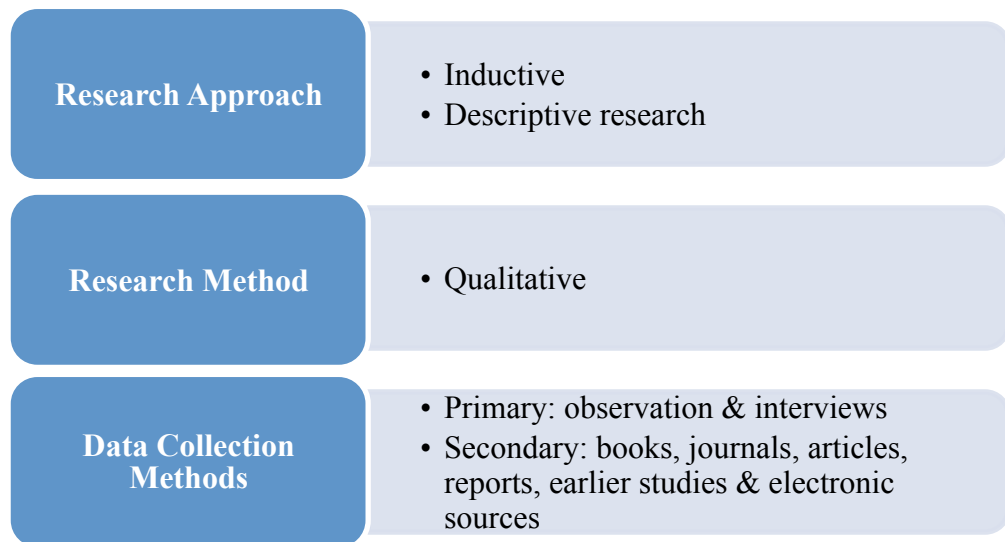


FIGURE 1. Research Methodology

Research Approach

There are two commonly used methods in research approaches: deduction and induction. In deductive approach, research develops a research strategy in order to test a theory, putting hypotheses in empirical situations and checking outcomes. On the other hand, inductive approach is chosen for the purposes of building a theory after observing, collecting and analyzing empirical data. In some cases, combining both deductive and inductive methods are necessary to facilitate a sophisticated research approach. (Saunders et al. 2009, 124-127.)

Saunders et al. (2009) suggest that the nature of the research topic decides the according approach method. Therefore, inductive reasoning, which is presented in Figure 2, will be adopted as the main approach method in this thesis.

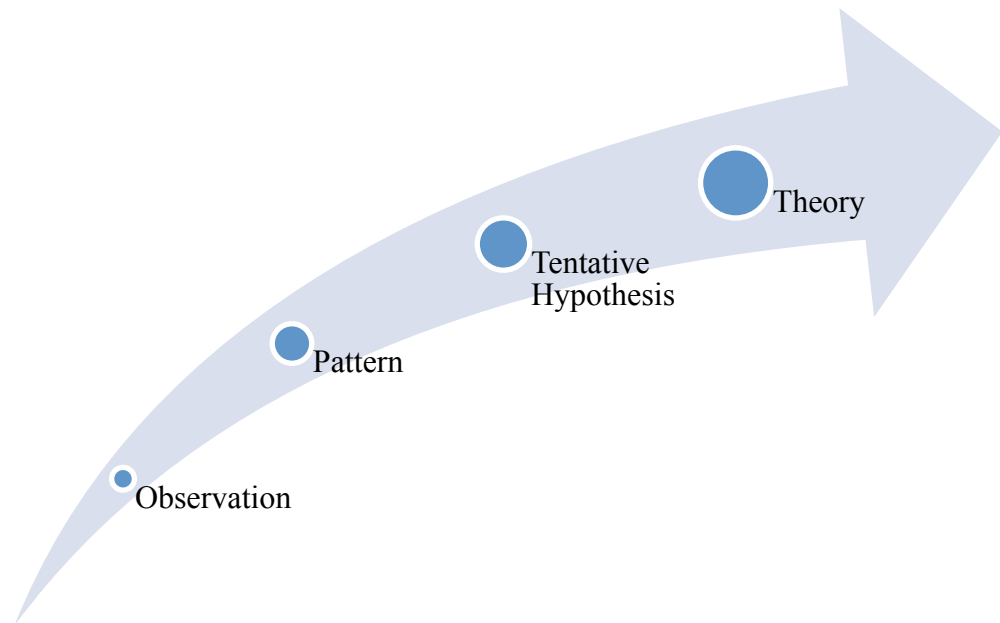


FIGURE 2. Inductive Approach Model

Using inductive approach, research is likely to be concerned with the context in which the event is taking place. The method encourages researchers to understand the nature of a problem better, and thus, to come up with the formulation of a theory. Furthermore, researchers using inductive reasoning tend to work with qualitative data and establish different views of the phenomenon. (Saunders et al. 2009, 125-126.)

In this thesis, practices of case universities, which are successful in carrying out the partnership with businesses, are studied and concluded as model practices. Moreover, those practices are going to be put in an improvement plan, which is developed for the case of Lahti University of Applied Sciences.

Research Method

Different contexts require different research methods. There are two popular research methods in the world of research: qualitative research and quantitative research. Quantitative research studies a portion of populations who think and act in a specific way, mostly regarding the problems of how many and how much. Qualitative research, on the other hand, focuses on solving WH-questions of what, how, why and when. (Keegan 2009, 11-13.)

This thesis is designed to develop theoretical UBC practices for the benefit of LUAS by answering what, how and why questions about research UBC cases from Canada and USA. Accordingly, qualitative method is rationally applied.

Data Collection

In order to answer research questions, researchers utilize two sources of information known as primary data and secondary data. Data that have already been collected, analyzed and published in either paper or electronic form are secondary data. Such data are available in public libraries, e-sources, and sometimes, only from the organizations producing them. The information that those data delivers occasionally supports the same or different purposes from the researcher. Primary data, in comparison, are newly collected data by the researcher, in order to give direct answers to research questions. (Saunders et al. 2009, 256-288.)

According to Saunders et al. (2009), observation is a data collection method used in research activities and there are two types of it: participant observation and structured observation. Using *participant observation*, a researcher tries to participate in the lives of subjects and shares their experiences by both observing and feeling them. The method acquires a qualitative approach. On the other hand, structured observation is more concerned with a quantitative approach and the frequency of those activities. (Saunders et al. 2009, 288.)

The second method of primary data collection in this thesis is interviews. According to Saunders et al. (2009), different types of interview serve different purposes of research and require different research strategies. *Structured interviews* use questionnaires and collect responses with pre-given answers. *Semi-structured interviews* cover a list of themes and questions, which may differentiate interviews from interviews. Finally, *unstructured interviews* are an informal type of interview, which is referred as in-depth interviews. (Saunders et al. 2009, 320-321.)

In this thesis, *participant observation* and *semi-structured interviews* are employed. However, modifications of these methods are made in order to adapt the researcher's research capabilities. For instance, the method of participant

observation in this thesis does not involve the researcher's participation because of the limitation of time. Instead, there are intense researching and analyzing activities during the process, which attempts to provide sufficient information for satisfactory outcomes. The same reasons lie in the adoption of semi-structured interviews in this thesis. Interviews with case universities may not be feasible to occur because of time constraints. Therefore, in-depth research and analysis is very important for this thesis topic.

Because of the possibility of lacking interviews with case universities, desk-research method will be employed in acquiring research data in this thesis. Desk research method refers to the collection and utilization of secondary data. There is a variety of sources that can be used in desk research, such as information on the Internet, market and company data, government and industry statistics or general directories and the press. In order to achieve satisfactory desk research outcomes, it is advisable to follow a process of data planning, recording and evaluating. Desk research should be conducted during a certain given timetable. Because the information gained is from secondary sources, tasks of data recording and evaluating should not be ignored. However, desk research does have its limits compared to a combination of primary and secondary research. (Hague and Wilcock 2014.)

1.4 Thesis Scope and Limitations

The thesis work aims at studying some university cases for their cooperation with businesses in order to give suggestions for the case of LUAS. These suggestions are drawn from the author's research, analysis and point of view as well as discussions with the thesis supervisor. Therefore, the results gained are theoretical and in need of practical appliance.

University cases chosen are either partner universities with LUAS or well-known cases of UBC. According to the discussions with the RDI project manager and the thesis supervisor, North America, including Canada and the United States of America, is the assigned region for this thesis work. As a result, the research outcomes are not as thorough as in terms of worldwide. Due to tight schedules and time constraints, interviews with benchmarking cases will not be possible to occur, which is totally a disadvantage for the thesis. Furthermore, the barrier in foreign languages is also an obstacle during the research process. Therefore, most of the tasks will be done using desk-research method.

However, under the support and supervision of the thesis supervisor – Ms Milla Laiji, this thesis work will be completed in time and deliver desirable results.

1.5 Thesis Structure

Figure 3 illustrates the structure of this thesis.

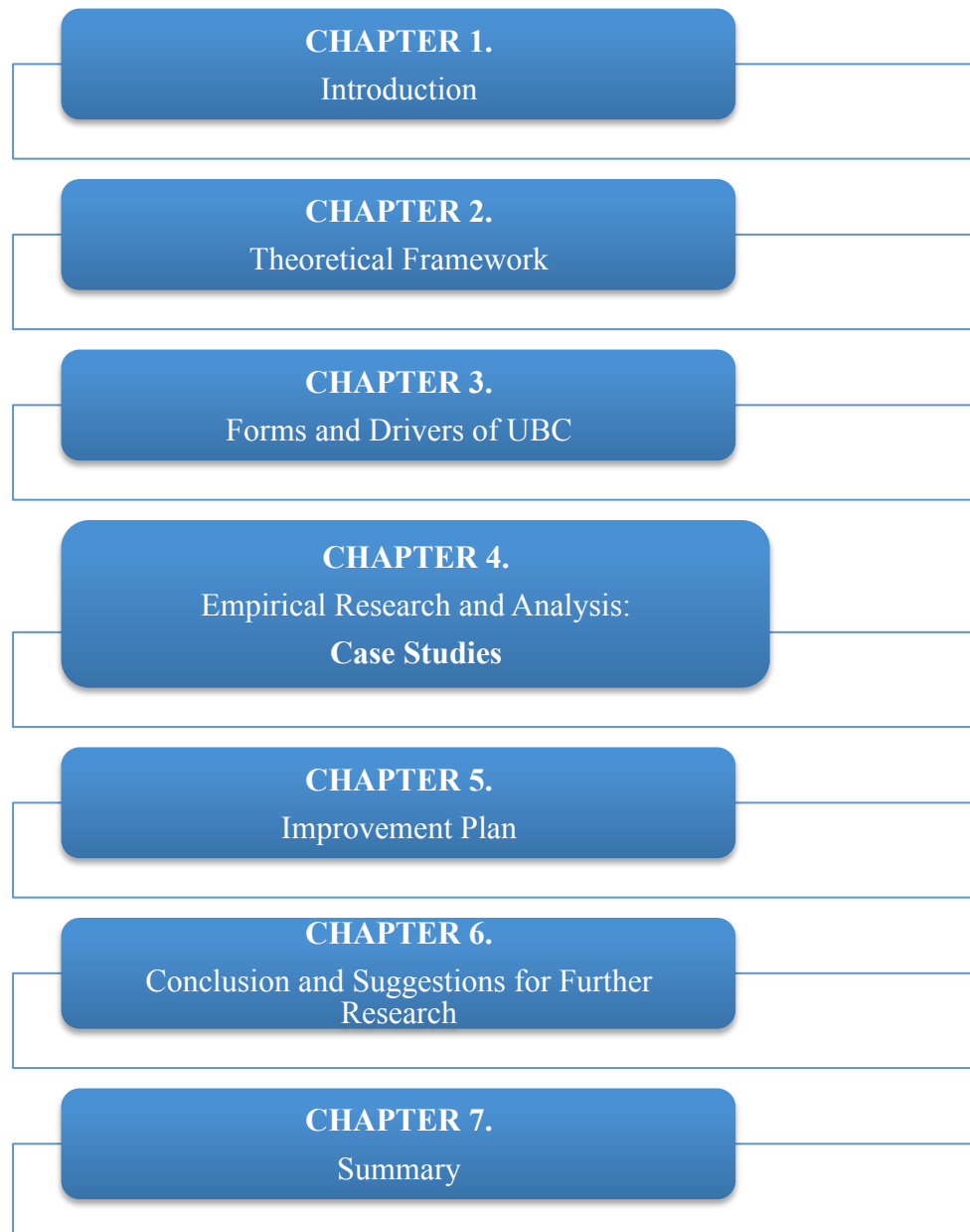


FIGURE 3. Thesis Structure

This study work is divided into two main sections: theoretical study and empirical study. Introduction of the thesis topic as well as the author's research methods are presented in Chapter 1.

Chapter 2 includes description of theoretical tools that are studied and applied in this thesis such as benchmarking practices, innovation management theories and decision-making methods.

Chapter 3 studies the forms and drivers of UBC, providing background knowledge about UBC in Finland and in North America.

Chapter 4 introduces four benchmarking case studies and analyzes their significant performance.

In Chapter 5, a detailed improvement plan is developed with an action plan and timeline.

Chapter 6 contains the thesis author's conclusion in addition to her suggestions for further research.

Finally, Chapter 7 concludes with a short summary of the thesis work.

2 BENCHMARKING AND INNOVATION MANAGEMENT

In this chapter, theories about benchmarking and innovation management are presented, providing a sufficient understanding of benchmarking and innovation. These two concepts are employed throughout this study. Additionally, explanation about decision-making process and force-field analysis is given as well since they aim at supporting further research.

2.1 Benchmarking

In the thesis, benchmarking will be mainly used as an analyzing tool for different UBC practices. The idea is to search for, analyze and apply suitable practices, which LUAS can learn from successful cases of UBC. The benchmarking theoretical content consists of benchmarking definition, benchmarking types and benchmarking process.

Benchmarking Definition

Camp (1995) defines benchmarking as an ongoing learning process used to improve business performance by analyzing and understanding various methods and practices by other organizations. It is essential that benchmarking firms learn from the leaders in the industries about how and why their practices work and pattern after the best practices. One of benchmarking principal objectives is to create a competitive advantage towards other firms in the same industry. (Camp 1995.)

There are many definitions of benchmarking as there are many organizations employed in it. Benchmarking is related to the method of finding and implementing better practices. However, using benchmarking does not mean to copy methods used by others; such approaches, at many times, do not work as every organization is different to every other in many aspects – background, culture and resources. Benchmarking should be taken as a slow and continuing solution to a business problem; it requires extensive effort, strong motivational forces and good project management. (Johnson and Scholes 2001, 85.)

Johnson and Scholes (2001) discuss that there is an extent of confusion that many managers have for benchmarking involvement. One of the most common misinterpretations is that benchmarking is about comparing statistic performance index from different organizations although they are referred to benchmarks. Camp (1995) differentiates between *benchmarks* and *benchmarking* by defining their roles. Benchmarking is considered as a process or activity of investigating and understanding how and why there are differences in performances across different organizations. Consequently, benchmarking process results in finding best practices and modifying them into a desired form so as to adapt to the benchmarking firm. On the other hand, benchmarks are taken as industry standards converted into performance measures and used as references in benchmarking activities. (Johnson and Scholes 2001, 86.)

Benchmarking Types

Camp (1995) categorizes benchmarking into four types – internal, competitive, functional and generic process benchmarking. *First*, internal benchmarking is a comparison activity within an organization towards a specific and similar operation. *Second*, competitive benchmarking is a method to compare for the best among direct competitors. *Third*, functional benchmarking is used to compare methods in the same function with other companies outside the industry. Fourth, generic process benchmarking is the type of comparing practices from available sources, in the same industry, for more efficient work processes. (Camp 1995.)

Johnson and Scholes (2001) also categorize benchmarking into four types, but one is different from Camp (1995) – internal, sector, competitive and best-in-class benchmarking. The first benchmarking type, internal benchmarking, has similar definition as the one that Camp (1995) mentions. Sector benchmarking, as known as generic process benchmarking, has as similar function of comparing own firm with others in a similar business and having the same operational region. The Camp (1995)'s definition for competitive benchmarking shares a similar definition with the third type that Johnson and Scholes (2001) define. The last type, best-in-class benchmarking, has some different aspects from previously mentioned functional benchmarking. While functional benchmarking

only compares similar practices by other outside firms, best-in-class benchmarking chooses organizations that are specifically considered having the best practices for certain operations regardless in the same or different industry. (Johnson and Scholes 2001.)

Figure 4 illustrates the trade-off between the levels of difficulty in gaining information using different types of benchmarking.

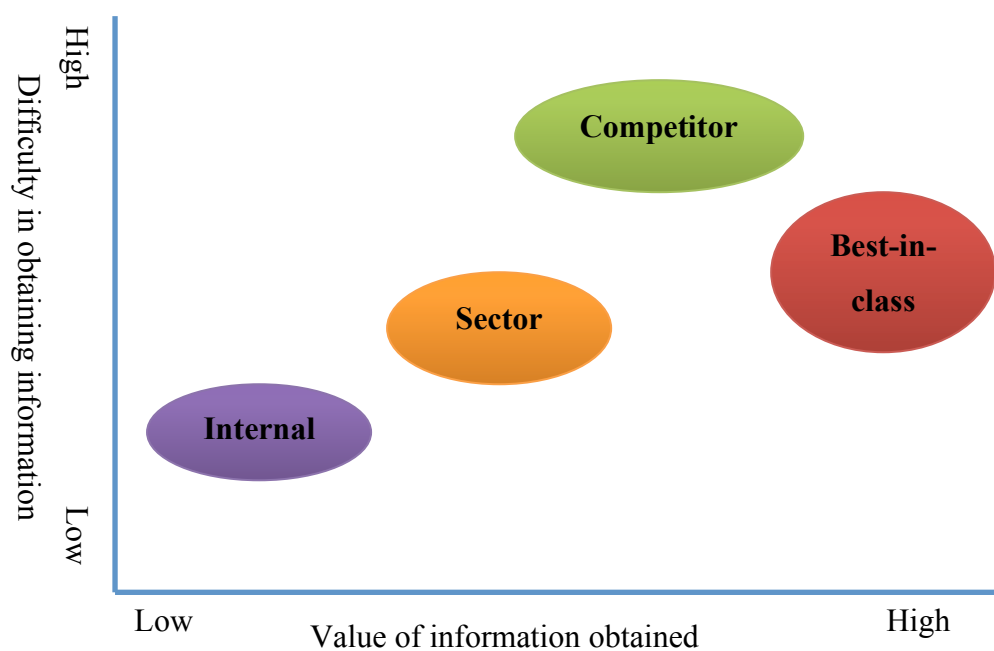


FIGURE 4. The trade-off between the levels of difficulty in gaining information using different types of benchmarking (modified from Johnson and Scholes 2001)

As shown in Figure 4, internal benchmarking is the easiest method to follow as it uses internal benchmarked sectors although such method limits the variety in studying external objects. The method has the lowest threats in applying best-discovered practices because they are within organization and sharing similar cultures and objectives. Sector benchmarking aims at comparing with other organizations using available information and especially focusing on regional competition. Competitive benchmarking has the highest level of difficulty in obtaining benchmarking information since it needs to gather operational data from competitors. However, knowledge gained from such benchmarking method

defines own current competitive disadvantages and supports performance improvement. Last but not least, best-in-class benchmarking, though has a higher level of difficulty in obtaining information compared to internal and sector benchmarking, it is an easier method compared to competitive benchmarking. The information regarding the best-in-class organization may sometimes be overly benchmarked and not practical to be applied in any organizations. (Johnson and Scholes 2001, 96.)

Benchmarking Process

There are four major stages in a benchmarking process – planning, analysis, action and review. Benchmarking tasks arise when there is a need to improve performance and start with the first stage of planning it. (Johnson and Scholes 2001.)

Figure 5 illustrates a benchmarking process.

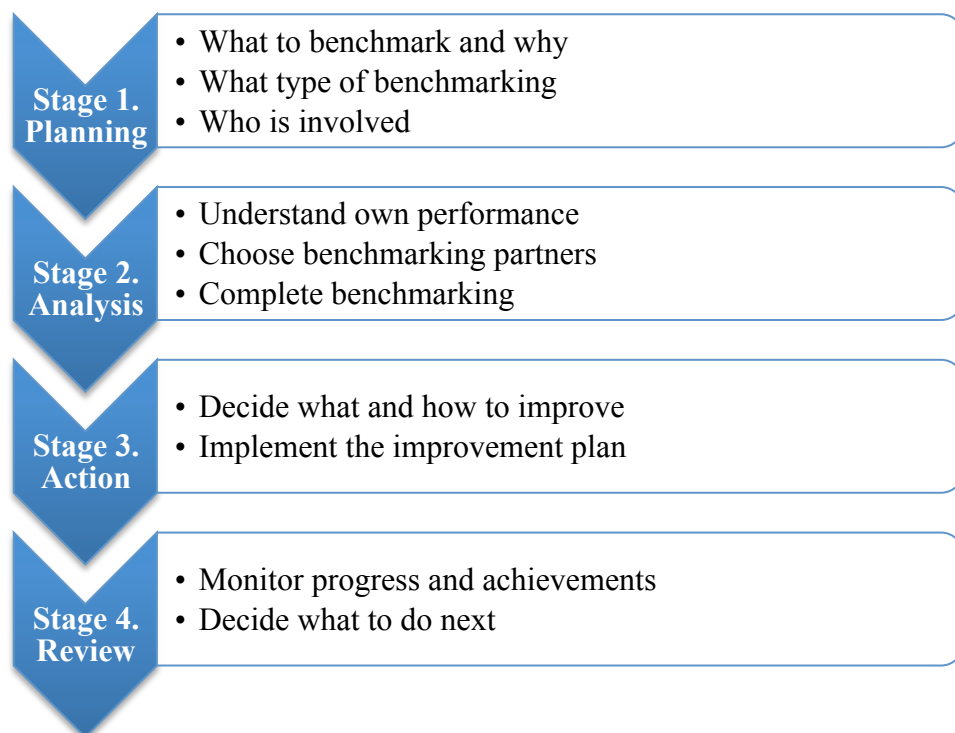


FIGURE 5. Benchmarking Process (modified from Johnson and Scholes 2001)

In stage one, it is essential to decide what to benchmark and why so.

Understanding the critically important areas of operation is necessary to decide

on the key issues for benchmarking. Benchmarking type is suitably chosen because of the availability of the information and involved people. In stage two, it is entirely analysis. In order to compare rationally own performance with others', one needs to understand thoroughly own situation. A firm should avoid choosing benchmarking partners simply because they are willing to get involved; it may end up with impractical results. A set of criteria is advisable in selecting partners. After a firm has done their benchmarking analysis, it proceeds to stage three of action. It is when a firm modifies and applies external practices that they choose. Stage four represents the review step. Change management and timely monitoring are implemented in the improvement plan. Benchmarking is not a quick fix; thus, it requires further actions to develop the plan. This is a repeated and continuous process until performance is improved. (Johnson and Scholes 2001, 97-104.)

2.2 Innovation Management

Innovation Concept

According to Ahmed and Shepherd (2010), innovation is considered as a source of improvement and development. Continuous innovation is a means for firms and nations to achieve economic vibrancy. Developed countries such as US, Japan and parts of Europe invest intensively in Research & Development activities (Ahmed and Shepherd, 2010). Drucker (1985) explains that entrepreneurs use innovation as a tool to seek for advancement opportunities. Furthermore, Tushman and Nadler (1986), while focusing more on firms, define innovation as the establishment of any new product, service or process in a business unit.

There are a number of characteristics that innovation carries with collective definitions (Ahmed and Shepherd 2010, 5):

- Innovation as invention: The focus is on using resources (human, time and finance) to develop a new product, service or process.
- Innovation as diffusion and learning: The focus is on intensive usage, observation and analysis of an existing product, service or process.

- Innovation as an event: The focus is on creating a single new object.
- Innovation as a stream of innovations: This explains a single act may be the original source for an upcoming sequence of innovations.
- Innovation as change: This explains changes through innovations, which might be minor adjustments to current products or processes.
- Innovation as a process: It happens at a firm level and focuses on series of activities that result in an innovation.
- Innovation as a context: This occurs at a higher level than that of an individual or a firm, usually is the outcome of a socio-political change.

Innovation Formats

According to Ahmed and Shepherd (2010), since innovation has various definitions, it appears in several different formats. The formats are categorized into two groups: those innovations that are under a firm's control - strategic, process and product innovations; those that are outside a firm's scope of manipulation - social, political and philosophical innovations (Ahmed and Shepherd 2010, 7). Since the thesis work's scope is within LUAS's control, the discussion is limited among strategic, process and product innovations.

The following figure illustrates the three formats of innovation.

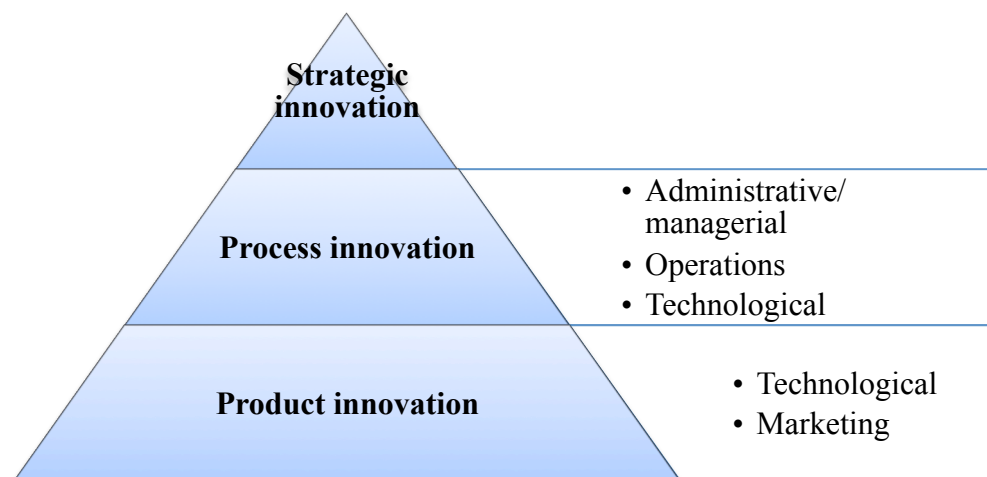


FIGURE 6. Innovation Formats (modified from Ahmed and Shepherd 2010, 7)

Product innovation, which is commonly referred to both products and services, results in the most visible outcomes of an innovation process. Product

innovation is based on either technological or marketing factors. Technological driving forces come within the features of the product, aiming at improving its performance. On the other hand, marketing innovation involves brand building and product-positioning strategy. However, only technological innovation is not enough to make a product successful; both technological and marketing driving forces are required for successful innovation. (Ahmed and Shepherd 2010, 7.)

Process innovation is to improve the performance of a firm's organizational activities. The urge for a process innovation may have its root from technological advancement in manufacturing, adoption of a new structure in operating and developing new methods in administration. Technological innovations increase the efficiency of manufacturing activities and at times, improve product features. Administrative innovations require new methods of operating the firm; it involves production-operation strategies in reducing waste of resources and using lean methods. (Ahmed and Shepherd 2010, 8.)

Strategic innovation involves the adoption and usage of a new business model. This is a consequence of external innovations and challenges. For instance, the Information Technology revolution has lead ways to many organizational-structure changes. Furthermore, electronic business models suggest new operational methods in information exchange, customized services, business intelligence, outsourcing logistics, online cooperation, et cetera. (Ahmed and Shepherd 2010, 8.)

Due to the thesis's scope and limitations, this work focuses only on product innovation and analyses benchmarking partners solely on their UBC in product innovation.

Innovation Process Management System

The thesis applies the push-pull innovation process to manage LUAS's RDI activities. The push-pull model, often referred to as the coupling model, was developed and widely used in the early 1970's. In order to recover from weak Research & Development (R&D), companies started to apply the model by taking advantage of pull factors from the markets and push factors from advancing technology. (Ahmed and Shepherd 2010, 167.)

Figure 7 visualizes the coupling model of innovation.

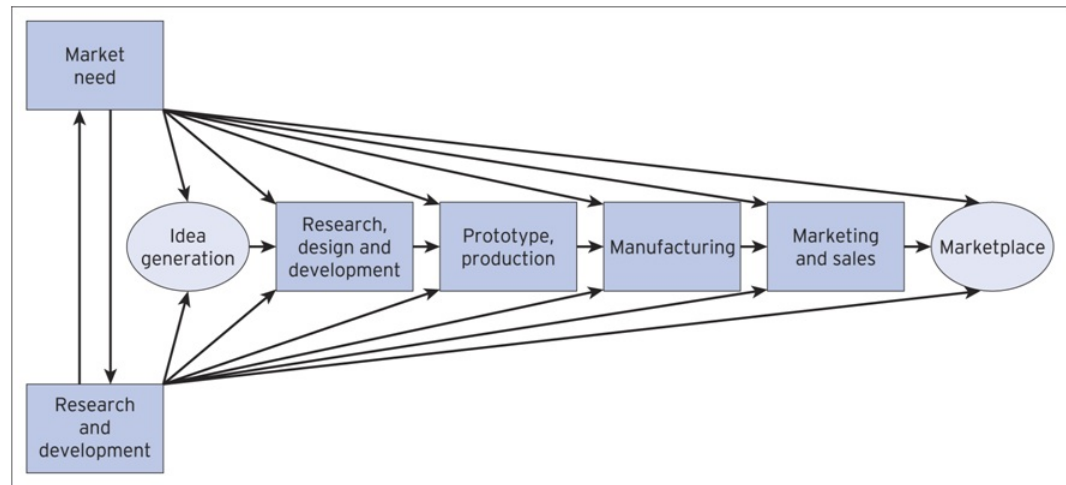


FIGURE 7. The coupling model of innovation (Ahmed and Shepherd 2010, 170)

The coupling model is rooted in the recognition of a successful innovation, which involves both market and technological factors. There are several discussions either factors from a market or those from advancing technology are more influential. Nevertheless, the key problem is that both market and technology are changeable. What is technically achieved now may be outdated tomorrow. In like manner, a product or service, which is popular today in the market, may not be as much appreciated in a near future. The pairing of market and technology is essential at all phases in the innovation process, from the first phase of ideas generation, through R&D activities, followed by prototype phase till manufacturing operations to the marketplace. (Rothwell 1992.)

Open Innovation

Henry Chesbrough, a Professor at the University of California-Berkeley, introduced the term of open innovation in his book *Open Innovation* in 2003. He has explained open innovation as a method of taking advantage of external ideas and technologies for a company's own innovations, and letting others do the same with the company's ideas and technologies. These represent two important types of open innovation: outside-in and inside-out. With its individual business

model, a company decides what to take in and what to leave out when choosing external knowledge. (Richards 2013.)

In the work “The Era of Innovation”, Chesbrough (2003) differentiates open innovation from closed innovation by their purposes and methods. Closed innovation means the development and introduction-to-market of new products within the company’s boundaries, while open innovation enables the process to take advantage of both internal and external ideas and technologies. Open innovation puts more focus on developing a business model as well as benefiting from licensing the company’s knowledge, and buying it from others when proved useful in building own model. On the other hand, closed innovation aims at being the first to commercialize an innovation and to protect own intellectual property so that the competitors do not benefit from it. (Chesbrough 2003, 37-38.)

The following figure visualizes the difference between closed and open innovation.

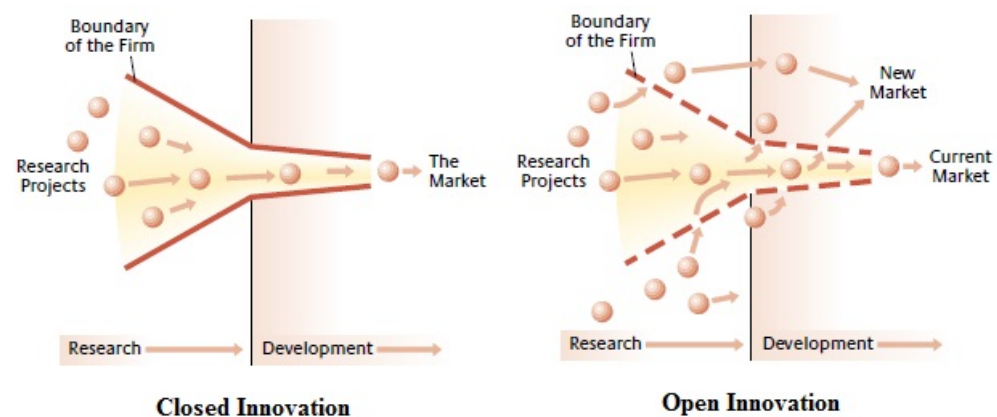


FIGURE 8. Closed Innovation versus Open Innovation (Chesbrough 2003, 37-38)

According to Wazoku (2014), people often confuse and mix up the three concepts: open innovation, crowdsourcing and co-creation. Though they support each other in meaning, these three concepts discuss different methods in application and management. Firstly, open innovation is meant for an environment where both internal and external parties have active participation in the development of mutual solutions. It represents a social method of solving

complicated issues. Secondly, crowdsourcing demands a lower level of management from a company when deciding to outsource projects to the public. The company then asks for the public's insights and suggestions, not necessarily in an official relationship with that company. Thirdly, co-creation suggests a relationship between a company and a well-defined group, usually its stakeholders and customers. Open innovation and co-creation requires a higher level of engagement from the company than crowdsourcing. (Wazoku 2014.)

The following figure visualizes the difference between open innovation, crowdsourcing and co-creation.

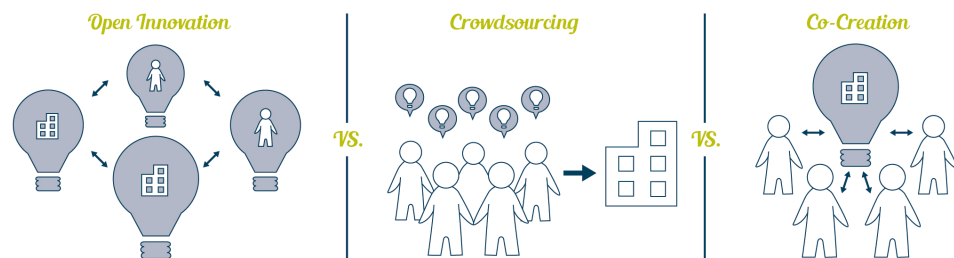


FIGURE 9. Open Innovation vs. Crowdsourcing vs. Co-creation (Wazoku 2014)

Thanks to globalization, companies gradually gain more interest in open innovation. There is an increasing number in innovation activities with the cooperation of two or more parties. The cooperation encourages different groups, such as external experts from universities, research institutes, customers and even competitors, to get involved in the product development process. However, open innovation is still under development and absent from the curriculum of European systems. For that reason, Lappeenranta University of Technology has established the European Academic Network for the Development of Teaching Open Innovation, with the purposes of promoting the benefits of open innovation, and discussing different cooperative innovation approaches brought from university representatives. The networking events bring together different universities, businesses and public sectors; facilitate cooperation between them and introduce new concepts and methods of open innovation. (Torkkeli 2013.)

2.3 Decision-Making Process

A successful decision-making process requires the decision-maker's deep understanding of three issues, which are the determining success criteria, possible outcomes and relevant pools of information (Courtney et al. 2013). A basic and simple decision-making process model, which will be applied in the thesis to decide suitable, adopted practices from the study cases, is described as follows.

A normal decision-making process consists of six steps: setting objectives, identifying alternative options, identifying success criteria, analyzing the options, making decision and finally, giving feedback. Figure 10 visualizes the mentioned decision-making process. (Department for Communities and Local Government: London 2009, 10.)

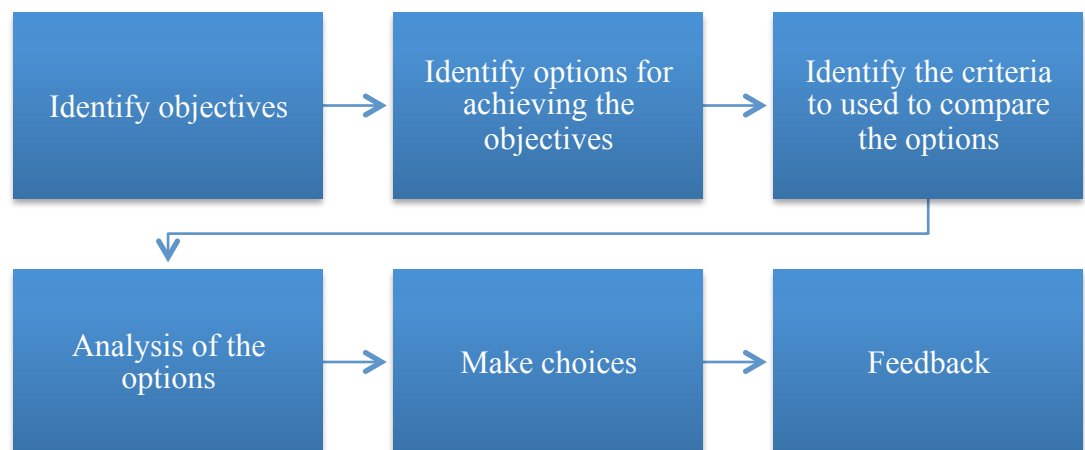


FIGURE 10. Decision-Making Process (modified from Department for Communities and Local Government: London 2009)

However, the above decision-making process is missing one most essential step from the beginning: the step of defining the problem or the identification of the purposes of a decision. Such first step is important because it explains the need of a decision and helps define desired objectives for the coming process. One way of identify purposes of a decision is to check which part of the problem requires an improvement plan; it narrows down and centralizes the objectives. (Ethnics Resource Center 2009.)

2.4 Evaluation Method: Force-field Analysis

In the thesis, force-field analysis is used to evaluate different recommended practices studied from benchmarking cases.

Force-field analysis, developed by Kurt Lewin in the 1950's, was initially meant for social circumstances but has also proven to be applicable in either small or big projects in organizational management. It is a simple and useful tool to assess both driving forces and opposing forces in a potential solution, in order to see how they impact against each other. (Atkins 2014.)

The following figure illustrates the force-field analysis model.

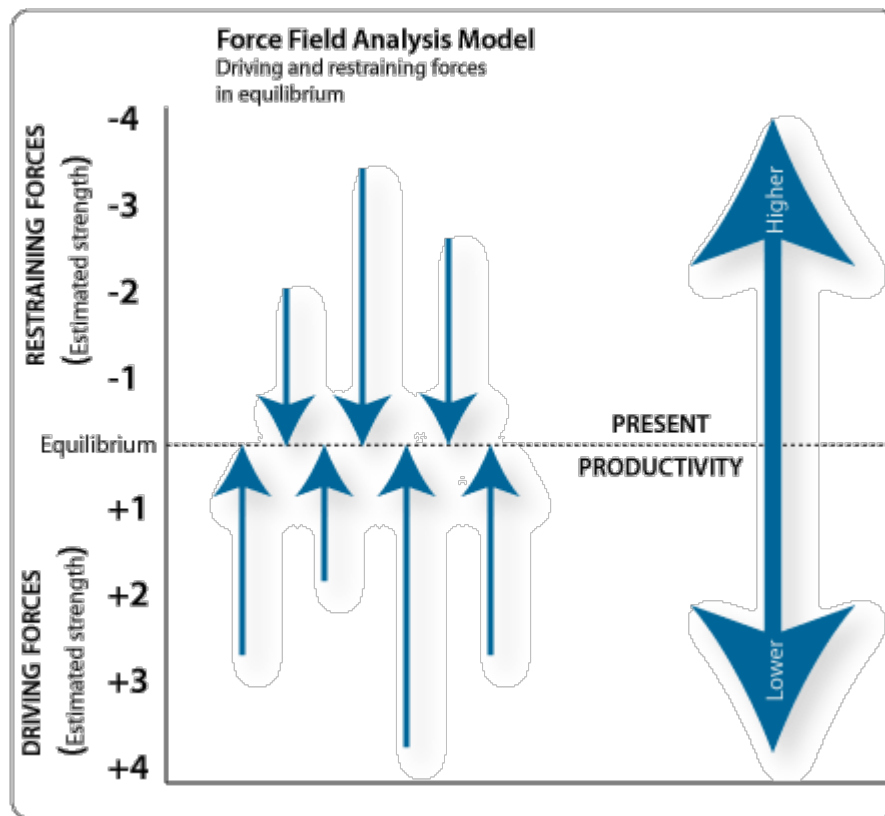


FIGURE 11. Force-Field Analysis Model (Accel Team 2014)

In Figure 11, major elements in a force-field analysis such as driving forces, restraining forces, equilibrium and current productivity level are listed. The figure also suggests two improvement plans for the analyzed project. Restraining forces are forces that suppress driving forces from becoming the dominating factors; as the stronger driving forces, the higher the productivity. When the total

of all restraining forces equals the total of all driving forces, equilibrium is reached. In Figure 11, the present productivity is at the same level of equilibrium, meaning that the combined forces have zero impact on changing the productivity level. (Accel Team 2014.)

In most cases, the sum of all restraining forces does not equal the sum of all driving forces. The solution to the problem is simple, with the ultimate purpose of increasing the productivity level, which is to strengthen the driving forces and weaken the restraining ones. In other case, when the opposing forces are so strong that it is impossible to eliminate their impact, the suggestion is to give up the change. (Manktelow and Carlson 2012.)

In *Creative Problem Solving for Managers*, Proctor (2005) also explains that force-field analysis is executed in order get a whole understanding of both the supporting and counter forces towards a decision. It helps take into consideration all influential factors. This is a particularized method of measuring pros and cons. The following steps are deigned to conduct a force-field analysis (Proctor 2005, 220):

- List all supporting factors in one column, and all counter factors in another column.
- Assess a score to each factor: for example, from 1 (least influential) to 5 (most influential). Positive factors receive positive values, and vice versa, negative factors with negative values.
- Draw a diagram showing all the factors and their scores.

Figure 12 gives an example of using force-field analysis.

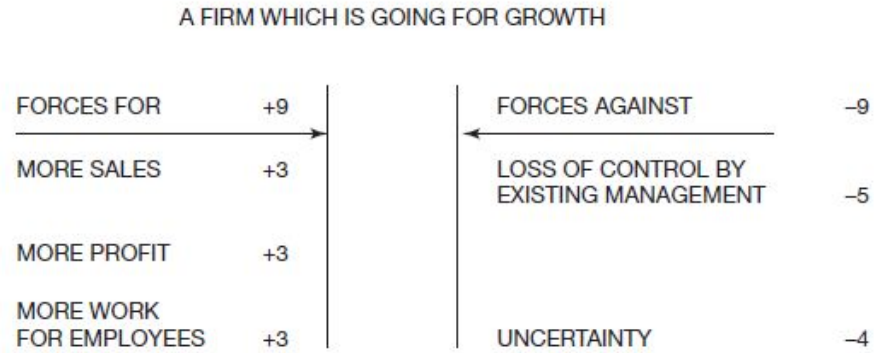


FIGURE 12. Force-Field Analysis (modified from Proctor 2005, 220)

In Figure 12, the example demonstrating the use of force-field analysis is taken from the case of a firm that is aiming for growth. All of the supporting factors are listed and given individually positive values based on how important each factor is to a whole. On the other column, against factors are also given negative values as their scores. The total score is calculated as a sum for each column so as to give a view of how strong all factors are.

Force-field analysis is to check the feasibility of the project. Proctor (2005) suggests two directions that make use of the analysis.

1. Weakening the influence of the factors against the decision
2. Strengthening the supporting factors

Force-field analysis is a useful technique to weigh the pros and cons of a decision. It helps to evaluate the success rate of a plan. Conducting a force-field analysis suggests approaches that improve the plan. (Proctor 2005, 221.)

3 FORMS AND DRIVERS OF UNIVERSITY-BUSINESS COOPERATION

3.1 Introduction to University-Business Cooperation

University-Business Cooperation (UBC) refers to a relationship in which knowledge transfer occurs between institutions and industries. The cooperation aims at solving business problems, motivating innovations or supporting academic research projects. UBC is transforming from a duo university-business relationship to a trio university-industry-government relationship, contributing to social and economic improvement at a local or national levels. (LSE Enterprise 2013, 3.)

UBC is seen as an important activity in developing a knowledge society. Many parties can get involved in UBC: a governmental body trying to boost its reunion economy, a higher education institution (HEI) seeking for additional funding in research, an academic institution undertaking more relevant research with extra fund, or a business getting access to the latest knowledge and improving its performance through innovation. (Davey et al. 2011.)

Businesses and universities cooperate and share benefits in education, research and knowledge transfer. While cooperating with businesses, universities increase the amount and quality of publications produced, improve their teaching content and methods according to the market's needs and requirements. In addition, UBC offers funding opportunities for university-based research projects. On the other hand, businesses have access to the latest knowledge and utilize technological facilities at the universities. (Galan-Muros and Davey 2014.)

There are eight types of UBC, these are (1) cooperation in R&D, (2) mobility of academics, (3) mobility of students, (4) commercialization of R&D outcomes, (5) curriculum development, (6) lifelong learning, (7) entrepreneurship and (8) governance. A description list of these eight UBC types can be found in Appendix 1. Among them, type (1) collaboration in R&D and type (3) mobility of students are the most developed in Europe. Collaboration in R&D refers to the cooperation in R&D activities, innovation, publications and supervision of research theses, et cetera. Student mobility means the transition of students from

education institution to businesses temporarily or permanently. (Davey et al. 2011.)

In order to achieve the Europe initiative “Youth on the Move”, effective cooperation between universities and businesses is recommended. Students are supposed to get strongly involved in innovative activities, for instance, start-ups and industry-based research projects. (European Commission 2011.)

3.2 University-Business Cooperation in Finland

The Finnish Research Infrastructure Committee has published Finland’s strategy and roadmap for research infrastructure for the period 2014 – 2020. The publication discusses a strategy for Finland to increase its R&D activities and maintain the reputation for having world-class research and education (Ministry of Education and Culture 2014). One of the recommended actions to be taken, so as to achieve the 2020 goals, is to collaborate the use and access to research infrastructures provided by education institutions. The action does not only encourage the utilization of available infrastructures but also promote technology and knowledge transfer. (Finnish Research Infrastructure Committee 2014.)

According to Statistics Finland, R&D expenditure has gradually decreased since 2011, especially in business enterprises. There is also a slight downfall in R&D expenditure of public sector and higher education sector but not as remarkably as with business enterprises. The statistics also indicates the need for university and business cooperation in R&D activities. (Statistics Finland 2014.)

Figure 13 describes the situation in a graph.

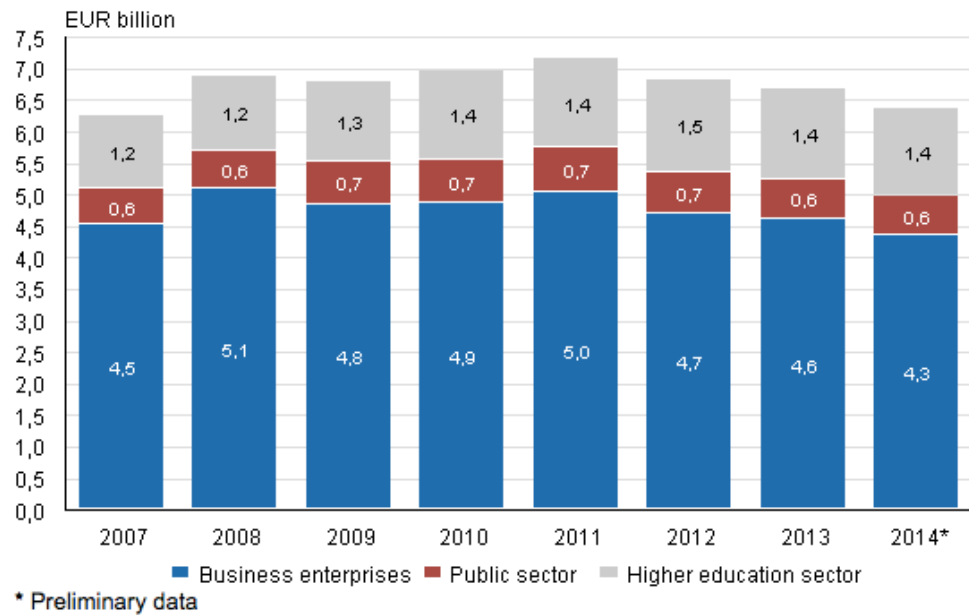


FIGURE 13. R&D Expenditure by Sector in 2007 – 2014 (Statistics Finland 2014)

Based on the study “The State of University – Business Cooperation in Finland” conducted on behalf of the Directorate – General for Education and Culture at the European Commission, the environment for UBC in Finland is one of the most positive in Europe. Supporting mechanisms such as UBC strategies in implementation and motivation are well developed. Seen Figure 14, collaboration in R&D projects, mobility of students and lifelong learning are the most popular forms of UBC in Finland. The figure also shows that Finland’s level of UBC only exceeds European average by a little; therefore, there is still room for improvement. (Davey et al. 2013.)

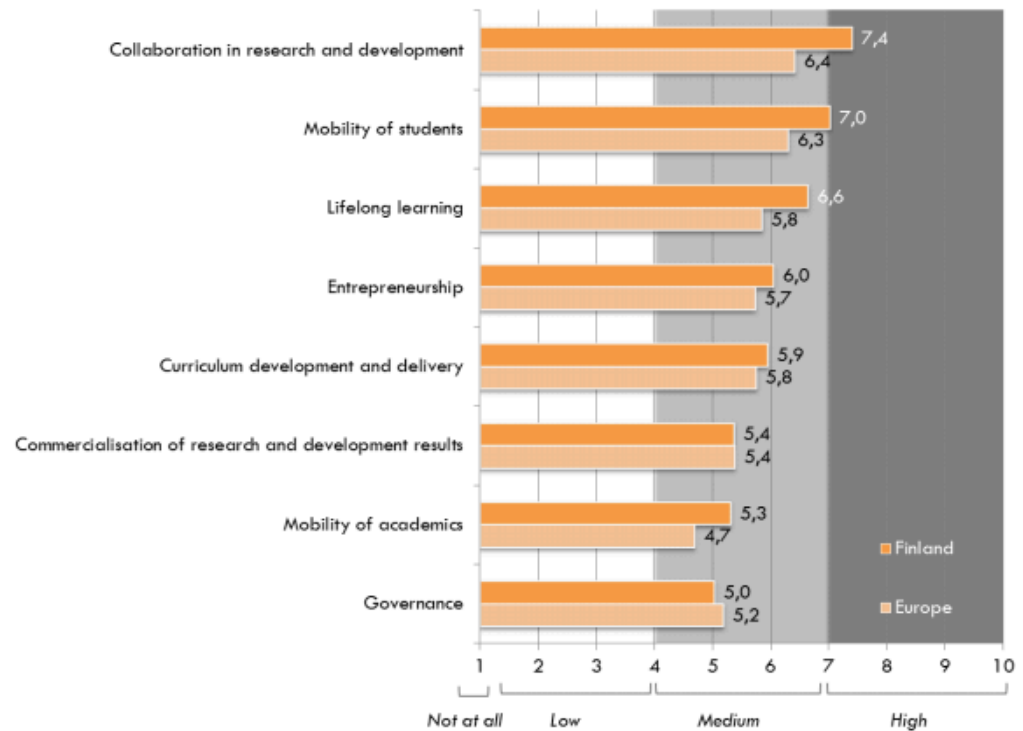


FIGURE 14. Extent of UBC in Finland (Davey et al. 2013, 9)

European University – Innovation Cooperation (EUBIC) is a Finland-based project, which studies and identifies different European models with the purpose of strengthening and developing the networks between universities and businesses. EUBIC has set three key targets: first, *“to disseminate and support good European practices and models for partnership and cooperation between universities and businesses”*; second, *“to open up innovative cooperation possibilities between universities and businesses, to find out new communication channels and methods”*; and third, *“to transfer the newest research results more efficiently for the use of companies and to promote the societal interaction of universities through partnerships”*. (EUBIC 2014.)

3.3 University-Business Cooperation at Lahti UAS

RDI Activities at LUAS

As a university of applied sciences, LUAS puts emphasis on applied research and experiments, and as a result, to gain new knowledge. There are four types of innovation being identified at LUAS: product, process, marketing and organizational innovation. (LUAS 2014.)

LUAS has maintained active participation in international co-op research projects that support the university's teaching and improves the region's working conditions. The cross-border business cooperation with Russia and Estonia has provided LUAS with valuable experiences in planning and executing international projects. In 2004, the Innovation Center was found to monitor the practicality of its R&D results. Entrepreneurship and innovation connection are common focus areas of R&D in UBC at LUAS. The success of RDI at LUAS is built on these important quality features: result orientation, higher education pioneer and strategic international attempts with healthy economic background. (Lahti Mechatronics 2012.)

RDI Strategy 2013 – 2016

LUAS has stated its vision for RDI 2016 to be *“an international leader in RDI and a major contributor to the practice-based innovation environment of the Lahti region”*. The strategy framework takes into consideration Europe 2020 – Europe's Growth Strategy and the government program of Education and Research 2011 – 2016 Development Plan. (LUAS 2013.)

Figure 15 lists the strategic focus and areas of RDI at LUAS.

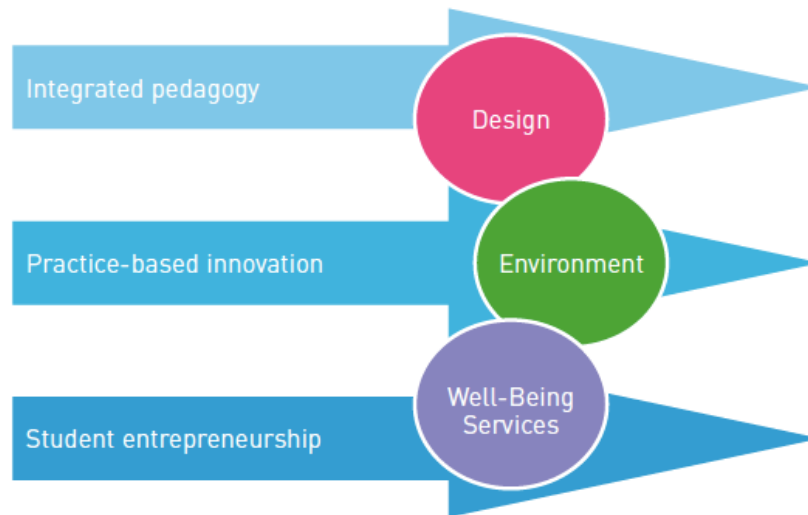


FIGURE 15. Strategic Focus and Areas at LUAS (LUAS 2013)

The 2016 strategic focus areas of RDI at LUAS include Environment, Design and Well-being Services, which have a strong relation with regional development. All education faculties share the same operation models of integrated methods of teaching, practice-based innovation and student initiative. First, *integrated pedagogy* means to study and develop solutions, which promote collaboration of RDI and education so as to increase cooperative relationship level between local businesses and LUAS. Second, *practice-based innovation* encourages students and teachers to combine theory and practice in working life projects proposed by partner businesses. Practice-based innovation is a form of knowledge creation rooted from the clear objective of practical orientation and real-life problem solving. Third, *student entrepreneurship* is a part of education when students take the initiative in learning and gaining their expertise experiences with an active and result-oriented approach. (LUAS 2013.)

Current Projects/Programs

There have been many projects and programs at LUAS. The following programs are the representatives.

Lahti University Consortium

Lahti University Consortium, which has been coordinated by the University of Helsinki, is known as Lahti University Campus. The consortium concentrates on

integrative research and development strategy that assist the growth and movement of local business activities. The research areas focus on design, environment, innovation and welfare service development. Its operation cornerstones consist of “*sustainable development and efficient application*”. Aalto University, Lappeenranta University and University of Helsinki have also joined the research campus in Lahti. (Lahti University Campus 2014.)

DuuniExpo

DuuniExpo is an annual job fair that is entirely organized by students of LUAS. The event is organized to offer networking, learning and employment opportunities with the participation of many different employers and job seekers. DuuniExpo is considered to be the “*largest entrepreneurship and career event*” in Finland. There is one special Entrepreneur Day in DuuniExpo that invite successful and inspiring guest speakers, who are going to talk about their own professional career paths and give advices on entrepreneurship. The coming DuuniExpo will be held in Lahti Fair Center on 21st January 2015. (DuuniExpo 2014.)

Wood Technology & Furniture RDI

In the faculty of technology, cooperation between furniture manufacturers and LUAS has not been much. Other faculties such as design and business have also done some minor projects for the companies by conducting Bachelor final theses. The current idea is to create networks with different furniture companies in Lahti and let them know about LUAS’s multi-area platform for RDI. Local furniture companies are now lacking of development resources and in need of entering new markets. Therefore, responsibilities of LUAS are to establish business cooperation with them in innovation and business development. (Lähteinen 2014.)

3.4 University-Business Cooperation Programs

In this part of the thesis, three well-known UBC programs are introduced. These programs are suggested by Mr Leo Lähteinen, the former Project Manager of Wood Technology & Furniture RDI at LUAS.

3.4.1 Cambridge – Silicon Fen

Silicon Fen, also known as Cambridge Cluster, is the homeland of more than 1500 technology companies in Cambridge, England. Their operations vary from software and electronics to biology. According to Charles Cotton, Silicon Fen was originated by Cambridge University. It all started in 1960, when Cambridge Consultants was set up, in order to encourage students to get involved in technology incubators, because the university was resistant to the explosion of entrepreneurialism. Cambridge Science Park was then founded, being the starting point of more than 500 technology companies by 1985, until when it grew into Silicon Fen. (Baker 2013.)

Cambridge has recently become known as a start-up hub for technology. In engineering labs, start-up companies have come up with many approaches to innovative research and experiments. In Entrepreneurship Center, one of the new centers for start-ups, entrepreneurs and academic staff gather and solve business challenges. The environment encourages freedom in academic research and experiments, then brings to apply in the business world. A lot of innovations have been commercialized with the help of Entrepreneurship Center. According to Krzysztof Koziol, Cambridge is a great place for start-ups, despite the fact that financial support for young and small companies is still lacking. However, there is a lot of professional mentoring at Cambridge, which is one of the most important support to make a company successful. As a new birthplace for technology incubators, there is still to see whether the scale of ambitions can match its potential at the Silicon Fen. (BBC 2014.)

3.4.2 Steelcase

Steelcase Incorporated is a global furniture manufacturer with over 100 years of operation. Its brands offer a variety of furniture products, including workplace furniture and products, healthcare services, et cetera. Steelcase is operating in more than 800 locations globally. During the past three years, it has invested 107.7 million US dollars in research, design and development projects. Steelcase is known of three core brands - Steelcase, Turnstone and Coalesse; their headquarters are located in Grand Rapids, Michigan, USA. (Steelcase 2014a.)

Steelcase has been conducting a lot of research in workplace trends and insights in order to help the world understand how people work and how creating great space makes a difference. Steelcase research results come in the form of reports, which are published by 360⁰ Magazine, available for both print and online reading. Many case studies about different companies have been done by Steelcase, which provides a great list of self-reading and studying. So far, there have been 68 issues being published and also the same amount of *Questions and Answers* sections, in which involved persons or experts carry out discussions about the topic in the issue. All discussions are open for readers. (Steelcase 2014b.)

Operating in the furniture industry, Steelcase Incorporated has never stopped impressing their end users, by making sure the products and services it offers are of the highest quality. Research projects are carried out by Steelcase WorkSpace Futures team, divided into three groups: discoveries group, explorations group and perspective group; each group carries a specific focus (Steelcase 2014c). Classroom 2.0 is one of Steelcase's recent research projects. This is a project studying about education environment – how teaching and learning facilities have changed over years and what makes the best out of an academic space. The project engages many universities, academic staff and students. (Steelcase 2014d.)

3.4.3 Google - Academic and External Research Support

Google was born in the Computer Science department at Stanford University. Since then, Google has maintained strong relationships with universities through collaborative research and innovation. There is a variety of programs at Google that provides resources to support research activities at universities. In return, Google has the access to their working results. Google understands that, despite its vast and varied research programs, it is only at universities where the most interesting and life-changing research outcomes come from. Therefore, it generously supports HEIs in funding innovation programs. Additionally, Google organizes different supporting programs for students, including scholarships, mentorships, internships, et cetera. Both external and academic researchers can as well benefit from Google set of tools and infrastructures in the form of services. Not only does Google support students in improving their skills, it also encourages universities in pursuing better education by providing a variety of products and resources. Google holds annual workshops and events in order to highlight the best and latest research outcomes in the field of computer science. These events are great opportunities for Google to learn from and cooperate with HEIs; in return, HEIs have their chances to study more about the business current challenges and its latest technology. (Google 2013.)

3.5 Benefits of University - Business Cooperation

In the following table, the benefits that cooperation between universities and businesses has brought to students, businesses, society, academic staff and HEIs are introduced.

TABLE 1. Benefits of University – Business Cooperation

	Benefits from University – Business Cooperation
Students	- learning experiences - employment opportunities
Businesses	- knowledge and technology exchange - speeding up innovation process - decreasing expenses
Society	- creating jobs - increasing local gross domestic product
Academic Staff	- professional training increasing academic reputation and employability
HEIs	- increasing brand-awareness in RDI activities - receiving sponsorships for research projects

Benefits for students

Benefits for students in UBC include the improvement in learning experiences, developing skills for certain fields and increasing their employment opportunities with better understanding of the world of work. Active participation in UBC helps students to enrich their curriculum vitae as well as build a professional self-image. In some occasions, students get their internships through UBC and have a better chance of securing a full-time position after they graduate. (Richmond Public Schools 2014.)

Benefits for business

Businesses cooperate with educational institutions in the form of a joint venture or a contract. Businesses have the opportunities to exploit the knowledge and technologies in common projects. The advantage is to speed up the innovation process and reduce the time between the product idea and its first introduction to the market. Businesses can also decrease the expenses in infrastructure

investments and personnel specialist hiring. Moreover, partnership with universities is a safe mode of acquiring innovative inputs and accessing the most recent technology discoveries. (Dan 2013, 69.)

Benefits for society

Such university-business partnerships create more jobs in society through research and implementation projects, as well as benefiting the local industries. As a result, they increase the local gross domestic product and disposable income of citizens. The more of such cooperation there is, the more variety of social and recreation benefits there are. As a result, regional productivity will be increased. (Davey et al. 2013, 28.)

Benefits for academics

Teachers and staff at the universities are given the opportunities through UBC for professional training and growth. Carrying out UBC activities, they are supposed to update their subject knowledge and get involved in research and implementation projects. Personal research projects can be sponsored and promoted by companies as long as it is relevant and practical. Furthermore, there is a good chance for them to increase their academic reputation and employability. (Australian Council for Educational Research 2011, 13.)

Benefits for HEIs

Cooperating with businesses increases the HEIs' brand-awareness in RDI activities. They also receive sponsorship from businesses to conduct research and renovate their research infrastructures. (European Commission 2014b.)

3.6 Drivers of University - Business Cooperation

There is no single driver for UBC. Involved businesses, students and universities together achieve benefits and bring about the growing of UBC. The cooperation makes significant social and economic contributions and promotes internationalization. (Lee 2014a.)

According to the research “The State of European University-Business Cooperation”, drivers that encourage UBC are grouped into two types: relationship drivers and business drivers. *Relationship drivers*, which are referred to the relationship between a university and a business, include the presence of mutual trust and commitment; possession of a shared goal; understanding of different parties such as students, teachers, business representative; previous relationship with the business partner and consideration of the cooperation as a means of addressing similar social issues. Moreover, the creation and development of supporting mechanism is critical for UBC. (Davey et al. 2013, 28.)

The second type of drivers, business drivers, refers to business motivations in having UBC. Students and staff having more than two years working in business substantially increase the academic extent of cooperation with business. The possibility of having access to knowledge and technology resources at the university motivates a business to start UBC. However, long geographical distance from the education institute to its business partner can hinder university-business collaboration. (Davey et al. 2013, 29.)

3.7 Challenges for Business - University Cooperation

Technology Transfer

Technology transfer refers to the activity of commercializing research and innovation outcomes. The collaboration between universities and businesses supports the transfer in through its process: innovation, testing, improvement, introduction to the market, and importantly, diminishing risks. However, core functions and objectives of an education institution and a business are different. Education system, as a public sector, contributes to the society in the form of teaching and producing publications. On the other hand, a business, seen as a private sector, is supposed to generate great profits in producing and selling goods or services. Therefore, in the technology transfer process, there is a challenge in maintaining the equilibrium between teaching, innovating, publishing, patenting and generating profits. Because of the probability of losing the nature of independence and clarity in education and research, it is common for a university to turn down a business offer in partnership. (Guilliams 2013, 13.)

Bureaucracy

High bureaucracy at all levels such as laws, procedures and principles is by far the highest barrier for UBC. Their impacts reduce the speed of cooperation and require more time to complete, that is a huge disadvantage in an ever-changing industry. However, removal of those barriers alone does not create UBC. (Kaymaz and Eryiğit 2011, 194.)

Funding barriers

Lack of funding is one of the highest barriers to UBC. The shortage comes both internally and externally. The issue speaks of lack of funding for UBC from external sponsorship, lack of substantial financial support from business partners, lack of university's own funding for RDI activities, and last but not least, impacts from current global financial crises. (Davey et al. 2013, 29.)

Mutual Interaction

One of the biggest challenges lies in mutual interaction and understanding in the cooperation. The problem arises when a side does not know enough about the other's possibilities. A study has proved 80% of companies do not know about university research infrastructures; 30% of which only know little about universities' current projects, therefore, none of the collaboration projects have been conducted. (Kaymaz and Eryiğit 2011, 197.)

4 EMPIRICAL RESEARCH AND ANALYSIS

4.1 Benchmarking Process

The thesis applies the benchmarking process through its learning, comparing performance, and choosing UBC practices. The following figure describes the benchmarking process in this thesis.

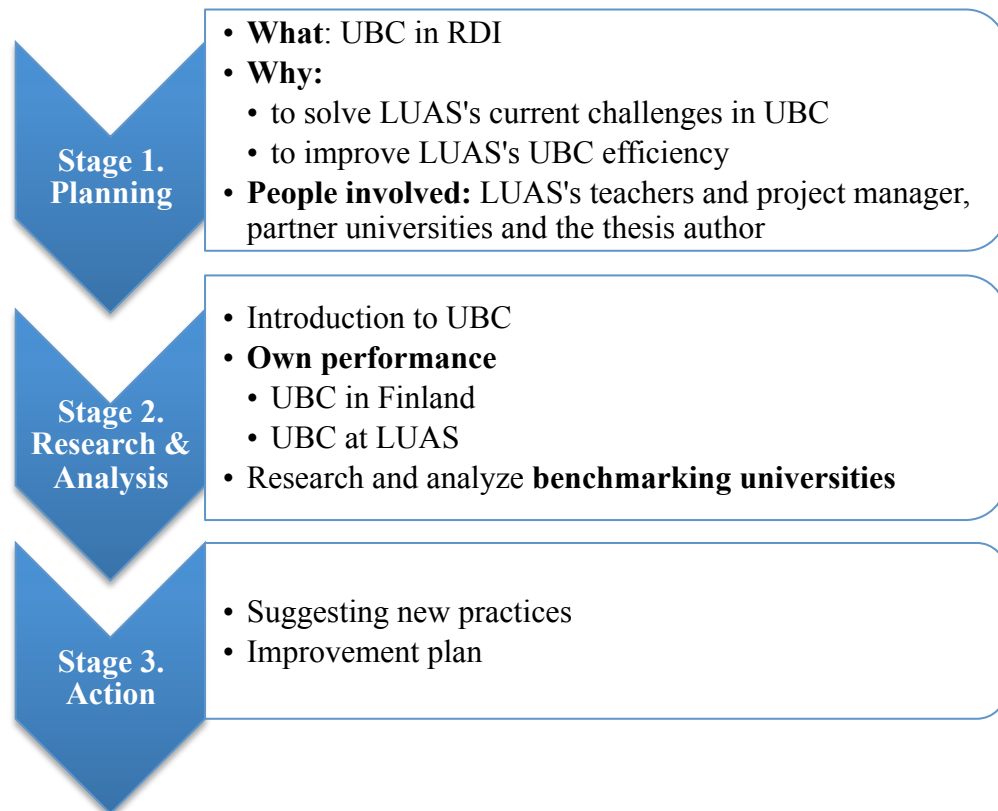


FIGURE 16. Benchmarking Process in the Thesis

Stage one of the process will be presented in Sub-chapter 4.2. Prior to looking for solutions from successful UBC examples, it is important to plan in advance the field of benchmarking, the reasons for benchmarking and people involved in the project.

Stage two of the process has been completed in Chapter 3 and Chapter 4. Chapter 3 provides a general understanding about the cooperation between universities and businesses. Furthermore, it contains the information regarding how Finland and specifically Lahti University of Applied Sciences have been

carrying out UBC. The characteristics, benefits and some examples of doing UBC are also described in the chapter. Sub-chapters from 4.3 till 4.6 focus on researching, analyzing benchmarking universities and more about some of their UBC practices that LUAS can learn from.

Stage three of the process, which is located in Chapter 5, is in charge of recommending UBC practices that have been studied in Chapter 4. Then, an action plan of those practices will be developed. A contingency plan will also be provided.

Benchmarking process in the thesis cannot be conducted further than stage three, leaving out the actual implementation plan and reviewing steps. The limitations are due to time and capacity restraints of the thesis author. However, decision-making and evaluation method, which will be useful when proceeding further than Stage 3, is already provided with theoretical tools in Chapter 3.

4.2 Lahti University of Applied Sciences: Objectives and Current Challenges in UBC

There have been three interviews conducted in order to support the development of this thesis. The first one was with Mr Leo Lähteinen - former Project Manager of Wood Technology & Furniture RDI at LUAS. The second one was with Ms Katariina Peltonen – LUAS's Research Manager and Lecturer. The third one was with Ms Gatja Tiusanen – RDI Director, Furniture Unite at LUAS. They have provided valuable information regarding how LUAS cooperates with business partners and what the future will be for the university's R&D activities. Their contributions to this thesis are so important that the upcoming improvement plan in Chapter 5 will be prepared accordingly.

The purposes of benchmarking in the thesis are to find solutions to LUAS's current challenges as it cooperates with businesses within the region and to improve the university's efficiency in the partnerships. LUAS's teachers and the project manager, partner universities and the thesis author are involved in the benchmarking process.

According to the interviewee, LUAS's research objective is to support the furniture companies in expanding their businesses and helping them with product development activities, including product design and new technological solutions, leading to new product innovations. The new RDI-unit offers furniture companies a platform for networking and cooperation with other companies. The third aim is to support and help the companies with internationalization, finding business opportunities and partners abroad. In a nutshell, the purpose of this unit is to act as a support and a development partner for furniture companies in all phases of the product development process from designing to going global. This involves many activities depending on the needs of furniture companies, including market, customer and competitor analysis, product design services using LUAS's wood laboratories, marketing and internationalization related services. The unit may also help the companies to find external R&D funding, for example Tekes – Finnish Funding Agency for Innovation and EU funding sources, for product development and production investments.

Despite its active visibility in the city of Lahti, LUAS has some weaknesses in cooperating with local businesses. Its available laboratory facilities are not up-to-date in certain fields, for example in wood lab and furniture testing lab. Although there have been many small projects going on between LUAS and regional businesses, companies seem to be less active in seeking help from the outside. Leo Lähteinen, the former Project Manager of Wood Technology and Furniture RDI at LUAS, expresses his concerns in LUAS's lacking promotion of its capacity, because of which, companies become reluctant in establishing partnerships with LUAS.

As referred from the interviews, in the cooperation between LUAS and furniture manufacturers, only a few projects have been carried out by Business as well as Design and Technology Faculties. Recently, LUAS has decided to take on its RDI-unit and create an innovation playground for regional businesses. This new RDI-unit attempts to help furniture manufactureres in Lahti region to facilitate innovations and develop their businesses.

Based on the answers of the interviews, the furniture unit operates through EU-funding. The budget at this phase is around 600 000 euros for three years.

Though it is a good start, more funding needs to be gathered in order to service more companies in the future. This unit has recently started its operation; therefore, at the moment, the furniture unit does not have any ongoing projects with companies. However, in the next few years, this unit is going to gain a reputation as a top level development partner. LUAS, as a whole, will be known as a dynamic, innovative and future-oriented educational institution.

Chosen benchmarking universities are chosen based on their remarkable performance in UBC. For instance, University of Utah, Cogswell Polytechnical College and University of British Columbia are well known for their successful cooperation with businesses in North America. Last but not least, the University of Guelph, which is currently an exchange-program partner of LUAS, is chosen for their successful practice of research publications.

4.3 Case 1: University of Utah (Utah, USA)

Background Introduction

The University of Utah (UU) is the state's flagship university, operating as a public research university. The UU offers both undergraduate and graduate degree programs to more than 30 000 students. Its programs cover a large numbers of educational fields, such as Architecture, Biology, Engineering, Pharmacology, Political Sciences, Economics, et cetera. The UU stands out as one of the top public research universities in the USA thanks to its long history and achievements in technology and venture commercialization. (University of Utah 2013a.)

The UU is well known for its Innovation Ecosystem, which has helped the university in earning number one ranking in the nation for outstanding performance in starting student start-ups based on university-based research. According to the annual surveys designed by the Association of University Technology Managers, the university maintained the position for three years in a row – 2009, 2010 and 2011 (LSE Enterprise 2013, 45). The Innovation Ecosystem at the UU consists of many innovation centers and institutions from different degree programs. Although each innovation holds individual functions,

they overlap each other through cooperative research; this collaboration brings about mutual benefits for different faculties. The Internal Commercialization Coordinating Council, which operates as a forum for cooperation, is in charge of leading the Innovation Ecosystem. (University of Utah 2014b, 6.)

In the following figure, the UU's ecosystem partners are listed. For the thesis purposes, only Technology and Venture Commercial and Lassonde Entrepreneur Institute will be studied.

A more detailed description of other ecosystems partners can be found in Appendix 2.

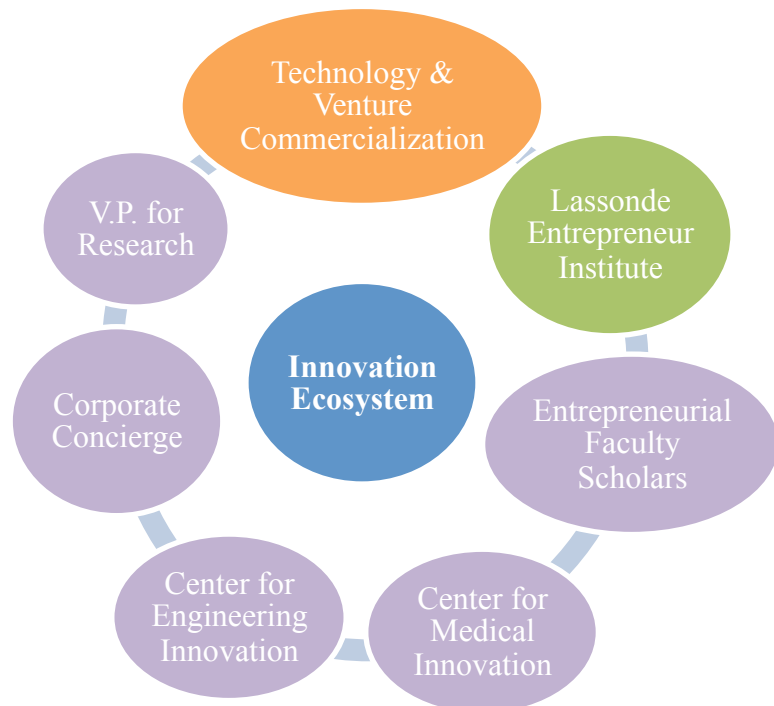


FIGURE 17. Ecosystem Partners (modified from University of Utah 2014b, 6)

Technology and Venture Commercialization (TVC), founded in 1967, commercializes new technologies and inventions from university-based research projects, making them business productive applications. It manages the university's technology transfer and intellectual properties. TVC also helps to build commercial connections with businesses. Students involved in TVC's

projects can earn themselves both learning and employment opportunities. (Technology and Venture Commercialization 2014, 6.)

Bearing the objective to transform practical ideas and inventions into applicable business practices, TVC has set its visions to be one of the top commercialization hubs for value creation in patents, licenses, start-ups and also as a well-known center for public education and research. All of these activities are supported by Commercialization Engine, a value-adding process, through which university-based technologies and inventions define their market niche, receive constructive feedback from industries and potential customers. This process assists newborn technologies and inventions in de-risking themselves in operation; so as to succeed, the process requires active engagement of the community. (University of Utah 2014c.)

Lassonde Entrepreneur Institute, established in 2001, additionally serves as an entrepreneur playground for students' innovations and start-ups. The institute receives generous sponsorship from Pierre Lassonde, a formerly MBA engineering student at the UU, who is now a billionaire in mining business and also the founder of the institute. There are many programs at this student hub such as statewide business-plan competitions, student-entrepreneur clubs, youth innovation programs, and so on. The institute offers courses in entrepreneurship and innovation, through which young students and researchers access to discovery centers, to enjoy mentorship opportunities, to join business competitions and many more programs. (University of Utah 2014d.)

Technology Venture Development, which was established in 2005, manages both the Technology Commercialization Office and Pierre Lassonde Entrepreneur Center. (University of Utah 2012a.)

Good Practice: Commercial Research Process

In this thesis, Commercial Research Process (CRP) by the University of Utah is studied as a good practice to learn from, in order to apply in the case of LUAS.

Commercially sponsored research, also known as contract research, is conducted in the form of projects, which are primarily or wholly funded by commercial entities, serving their commercial objectives (University of Wollongong 2014). Grants and donations for research are different from contract research for their curiosity-driven purposes. As in a commercial sponsored research project, there is defined scope of work carried out according to an agreed timeline. Ownership of intellectual property is clearly defined as well; for instance, the funding agency is given rights to use the results for their commercial purposes while the university only retains a minimum right to use them for non-commercial purposes such as research, education, publication, et cetera. (University of Alberta 2014.)

According to the University of Utah, commercially sponsored research is a practical solution when the federal funding for HEIs in the USA has been decreasing for the last five years and companies are cutting down costs. Through commercially sponsored research, businesses and universities support each other's capacity, in which, businesses can rely on external sources of R&D and universities receive research funding from commercial entities. (University of Utah 2012b.)

The following figure shows the steps in the commercial research process, developed by the University of Utah.

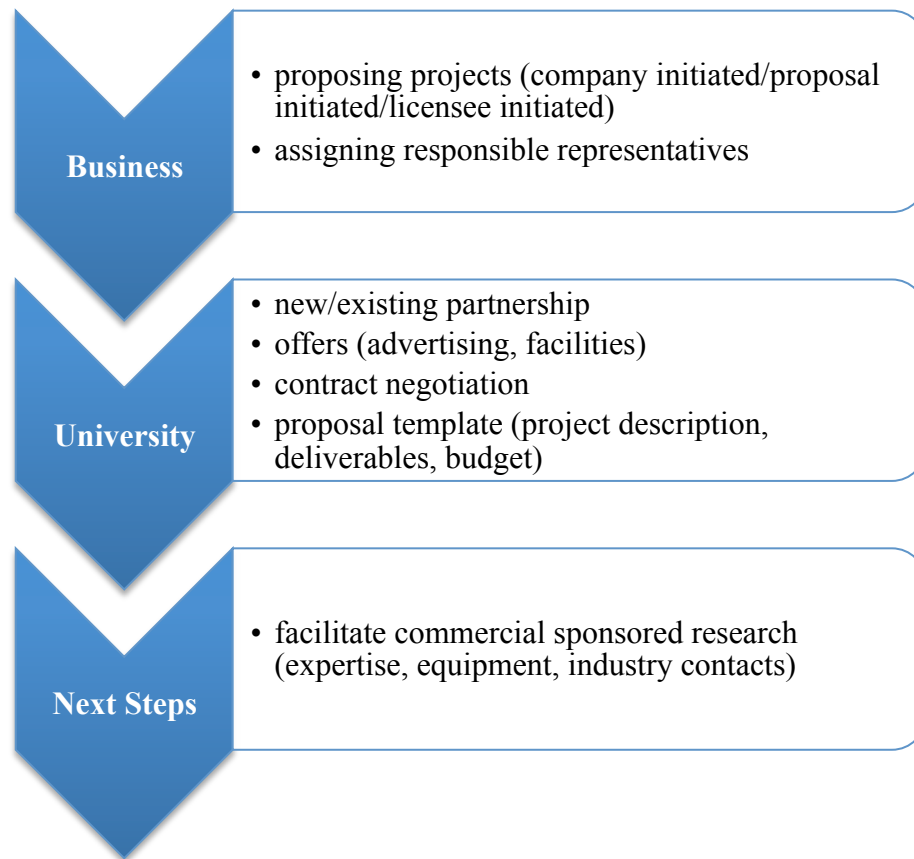


FIGURE 18. Commercial Research Process (modified from University of Utah 2012b)

In the above figure, the CRP is described according to different roles of a business and its partner university. Firstly, as in a commercial research project, the business takes the initiative to suggest the research topic; the topic might be due to a change in the business environment, or because of a new project within the business, et cetera. Besides, representatives of the business are also chosen, as being the main contacts and responsible for signing the involved paper. Secondly, it is right after the business proposes their research topic to the university that the two of them start to discuss matters about creating a project together. The university checks to see whether its partnership with this business has been previously established or is a new one, which will later affect the contract negotiation on terms. Additionally, the university explains to the business to which extent it can carry out this research project, based on the available facilities of them both. The university, summarizing the project's description, provides a proposal template, which clearly states the promised

deliverables and budget for the project. Thirdly, as the contract is made, the university starts to work with the business in the project by providing its own expertise in the field, laboratory facilities and industry contacts. More importantly, every stage in the CRP proceeds in a timely manner. (University of Utah 2012b.)

4.4 Case 2: Cogswell Polytechnical College (California, USA)

Background Introduction

Cogswell Polytechnical College is a private institution of higher education, founded in 1887. Its academic programs range from Digital Arts to Engineering and Entrepreneurship. At Cogswell, students learn to integrate with global industries in digital arts, engineering sciences and entrepreneurial professions. Additionally, Cogswell's academic staff, who have long experiences and wide connections in different industries, contribute a lot in building their curricular programs at Cogswell, making sure the content is updated and relevant to the on-going working environment (College US News 2014). Because of its features in geography as well as in UBC, Cogswell Polytechnical College was chosen to be one of the significant case studies for the "Study of University-Business Cooperation in the US" by London School of Economics and Political Sciences in 2013. With the balanced geographical coverage, mix of various forms of UBC and recent UBC outstanding performances, Cogswell turns out to be a good example on how to carry out UBC in higher education institutions. (LSE Enterprise 2013, 5-6.)

In order to support its entrepreneurship programs in Silicon Valley and encourage the interaction between universities and businesses in the region, Cogswell has established four well-known programs: Immersion Program, Kauffman Fastrac®, Idea & Innovation Lab and Master's Program in Entrepreneurship & Innovation (Cogswell 2014a.)

The Master's Program in Entrepreneurship & Innovation is designed to provide a business foundation in order to launch start-up ventures, or lessons in innovation that Master students can apply in their current jobs. The program is

organized for busy students who are currently full-time employed and is proved to be “comprehensive and experiential”. (Cogswell 2014b.)

The Immersion Program, also known as “The Silicon Valley Immersion Experience”, has been recently launched in 2014. The program is held for international students and companies to explore the professional businesses in Silicon valley-based companies such as Skype, Flipboard, Google, et cetera, and wholly organized by Cogswell (Computer Graphics World 2014). During the five-day program, participants enjoy the environment of innovation and entrepreneurship, giving them ideas and providing firsthand experiences, so they come back and continue with their business plans. The program also offers networking opportunities among entrepreneurs, which is valuable in the era of globalization. (Cogswell 2014c.)

As an affiliate of the Kauffman Fastrac®, Cogswell designs and organizes learning courses for entrepreneurs. Joining the courses, entrepreneurs learn about skills to create, grow and manage their businesses. Additionally, they receive advices on legal, marketing finance, et cetera, from successful business owners. Moreover, participants can work on their own businesses throughout the courses, and with the help of professionals and other participants, turning them into realities. (Cogswell 2014d.)

The Idea & Innovation Lab at Cogswell supports its students in commercializing their work with the end goal of “*bringing it to the mass market*”. A support system is provided for selective projects to fill the gap from their ideas to commercial applications. There are different alternatives for support. For instance, an entrepreneurial project receives guidance on business or an engineering project benefits from technical assistance. Addition support can be in the form of providing working space and equipment, and even knowledge access to the entrepreneurial eco-system of Silicon Valley. (Cogswell 2014e.)

Good Practice: Cooperative Programs

In this thesis, the diversity in cooperative programs between universities and businesses is appreciated and studied as a good practice to learn from, in order to apply in the case of LUAS. Cogswell Polytechnical College sets a great example in designing and successfully carrying out such programs.

Colleges and universities have long served their surrounding communities in growing regional economies. The growth of regional economies and success of their HEIs are interactively tied. Therefore, in order for a university to properly contribute to its local economic performance, it is essential to understand the conditions and characteristics of surrounding businesses. (Porter 2006.)

The benefits of having successful local cooperative programs between universities and businesses include attracting internationally trained students to local industries, keeping graduates in the local regions and supporting regional economic development. (Washburn and McDearman 2014)

4.5 Case 3: University of Guelph (Ontaria, Canada.)

Background Introduction

Thanks to its contributions in improving student learning and supporting innovative research, the University of Guelph (UG) is one of Canada's most comprehensive universities. The goal is to make use of knowledge and research projects to better the quality of life and help people. As an active university, the UG encourages individual and cooperative research through investment, which helps enhancing the curriculum and student learning, and at the same time, promotes incorporative research projects with businesses. Innovations born from such projects are believed to benefit the society and economy. (University of Guelph 2012.)

The UG has a long history in doing innovative research with the variety of partners ranging from other universities, governmental sectors to private sectors in different industries. These partnerships, which perform at both domestic and international level, focus on the UG's mission in creating knowledge and value for the society. For more than a century, the UG has been supporting the commercialization of technologies, bringing its innovations to the marketplace. One of the key partners is the Ontario Ministry of Agriculture and Food and the Ministry of Rural Affairs. Thanks to the cooperation, the UG takes an important role in agricultural science research and training in the region. (University of Guelph 2014a.)

The UG's research falls into four categories that are Community, Environment, Food and Health. All areas of research contribute to the title of the UG as one of Canadian most comprehensive universities. So far, initiatives at UG are built from the belief that teaching and researching are mutually interacting. Therefore, the academic staff try to develop research activities in a way that enhance their teaching content. Furthermore, researchers at UG have connections with more than 55 research centers and networks widely in the industries. (University of Guelph 2014b.)

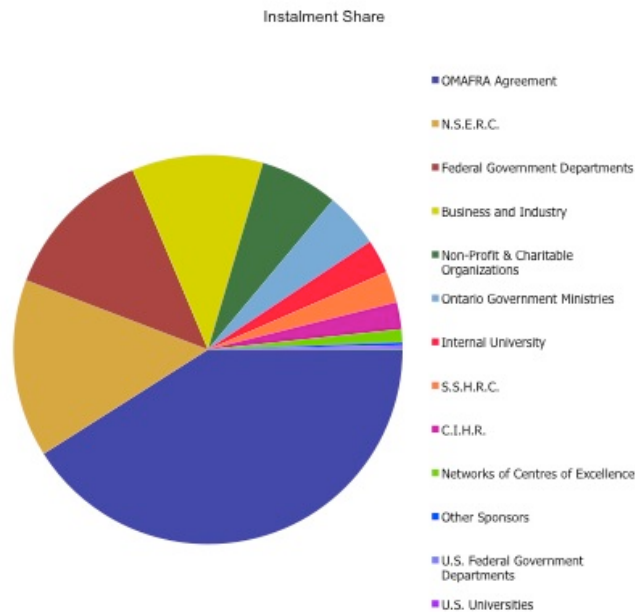


FIGURE 19. University of Guelph Research Funding (University of Guelph 2014c)

Research funds available for the years 2013-2014 were up to 130 million Canadian dollars in total, roughly 89.5 million euros. Shown in the above figure, the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) accounts for the largest sum of research funding at the UG, followed by the Natural Sciences and Engineering Research Council (NSERC), and the third biggest portion is from Federal Government Departments. Private businesses and industrial partners are the fourth largest sponsors of the UG. As can be concluded, the majority of research funding at the UG comes primarily from the public sectors. (University of Guelph 2014c.)

In the university's Strategic Research Plan proposed for the years 2012-2017, there is a framework including the areas that the plan is supposed to put focus on. The areas consist of the *training of highly qualified personnel*; *research excellence* – improving the quality of research in all fields by both individuals or through collaborations; *support for creativity and diversity*; *open innovation*; *public policy* – encouraging research in animal and human health, culture, language, economy, et cetera; *collaboration*; and *scholarship* – enhancing classroom practices and lifelong learning. (University of Guelph 2012.)

Good Practice: Academic Publications

In this thesis, the activity of publishing research results by the University of Guelph is studied as a good practice to learn from, in order to apply in the case of LUAS.

The University of Guelph has been presenting their results of research activities through publications. Their publications are featured in the *Research* magazine of OMAFRA – University of Guelph Partnership. The topics are diverse and updated, ranging from modern agriculture to medicine and music (University of Guelph 2014d). The research magazine is written and produced by both students and professors, who participate in the Students Promoting Awareness of Research Knowledge, also known as the SPARK. The SPARK program offers a special training opportunity for students to acquire marketing skills, as well as to improve written communications and knowledge. (University of Guelph 2014e.)

The following figure shows the SPARK process in issuing research publications.



FIGURE 20. SPARK Process (modified from University of Guelph 2014f)

SPARK participants, including students and researchers, work hand in hand with senior SPARK writers, by whom the research topics are assigned to the students. Next, students start to conduct background research of the topic, and prepare interviews with the laboratory researchers in order to have a thorough understanding of the topic they are writing about. After the interviews, the writing process begins. Students' manuscripts will be reviewed and approved by researchers before being publicly issued as news or research publications. Such

publications are edited in an easy-to-understand manner, so as to target the world outside the university. (University of Guelph 2014f.)

Publications produced by universities come in the forms of theses, articles, conference reports, et cetera (Lund University 2014). Such academic publications have been recently made available in *open access*. *Open access*, also known as free online access, offers worldwide electronic entry to research publications, and it is free of charge. Open access provides valuable opportunities not only to the university's students and staff, but also to other HEIs (Government of the Netherlands 2014). Moreover, the act of giving worldwide readers free online access to public research projects is one of the core strategies in achieving Europe 2020 (European Commission 2014c). Research gains immense benefits from open access; it accelerates the speed of publishing public project results, and at the same time, opens up for wider readers (Monbiot 2011). On the other hand, academic publications should be distinguishable from other types of publications due to its maximized transparency, which is referred to quality research. The methods that researchers use to producing such results should be clearly and transparently explained in the publications (The Conversation 2014).

4.6 Case 4: University of British Columbia (Vancouver, Canada)

Background Introduction

The University of British Columbia is well known for being one of Canada's leading universities for research and teaching; it is constantly placed among the 40 best universities in the world. Since 1915, the university has been fostering innovation, creating an exceptional learning environment that helps build a civil and sustainable society (Times Higher Education 2014). During the years 2013 – 2014, the university supported 8442 research projects with the total fund of 564 million Canadian dollars, roughly 396 million in euros. Among its current and former faculty and staff, there are seven Nobel Prize winners, who have contributed largely to its international reputation in advanced research and innovation programs. (University of British Columbia 2014.)

Arvind Gupta, the president of University of British Columbia, was formerly the CEO and scientific director of Mitacs. Mitacs is a not-for-profit organization founded in 1999, which aims at building partnerships between academia and industries. So far, Mitacs has established more 10 000 research collaborations in Canada with over 19 000 training participants (Mitacs 2014). Being the new assigned president, Arvind Gupta has tried to turn the research paradigm inside out. As he explains, a common research paradigm in Canada refers to a *push* model of research, in which a university generates new ideas and develops new technologies, then tries to commercialize them to companies that are interested. However, this model may end up in neglecting real-time problems of companies and losing employment opportunities of graduate students. Therefore, a *pull* model of research should be employed. After universities get to ask companies about their current problems and challenges, students start to work on them and create their own employment opportunities. (Cowan 2014.)

Good Practice: Research Paradigm

In this thesis, the idea of turning the research paradigm inside out, as proposed by Doctor Arvind Gupta, the new president of University of British Columbia, is studied as a good practice, in order to apply in the case of LUAS. As mentioned in the previous part, turning the research paradigm inside out refers to the model

of universities helping companies with their on-going challenges, in addition to introducing them to universities' latest research achievements.

Students are the heart and soul of a university. Therefore, enriching students' experiences by creating better opportunity is a must. Universities are about to integrate increasingly with local businesses. Nowadays, universities' research and innovation projects do not only solely support academic purposes but also solve society's issues both economically and socially (Singh-Joseph 2014). In a near future, companies will spend less on their internal R&D activities, and as a result, they are going to turn towards universities, where the next generation of innovation is forecasted to be. (Lee 2014b.)

In addition, small and medium-sized companies start to work with universities, in order to receive professional support and be stimulated by latest innovative ideas. Partnership with universities used to be a common practice only for large companies, but now even smaller businesses can benefit from it. Small and medium-sized companies are able to make use of universities' research equipment with skilled technical support once the partnership is established. They can also take advantage of the universities' industry contacts and networks while working together on cooperative research projects. On top of that, small and medium-sized businesses help commercialize intellectual property from university research and create employment opportunities by recruiting skilled graduates from the universities. (Atherton 2014.)

On the other hand, there are discussions about issues in the cooperation between universities and businesses. While businesses are not familiar with slow pace operation at universities, universities normally overprotect their intellectual property and are unwilling to pass ownership rights to outside investors. Money matter is also considered as a threat in changing the original mission of HEIs, which is to educate people and conduct basic research for pure curiosity-driven purposes. (Lee 2014b.)

5 DETAILS OF UNIVERSITY-BUSINESS-COOPERATION PRACTICES

In this chapter of the thesis, an improvement plan consisting of an action, timeline and contingency plan is developed.

5.1 Improvement Plan: Action Plan

In the improvement plan, four mentioned practices are chosen and adjusted so as to be applicable in the case of Lahti University of Applied Sciences. The following table includes the four practices along with their according goals and actions. The main shared objectives of these practices are to improve LUAS' performance in UBC as well as to promote the university's role in supporting regional economies.

According to the interviewee, product innovation is the chosen innovation format for the thesis. The decision is based on the objective of LUAS's furniture unit in acting as a support and a development partner for furniture companies, in all phases of the product development process from designing to going global. However, in the future, when the university's RDI facilities have been increased and updated, process innovation and strategic innovation will be considered in the cooperation with businesses.

In the following table, four UBC practices are summarized with their goals and required actions.

TABLE 2. Recommended Practices: Goals and Actions

Practice	Goals	Actions
Research Paradigm	Develop and apply an active approach in R&D activities	Approach and support businesses in their current challenges
Commercial Sponsored Research	<ul style="list-style-type: none"> - Receive commercial sponsorship in R&D activities - Increase university capacity in research activities - Encourage open innovation 	<ul style="list-style-type: none"> - Update research activity information on own website - Inform companies of the procedure of becoming research partners with LUAS - Invest in laboratory facilities
Cooperative Programs	<ul style="list-style-type: none"> - Build brand awareness - Support regional economies 	Create local projects, involving local businesses
Research Publications	<ul style="list-style-type: none"> - Publicize R&D results - Encourage open access and open discussions 	<ul style="list-style-type: none"> - Publishing academic reports - Encourage students to participate - Organize open discussions for students, academic staff and outside researchers

Regarding the development plan, one of the most important matters to be taken care of in advance is to clarify the needs and persons in charge. In addition, the coupling model of innovation (Figure 7) is recommended to assist throughout the process, with the purpose of monitoring it. Furthermore, this plan is meant for a long-term period; therefore, each step should be carefully planned and supervised.

Research Paradigm

LUAS should define its research paradigm as the *pull model* in research. This research approach allows the university to come to businesses and ask to help solve the challenges they are facing. The university will then work on business problems and its research projects will revolve current issues and offer practical solutions. Besides, such active research model creates many opportunities for students to participate in real-life projects, which become valuable for self-learning and improvement. The practice is learnt from the example of the University of British Columbia.

In order for the *pull model* of research to succeed, the idea and benefits of it should be spread and fully understood by all of the university's academic staff and students. It creates a positive reaction when they actively contact local businesses and ask to create cooperation in R&D projects, for instance, in thesis topics, research projects, conferences, et cetera. *Push model* of research, on the other hand, will be applicable when LUAS's laboratory capacity is increased and strengthened. In the future, LUAS will be able to commercialize new ideas and technologies they developed to interested businesses.

Furthermore, in order for companies to realize that LUAS also helps businesses in solving commercial or technical issues, certain marketing activities should be carried out, including showcasing previous cooperative projects and on-going research activities, as well as inviting companies to attend LUAS's conferences and discussions in R&D topics.

Commercial Sponsored Research

The research section on LUAS's website is obviously lacking of information about how LUAS has been doing so far and its achievements. The information is rather scattered across different online site than on the university's own website. Therefore, an immediate action to take is to update the website with sufficient information about why companies should do partnerships with LUAS in R&D, how and whom they should contact if they want to work with LUAS, and last but not least, previous research outputs and achievements that LUAS has earned

during the years. All of them provide a firm and reliable foundation for companies to find trust in cooperating with LUAS.

Commercially sponsored research seems to be a workable solution for LUAS in this situation. Using commercial sponsorship, LUAS is allowed to update its research facilities gradually. LUAS has had a good reputation for having a variety of degree programs, ranging from business studies till arts and engineering studies. The university also invites respectable teachers and researchers to join it (Lähteinen 2014). Therefore, it will not be a difficult decision for companies to work with the university, if LUAS can overcome its current weaknesses of information display and research capacity.

The commercial research process, which is a necessary process for a business to become a research partner with LUAS, is learnt from the practice of the University of Utah. The process is epitomized and proposed as followed.

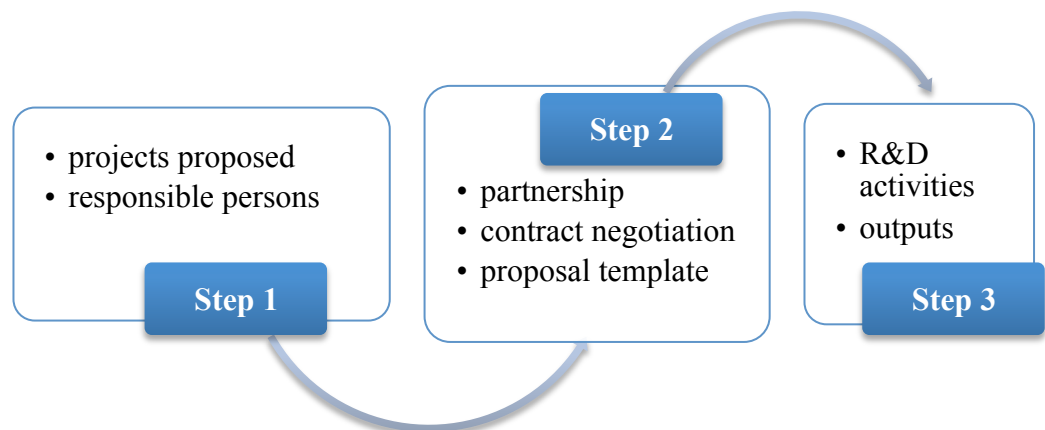


FIGURE 21. Proposed Commercial Research Process

The process consists of three important steps. In Step 1, businesses propose the research topics that they need universities to work with them. The people in charge, from LUAS and the business, arrange meetings for further discussion. In Step 2, LUAS evaluate the feasibility of the partnership and there comes meetings for contract negotiation. When a contract agreement between two parties is reached, a proposal template with information about the project research topics, budget and research facilities is provided by LUAS. Intellectual

property rights and time frame of the research contract will also be decided. In Step 3, actual R&D activities are carried out under close supervision and counsel from the business and LUAS.

According to the interviewee, as the Furniture Unit has just started its operation, it takes time to contact the companies and let them know in what way we may help them. Before that, the university has to be able to define what its services are, and manage to market these services to the companies. In addition, at this phase, LUAS's R&D laboratories and other facilities needs updating and the services now are limited. However, once LUAS has new premises, the situation will be better.

Cooperative Programs

The practice of organizing regional cooperative programs is learnt from the example of Cogswell Polytechnical College. The objectives of this practice are to build the university's brand awareness in the region as an active and capable research partner, and also to support the local economic situation by arranging visit tours to the business region.

The Lahti region is one of the biggest growth centers in Finland. The city offers favorable locations for businesses, especially for start-up companies with excitingly new ideas. With easy transport access and cost-effective neighborhoods, Lahti welcomes companies in supporting their successes with strong local networks and excellent support centers. The city is also an ideal location for both domestic and foreign markets, as it lies closer to Russia than most cities in Finland. (Lahti Business Region 2014)

According to the interviewee, there is a big development project called Intelligent Office, which the university is operating with Isku and other companies. The project has just started and will continue until the end of 2016. Furthermore, arranging cooperative programs in Lahti city attracts visitors and students from other regions to come and join its workforce hopefully. It is also a solution to have LUAS's graduates to stay and work after graduation.

Research Publications

The more popular the name of LUAS is as a successful research partner, the better it appears. Needless to say, LUAS publishing its research results is one method to bring its brand name to the outside world and to publicize its achievements in research projects. This practice is learnt from the example of the University of Guelph.

So far, Lahti University of Applied Sciences has published its Bachelor and Master's thesis work mostly, rarely any of its research results are known of. Now the times have changed and there is more demand for a university to be known of their R&D achievements. Once a new research publication is open for public view, it reaches companies and outside readers and there may be open discussions on the topic.

Writing about research projects and outcomes provides professional experiences for the students who participate in. The task also encourages students and academic staff to join and be responsible for important business projects. Moreover, reading the university's research publications gives companies ideas of how LUAS can help them solve their current business issues.

5.2 Timeline

In the following figure, activities, that are meant to improve LUAS's UBC performance, are divided into three groups: immediate actions, mid-term actions and long-term actions. The decision is made based on each activity's contributions in the whole improvement plan.

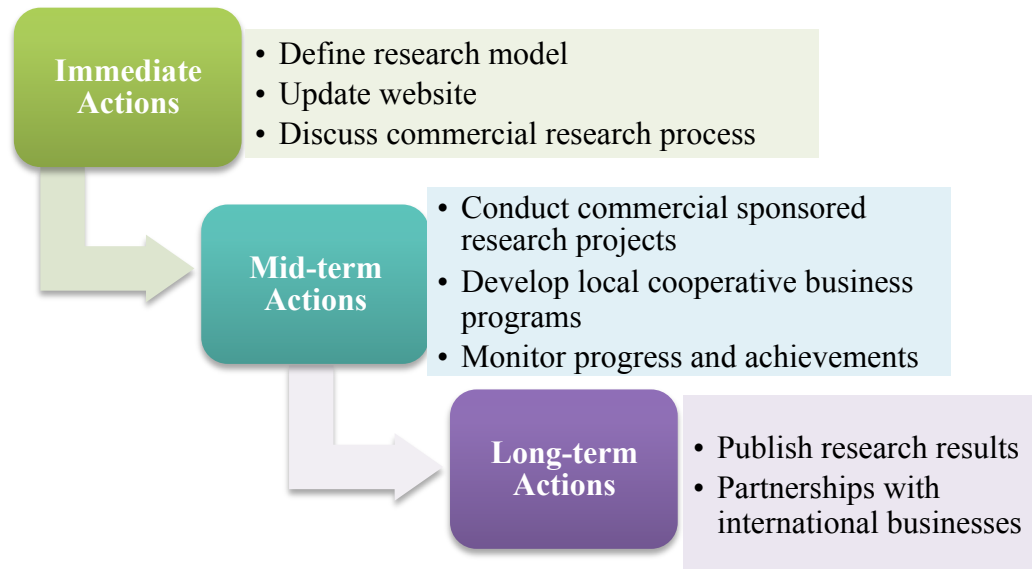


FIGURE 22. Improvement Plan: Timeline

Immediate actions are activities that bring immediate results in improving the partnerships with businesses at LUAS. Research model, university website and commercial research process are the most urgent issues to be taken care of. Together they create research cultures, suggest research directions and unite the university's academic staff and students in building a mutual understanding of cooperating with businesses in RDI.

Mid-term actions are to be taken once immediate actions are completed. They include activities that involve directly in cooperating with businesses: partnerships with companies through contract research and executing cooperative programs that are also to support regional economies. These activities belong to the group of *mid-term actions* because they require more time to be prepared for than *immediate actions*. While carrying out these activities, so as to decide on what to do next, LUAS needs to monitor progress and achievements.

Long-term actions refer to activities that can only be done in the long run and needs to start being prepared for immediately. So far, publishing research results and establishing partnerships with international businesses are seen as promising targets for LUAS in the future. These actions will be considered if LUAS has gained certain achievements in UBC.

5.3 Contingency Plan

In this thesis, contingency plan is necessary to foresee unfavorable events and suggest solutions in case they occur. Events are listed and evaluated impacts based on their likelihood of occurring and how seriously they affect UBC activities of LUAS in three levels: high, medium and low. Seven unfavorable events are mentioned in the following table. However, only three of them will be further explained because of their high likelihood of occurring with serious impacts.

The following table lists seven major risks of the improvement plan.

TABLE 3. Improvement Plan: Contingency Plan

Event	Likelihood of event occurring	Impact	Solution
Delay in website updating	High	Medium-Low	- update on a regular basis - assign people in charge
Failure in commercial research process	Medium	Medium	- review the cases - continuous improvement
Reluctance of local businesses	High	High	- information availability and transparency on website - active approach
Out-of-date research facilities	High	High	- continuous improvement - update available facilities
Shortage in research funding	High	High	- different funding sources - commercialize R&D outputs
Copyright infringement	Medium - Low	Low	- contract negotiation - register patents
EU's trade embargo with Russia	Medium	Low	- local partners - EU partners

Reluctance of local businesses in cooperating with LUAS is one of the main concerns and likely to have bad effects on UBC activities. The businesses' hesitation may come from lacking of available information on the university's website, which fail to provide them full understanding of what and how the university can offer a business in solving its current issues. Therefore, besides keeping the site up-to-date, it is advisable for the academic staff and students to have an active approach in contacting businesses, explaining to them about the university RDI programs.

According to the interviews, LUAS is having disadvantage because its available laboratory facilities are not as modern. However, although this issue is a bottleneck in research activities, it is not an eternal problem as long as the university prepares proper funding programs and/or receives sponsorships from federal and outside investors. It will be a huge burden if the university innovates everything at once. With the help of business partners and industry experts, the university will be able to update itself with the latest technologies and equipment.

Shortage in research funding means postponement in research activities. Therefore, the university should not rely on one single source of funding; instead, have a variety of funding coming from different sources. Furthermore, commercializing its RDI results bring both income and new partners to the university.

For the rest of unfavorable events in the list, some mutual solutions are to do continuous improvement through updates on a regular basis and reviewing activities. Issues concerning copyright infringement should be foreseen and avoided when the two parties negotiate the research contract. In most cases, it is always the best to register for patents in advance. The new European trade embargo with Russia seems to be troublesome since Lahti locates closely to Russian regions. However, the university still has the pool of business partners in Finland and in other European countries.

6 CONCLUSION AND SUGGESTIONS FOR FURTHER RESEARCH

In this chapter, thanks to all the findings and analysis outcomes, answers to the thesis research question and sub-questions, which are mentioned in Chapter 1, are given. Then, there follows sections for self-evaluation, and after that, for validity and reliability of the thesis work. Moreover, some suggestions for further research will also be given in order to support coming projects on the same topic.

6.1 Answers for Research Questions

Here are the answers to the thesis research questions:

- **What are the purposes of UBC and its characteristics?**

Based on research outcomes, UBC refers to a relationship in which knowledge transfer occurs between educational institutions and industries. The cooperation aims at solving business problems, motivating innovations and supporting academic research projects through funding. Many parties can get involved in UBC such as a governmental body, an academic institution and a business. There are eight types of UBC, among which collaboration in R&D and mobility of students are the most developed in Europe. Moreover, UBC involves important activities in developing a knowledge society.

- **How is UBC in Finland?**

UBC is one of the strategies that the Finnish Research Infrastructure Committee has planned for the period 2014 – 2020. Although there has been a slight downfall in R&D expenditure of public sector and higher education sector since 2011 (Figure 13), the environment for UBC in Finland is one of the most positive in Europe. It is all thanks to well-developed supporting mechanism in UBC implementation and motivation.

- **How do universities in Canada and USA cooperate with businesses? What are their achievements?**

Universities in Canada and USA have a long history in cooperation with businesses. They are well known for cooperative research projects and co-op programs, which offer students many opportunities in internships and graduate employment. Furthermore, they have earned high rankings for outstanding performance in R&D activities. For example, the University of Utah (USA) is well known for its Innovation Ecosystems and commercialization hubs, which supports in transforming practical ideas and inventions into applicable business practices. Cogswell Polytechnical College (USA), locating in the region of Silicon Valley, is reputable for its variety in entrepreneurship programs, which encourage the interaction between universities and businesses in the region. Furthermore, some universities are well known for their research publications, for instance, the University of Guelph (Canada). Last but not least, the University of British Columbia (Canada), with the visions of its newly assigned president – Arvind Gupta, has utilized the pull model of research, which turns out to be a new UBC trend for UBC in this century.

- **To what extent has LUAS supported businesses?**

In the cooperation between LUAS and furniture manufactureres, only a few projects have been carried out by Business as well as Desgin and Technology Faculties (Lähteinen 2014). Recently, LUAS has decided to take on its RDI-unit and create an innovation playground for regional businesses. This new RDI-unit attempts to help furniture manufactureres in Lahti region to facilitate innovations and develop their businesses.

- **What practices can LUAS learn from benchmarking cases?**

There are four practices that LUAS can learn from benchmarking cases: research paradigm (pull model of research), commercial sponsored research, cooperative programs and research publications. Detailed description of each practices and how they apply to the case of LUAS are provided in Chapter 5 and Chapter 6.

The answers for the thesis research question and sub-questions are summarized in the following table.

TABLE 4. Answers to Research Questions

RESEARCH QUESTIONS	ANSWERS
What are the purposes of UBC and its characteristics?	UBC serves purposes of both academic institutions and industries. It reflects a knowledge-exchange relationship between them and is seen as an important activity in a knowledge society.
How is UBC in Finland?	UBC environment in Finland is one of the most positive in Europe, though there is room for improvements.
How do universities in Canada and USA cooperate with businesses?	Universities in Canada and USA cooperate with businesses through research projects and regional cooperative programs.
To what extent has LUAS supported businesses?	LUAS has been mostly cooperating with furniture businesses through research projects and thesis topics.
What practices can LUAS learn from benchmarking cases?	There are four practices that LUAS can learn from benchmarking cases: research paradigm (pull model of research), commercial sponsored research, cooperative programs and research publications
How can Lahti University of Applied Sciences improve its university-business cooperation performance?	The university can improve its UBC performance using the recommended improvement plan with the suggested timeline and contingency plan.

Research question: How can Lahti University of Applied Sciences improve its university-business cooperation performance?

There are many possibilities for LUAS to improve its university-business cooperation performance. One of them is to try out the improvement plan developed in this thesis. The improvement plans include four successful UBC practices together with a timeline and contingency plan, which attempts to solve possible risks once the plan is carried out. It requires great efforts and participation of all the university staff and students to make it a success. Furthermore, reviewing process and continuous improvement are two important matters to be taken care of. Although the study cannot proceed further than stage 3 of the benchmarking process (Figure 5), it provides some theories regarding decision-making process and force – field analysis, which is meant to assist stage 4 of progress review.

Self-evaluation

The author has taken the opportunity to study most of the aspects of UBC, which is considered to be interesting and beneficial for her self-learning. Thanks to the instructions of the thesis supervisor, theoretical content regarding innovation management has also supported the writing process. As for the empirical part, although not many interviews have been conducted, it is possible for the author to present important findings via intense research and analysis.

6.2 Validity and Reliability

Regarding validity, the research and analysis of this thesis have helped to answer the research questions in Chapter 1 properly. In other words, the research has measured what it is supposed to measure. The thesis objectives, which are of studying other universities for their UBC using benchmarking method and coming up with suggestions of relevant practices for the case of LUAS, have been successfully fulfilled. All possible attempts have been made to complete research and analysis activities, including utilizing primary and secondary data collection. Therefore, the whole research work is considered to be highly valid.

Regarding reliability, the research results are applicable to a wider group than the author and the university itself. Although this study has been done based on the case of LUAS especially, all of its theoretical and empirical content is beneficial as references for other research projects. Besides, research data has been acquired from reliable sources, which mostly come from well-known researchers and it is up-to-date. Therefore, if other authors conduct a similar research, same results will be achieved.

6.3 Suggestions for Further Research

There are two constructive suggestions for further research: in-depth interviews and financial projection for the improvement plan. The biggest limitation of this thesis is not having in-depth interviews with benchmarking universities. Such interviews are able to provide insightful findings to the thesis as well as to support building the improvement plan. Additionally, getting information from universities' experts is a huge advantage in understanding the research topic thoroughly. Besides, expanding research geographical areas to other developed countries such as United Kingdom, Japan, South Korea, et cetera, is suggested to capture a bigger picture of UBC around the globe. Finally, this thesis would be a more complete piece of work if a financial projection plan were provided. Therefore, further research projects on a similar topic are advised to provide a detailed financial plan in order to make the improvement plan more persuasive.

7 SUMMARY

The research aims at assisting Lahti University of Applied Sciences in improving its university-business cooperation performance. The findings and recommendations have managed to achieve the research objectives and become a beneficial study source for similar research projects. Based on the findings, an improvement plan has also been developed together with a timeline and a contingency plan.

Throughout this study, an inductive method was employed with the assistance of a qualitative approach. Primary data was collected through observation and interviews, while secondary data was obtained from reliable publications and online sources. Regarding the thesis scope and its limitations, desk-research method was intensively employed and proved to be useful for the research purposes. Introduction of the thesis topic, thesis objectives, research questions, research methodology and thesis structure can all be found in Chapter 1.

In Chapter 2, there are descriptions and an explanation of benchmarking method, innovation management, decision-making process and evaluation method. Firstly, because one of the main tasks of this study is to benchmark case universities for their successful UBC performances, some basic understanding regarding benchmarking method has been provided. Secondly, innovation plays an important role in UBC, and how to manage it is top concern for universities and business partners. Thirdly, decision-making process is a helpful process throughout this study, and therefore, is necessary to be well presented. Fourthly, although the mentioned evaluation method, force-field analysis, has not been truly used in this thesis, it is meant to assist further steps in the benchmarking process (Figure 5), in reviewing the improvement plan.

Chapter 3 presents the forms and drivers of university-business cooperation. The chapter provides sufficient information so as to understand the concept and characteristics of UBC, how it is done at LUAS and around the globe, the many benefits it has brought to participants and what challenges it faces nowadays.

In Chapter 4, the information regarding case universities, UBC activities is provided. Four UBC practices drawn from the case studies have been analyzed

and concluded as relevant practices to apply in the case of LUAS. The information acquired through empirical research and analysis does not only suggest good UBC practices, but also provide a thorough understanding about how universities in North America have been carrying out partnerships with business in RDI activities.

In Chapter 5, there is an improvement plan. In the improvement plan, four mentioned practices are chosen and adjusted so as to be applicable in the case of Lahti University of Applied Sciences. The main shared objectives of these practices are to improve LUAS' performance in UBC as well as to promote the university's role in supporting regional economies.

In Chapter 6, the author gives answers to all research questions stated in Chapter 1. Evaluation of the thesis is given in terms of validity and reliability. The research outcomes have proved that this study is highly valid and reliable. In conclusion, some suggestions for further research are made with the objectives to remove current limitations and produce further findings on a larger scale.

REFERENCES

PUBLISHED REFERENCES

Ahmed, P. & Shepherd, C. 2010. Innovation Management: Context, Strategies, Systems and Processes. 1st edition. Essex: Pearson Education Limited.

Camp, R. 1995. Business Process Benchmarking: Finding and Implementing Best Practices. 2nd edition. Milwaukee: ASQC Quality Press Publications.

Drucker, P. 1985. Innovation and Entrepreneurship. 1st edition. New York: Harper Row Publishing.

Johnson, G. & Scholes, K. 2001. Exploring Public Sector Strategy. 1st edition. Essex: Pearson Education Limited.

Keegan, S. 2009. Qualitative research: good decision making through understanding people, cultures and markets. 1st edition. London: Kogan Page Limited.

Proctor, T. 2005. Creative Problem Solving for Managers: Developing Skills for Decision Making and Innovation. 2nd edition. New York: Routledge.

Rothwell, R. 1992. Successful Industrial Innovation: Critical Factors for the 1990s. 1st edition. Sussex : R&D Management.

Saunders, M., Lewis, P., & Thornhill, A. 2009. Research Methods for Business Students. 5th edition. Essex : Pearson Education Limited.

Tushman, M. & Nadler, D. 1986. Organizing for Innovation. 1st edition. California: California Management Review.

ELECTRONIC SOURCES

Accel Team 2014. Productivity Improvement [Referenced: 29th November 2014]. Available at: http://www.accel-team.com/techniques/force_field_analysis.html.

Atherton, A. 2014. How Engaging with Universities Can Help Small Businesses Grow. [Referenced: 7th January 2015]. Available at: <http://realbusiness.co.uk/article/28444-how-engaging-with-universities-can-help-smaller-businesses-grow>.

Atkins, J. 2014. Strategy and Planning [Referenced: 29th November 2014]. Available at: <http://www.vantagemarketing.com.au/BlogRetrieve.aspx?PostID=367897&A=SearchResult&SearchID=7899433&ObjectID=367897&ObjectType=55>.

Australian Council for Educational Research 2011. The Benefits of School-Business Relationships [Referenced: 4th December 2014]. Available at: http://docs.education.gov.au/system/files/doc/other/benefits_sbr_acer_report.pdf.

Baker, D. 2013. A Meeting of Minds in Cambridge: Key Figures from Silicon Fen's Tech Economy [Referenced: 23rd December 2014]. Available at: <http://www.wired.co.uk/magazine/archive/2013/05/start/a-meeting-of-minds-in-cambridge>.

BBC 2014. Is Cambridge's Start-up Scene Rivalling Silicon Valley? [Referenced: 22nd December, 2014]. Available at: <http://www.bbc.com/news/world-26683055>.

Chesbrough, H. 2003. The Era of Open Innovation [Referenced: 9th December 2014]. Available at: http://www.humanitarianinnovation.com/uploads/7/3/4/7/7347321/chesbrough_2003.pdf.

Cogswell 2014a. Entrepreneurship in Silicon Valley [Referenced: 28th November 2014]. Available at: <http://www.cogswell.edu/>.

- Cogswell 2014b. Masters Program [Referenced: 29th November 2014]. Available at: <http://www.cogswell.edu/entrepreneurship/masters.html>.
- Cogswell 2014c. Immersion Program [Referenced: 5th December 2014]. Available at: <http://www.cogswell.edu/entrepreneurship/immersion.html>.
- Cogswell 2014d. Kauffman FasTrac [Referenced: 5th December 2014]. Available at: <http://www.cogswell.edu/entrepreneurship/fasttrac.html>.
- Cogswell 2014e. Idea & Innovation Lab [Referenced: 5th December 2014]. Available at: <http://www.cogswell.edu/entrepreneurship/idea.html>.
- College US News 2014. Cogswell Polytechnical College [Referenced: 30th November 2014]. Available at: <http://colleges.usnews.rankingsandreviews.com/best-colleges/cogswell-college-1177>.
- Computer Graphics World 2014. Cogswell College Launches ‘Immersion Experience’ Program [Referenced: 5th December 2014]. Available at: <http://www.cgw.com/Press-Center/Web-Exclusives/2014/Cogswell-College-Launches-Immersion-Experience-P.aspx>.
- Courtney, H., Lovallo, D. & Clarke, C. 2013. Deciding How To Decide [Referenced: 30th November 2014]. Available at: <https://hbr.org/2013/11/deciding-how-to-decide>.
- Cowen, J. 2014. Interview: UBC President Arvind Gupta on Academic Innovation [Referenced: 20th December 2014]. Available at: <http://www.canadianbusiness.com/leadership/arvind-gupta-ubc/>.
- Dan, M. 2013. Why Should University and Business Cooperate? International Journal of Economic Practices and Theories [Referenced: 4th December 2014]. Available at: http://www.ijept.org/index.php/ijept/article/viewFile/Why_Should_University_and_Business_Cooperate%3F_A_Discussion_of_Advantages_and_Disadvantages/pdf.

Davey, T., Baaken, T., Muros, V. & Meerman, A. 2011. The State of European University-Business Cooperation [Referenced: 28th November 2014]. Available at: http://www.ub-cooperation.eu/pdf/final_report.pdf.

Davey, T., Baaken, T., Muros, V. & Meerman, A. 2013. The State of University-Business Cooperation in Finland [Referenced: 2nd December 2014]. Available at: <http://www.ub-cooperation.eu/pdf/finland.pdf>.

Department for Communities and Local Government: London 2009. Multi-criteria Analysis [Referenced: 23rd November 2014]. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/7612/1132618.pdf.

DuuniExpo 2014 [Referenced: 3rd December 2014]. Available at: <http://duuniexpo.eu/en/>.

Ethnics Resource Center 2009. The Decision Making Process. Ethnics Resource Center [Referenced: 25th November 2014]. Available at: <http://www.ethics.org/resource/plus-decision-making-process>.

EUBIC 2014. EUBIC Targets [Referenced: 3rd December 2014]. Available at: <http://eubic.fi/targets/>.

European Commission 2011. Regional Policy for Smart Growth in Europe 2020 [Referenced: 30th November 2014]. Available at: http://ec.europa.eu/regional_policy/information/pdf/brochures/rfec/2011_smart_growth_en.pdf.

European Commission 2014a. Education and Training: Supporting Education and Training in Europe and beyond [Referenced: 20th October 2014]. Available at: http://ec.europa.eu/education/tools/university-business_en.htm.

European Commission 2014b. Education and Training [Referenced: 25th November 2014]. Available at: http://ec.europa.eu/education/library/study/2014/university-business_en.pdf.

European Commission 2014c. Open Science (Open Access). [Referenced: 7th January 2015]. Available at:

<http://ec.europa.eu/research/swafs/index.cfm?pg=policy&lib=science>.

Finnish Research Infrastructure Committee 2014. Finland's Strategy and Roadmap for Research Infrastructure 2014-2020 [Referenced: 1st December 2014]. Available at:

http://www.aka.fi/Tiedostot/FIRI/Tutkimusinfrastruktuurien_strategia_ja_tiekartta_2014_en.pdf.

Galan-Muros, V. & Davey, T. 2014. University-Business Cooperation Can Benefit All [Referenced: 30th November 2014]. Available at:

<http://www.researchmedia.com/blog/university-business-cooperation-can-benefit-all/>.

Google 2013. Tools and Resources [Referenced: 19th December 2014].

Available at: <http://research.google.com/university/tools.html>.

Government of the Netherlands 2014. Open Access to Publications.

[Referenced: 7th January 2015]. Available at:

<http://www.government.nl/documents-and-publications/parliamentary-documents/2014/01/21/open-access-to-publications.html>.

Guilliams, T. 2013. Insights into University-Business Interaction [Referenced: 3rd December 2014]. Available at:

<http://www.csap.cam.ac.uk/media/uploads/files/1/university-industry-interactions-cambridge-guilliams-final.pdf>.

Hague, P. & Wilcock, C. 2014. How to Get Information for Next to Nothing [Referenced: 16th January 2015]. Available at:

<http://www.b2binternational.com/publications/desk-research/>.

Kaymaz, K. & Eryiğit, K. 2011. Determining Factors Hindering University-Industry [Referenced: 4th December 2014]. Available at:

<http://www.socialinquiry.org/articles/IJSI-V4N12011%20-%20009.pdf>.

Lahti Business Region 2014. An Ideal Place for Your Business [Referenced: 7th January 2015]. Available at: <http://www.lahtibusinessregion.com/>.

Lahden Kaupunki 2014. Furniture and Woodworking Industry. [Referenced: 12th January 2015]. Available at:
<http://www.lahti.fi/www/cms.nsf/pages/4B516D077F843141C22571EA00327FF8>.

Lahti Mechatronics 2012. Lahti University of Applied Sciences [Referenced: 3rd December 2014]. Available at: http://www.lahtimechatronics.fi/filebank/1823-luas_in_english.pdf.

Lahti University Campus 2014. Research. Multidisciplinary City Campus [Referenced: 3rd December 2014]. Available at:
<http://www.lahdenyliopistokampus.fi/en>.

Lee, P. 2014a. More University-Business Collaboration Needed [Referenced: 4th December 2014]. Available at:
<http://www.universityworldnews.com/article.php?story=2014070311174870>.

Lee, T. 2014b. Companies Look to Universities for Next Innovations. [Referenced: 7th January 2015]. Available at:
<http://www.sfgate.com/business/article/Companies-look-to-universities-for-next-5869930.php>.

LSE Enterprise 2013. Business and Consultancy [Referenced: 20th November 2014]. Available at:
<http://www.lse.ac.uk/businessAndConsultancy/LSEEnterprise/pdf/UBC-Final-report-May2013.pdf>.

LUAS 2013. Research and Development [Referenced: 20th October 2014]. Available at:
http://www.lamk.fi/english/rd/Documents/lahtiuas_rdi_brochure.pdf.

LUAS 2014. Research and Development [Referenced: 2nd December 2014]. Available at: <http://www.lamk.fi/english/rd/Sivut/default.aspx>.

- Lund University 2014. Search Publications and Upcoming Thesis Defenses. [Referenced: 7th January 2015]. Available at: <http://www.lunduniversity.lu.se/research-innovation/search-publications-and-upcoming-thesis-defences>.
- Manktelow, J. & Carlson, M. 2012. Force Field Analysis [Referenced: 29th November 2014]. Available at: http://www.mindtools.com/pages/article/newTED_06.htm.
- Ministry of Education and Culture 2014. Finland's Strategy and Roadmap for Research Infrastructures 2014–2020 [Referenced: 1st December 2014]. Available at: <http://www.minedu.fi/OPM/Verkkouutiset/2014/03/roadmap.html?lang=en>.
- Mitacs 2014. About Mitacs [Referenced: 12th December 2014]. Available at: <https://www.mitacs.ca/en/about-mitacs>.
- Monbiot, G. 2011. Academic Publishers Make Murdoch Look Like A Socialist. [Referenced: 7th January 2015]. Available at: <http://www.theguardian.com/commentisfree/2011/aug/29/academic-publishers-murdoch-socialist>.
- Porter, M. 2006. Colleges and Universities and Regional Economic Development: A Strategic Perspective. [Referenced: 7th January 2015]. Available at: <http://www.hbs.edu/faculty/Pages/item.aspx?num=46840>.
- Richards, H. 2013. Talking Open Innovation with Prof. Henry Chesbrough [Referenced: 9th December 2014]. Available at: <http://www.intelligenthq.com/innovation-management/interview-talking-open-innovation-with-prof-henry-chesbrough/>.
- Richmond Public Schools 2014. Benefits of University-Business Cooperation [Referenced: 4th December 2014]. Available at: <http://web.richmond.k12.va.us/Departments/SchoolCommunityPartnerships/About/WhatarethebenefitsofaSchoolBusinessPartner.aspx>.
- Singh-Joseph, R. 2014. Arvind Gupta: The Man Behind the Vision. [Referenced: 7th January 2015]. Available at:

<http://www.darpanmagazine.com/people/newsmakers/arvind-gupta-the-man-behind-the-vision/>.

Statistics Finland 2014. Research and Development Expenditure [Referenced: 1st December 2014]. Available at: http://www.stat.fi/til/tkke/2013/tkke_2013_2014-10-30_tie_001_en.html.

Steelcase 2014a. About Steelcase [Referenced: 23rd December 2014]. Available at: <http://www.steelcase.com/en/company/who/about-steelcase/pages/aboutsteelcase.aspx>.

Steelcase 2014b. Steelcase 360 Magazine [Referenced: 23rd December 2014]. Available at: <http://360.steelcase.com/case-studies/>.

Steelcase 2014c. Workspace Futures Team [Referenced: 23rd December 2014]. Available at: <http://www.steelcase.com/en/resources/research-projects/pages/workspacefutures.aspx>.

Steelcase 2014d. A Workspace Futures Research Project [Referenced: 23rd December 2014]. Available at: <http://www.steelcase.com/en/resources/research-projects/pages/classrooms-2-0.aspx>.

Technology and Venture Commercialization 2014. Innovate [Referenced: 25th November 2014]. Available at: <http://www.utah.edu/innovate/Innovate-2014-LR.pdf>.

The Conversation 2014. What Counts As An Academic Publication? [Referenced: 7th January 2015]. Available at: <http://theconversation.com/what-counts-as-an-academic-publication-34549>.

Times Higher Education 2014. University of British Columbia [Referenced: 12th December 2014]. Available at: <http://www.timeshighereducation.co.uk/world-university-rankings/2014-15/world-ranking/institution/university-of-british-columbia>.

Torkkeli, M. 2013. Thoughts of Open Innovation Should Be Worked Into Curricula [Referenced: 10th December 2014]. Available at:

<http://www.lut.fi/web/en/-/thoughts-of-open-innovation-should-be-worked-into-curricula>.

University of Alberta 2014. Types of Sponsored Research. [Referenced: 7th January 2015]. Available at:

<http://www.rso.ualberta.ca/en/Applying/ResearchAgreements/SponsoredResearchTypes.aspx>.

University of British Columbia 2014. Overview and Facts 2013/14 [Referenced: 14th December 2014]. Available at:

http://www.ubc.ca/_assets/pdf/UBC_Overview_Facts_2013-14_Web.pdf.

University of Guelph 2012. Strategic Research Plan 2012-2017 [Referenced: 7th December 2014]. Available at:

http://www.uoguelph.ca/research/sites/default/files/University_of_Guelph-SRP_2012-2017-final_version-april_9_2012.pdf.

University of Guelph 2014a. Welcome from the Vice-President [Referenced: 7th December 2014]. Available at: <http://www.uoguelph.ca/research/about-us/welcome-message>.

University of Guelph 2014b. Learn About Research [Referenced: 7th December 2014]. Available at: <http://www.uoguelph.ca/research/learn-about-research>.

University of Guelph 2014c. Facts & Figures [Referenced: 7th December 2014]. Available at: <http://www.uoguelph.ca/research/about-us/fact-figures>.

University of Guelph 2014d. Guelph Research Magazines [Referenced: 9th December 2014]. Available at: <http://www.uoguelph.ca/research/guelph-research-magazines>.

University of Guelph 2014e. SPARK [Referenced: 9th December 2014]. Available at: <http://www.uoguelph.ca/research/spark>.

University of Guelph 2014f. SPARK Process. [Referenced: 7th January 2015]. Available at: <http://www.uoguelph.ca/research/spark/process>.

University of Utah 2012a. Technology Venture Development: Annual Report 2012 [Referenced: 26th November 2014]. Available at: <http://content.yudu.com/Library/A1y3um/2012AnnualReport/resources/index.htm?referrerUrl=>.

University of Utah 2012b. Commercial Sponsored Research. [Referenced: 7th January 2015]. Available at: <https://www.tvc.utah.edu/csr/wp-content/uploads/2013/10/CSR.pdf>.

University of Utah 2013. Campus Information [Referenced: 25th November 2014]. Available at: <http://obia.utah.edu/fastFacts.pdf>.

University of Utah 2014b. Innovate [Referenced: 26th November 2014]. Available at: <http://www.utah.edu/innovate/Innovate-2014-LR.pdf>.

University of Utah 2014c. About Us [Referenced: 26th November 2014]. Available at: <https://www.tvc.utah.edu/about.php>.

University of Utah 2014d. About Us. Lasonde Entrepreneur Institute [Referenced: 26th November 2014]. Available at: <http://lassonde.utah.edu/about-us/>.

University of Wollongong 2014. Guide to Commercial Research. [Referenced: 7th January 2015]. Available at: <http://www.uow.edu.au/content/groups/public/@web/@raid/documents/doc/uow041638.pdf>.

Washburn, O. & McDearman, B. 2014. A Global Role for Universities: Helping Firms Boost Exports. [Referenced: 7th January 2015]. Available at: <http://www.brookings.edu/blogs/the-avenue/posts/2014/11/18-global-role-universities-exports-washburn-mcdearman>.

Wazoku 2014. Open Innovation, Crowdsourcing and Co-Creation [Referenced: 9th December 2014]. Available at: <http://www.wazoku.com/blog/open-innovation-vs-crowdsourcing-vs-co-creation/>.

INTERVIEWS

Lähteinen, L. 2014. *Former Project Manager of Wood Technology & Furniture RDI (Faculty of Technology, Lahti University of Applied Sciences)*. Email interviews during November 2014. Interview questions available in Appendix 3.

Peltonen, K. 2015. *Research Manager and Lecturer at Lahti University of Applied Sciences*. Email interview in January 2015. Interview questions available in Appendix 4.

Tiusanen, G. 2015. *RDI Director (Furniture Unit, Lahti University of Applied Sciences)*. Email Interview in January 2015. Interview questions available in Appendix 5.

APPENDICES

APPENDIX 1. Eight Types of UBC (Davey et al. 2011)

	Key Findings	Goal
Collaboration in R&D	Collaboration in R&D is the highest developed type of UBC but is still only moderately developed amongst academics	Achieving further support for collaboration and joint research projects between academics /HEIs and business
Mobility of Students	Mobility of students is the second highest developed type of UBC but it is still only moderately developed through academics	Increasing support mechanisms for fostering the mobility of students
Mobility of Academics	Mobility of academics is the second lowest developed type of UBC	<ul style="list-style-type: none"> - Increasing support mechanisms for fostering the mobility of academics - Increasing knowledge about the mobility of academics
Commercialization of R&D Results	Commercialization of R&D results is the third highest developed type of UBC but is still only lowly developed amongst academics	<ul style="list-style-type: none"> - Increasing support mechanisms for fostering the commercialization of R&D Results - Increasing knowledge

		about the commercialization of R&D Results
Curriculum Development and Delivery	Curriculum development and delivery is lowly developed amongst academics	Increasing support mechanisms for fostering curriculum development and delivery
Lifelong Learning	Lifelong learning is lowly developed amongst academics	Increasing knowledge about lifelong learning
Entrepreneurship	Entrepreneurship is lowly developed amongst academics	Increasing support mechanisms for fostering the entrepreneurship
Governance	Governance is the lowest developed type of UBC	Increasing business participation in the management decision-making of the HEI

APPENDIX 2. Utah University – Ecosystem Partners (University of Utah 2014b)

<p>TECHNOLOGY & VENTURE COMMERCIALIZATION</p>	<p>Technology and Venture Commercialization (formerly the Technology Commercialization Office) manages the U’s intellectual property and works with new and established companies to develop technologies.</p>
<p>LASSONDE ENTREPRENEUR INSTITUTE</p>	<p>The Lassonde Entrepreneur Institute is home base for student entrepreneur programs at the U. Programs include student business plan competitions, innovation courses, internships and commercialization opportunities.</p>
<p>ENTREPRENEURIAL FACULTY SCHOLARS</p>	<p>The Entrepreneurial Faculty Scholars program brings together innovative faculty at the U who share the common dedication to motivating and enriching the translational experience for faculty and student entrepreneurs.</p>
<p>CENTER FOR MEDICAL INNOVATION</p>	<p>Medical doctors and students interested in innovation have a one-stop-shop for resources at the Center for Medical Innovation. It serves as an information and gathering hub for faculty, students and industry in the health sciences.</p>
<p>CENTER FOR ENGINEERING INNOVATION</p>	<p>The College of Engineering, with the Utah Nanofabrication Laboratory, established the Center for Engineering Innovation. It bridges the gap between basic science and engineering innovation and commercial product development.</p>
<p>CORPORATE</p>	<p>The new Corporate Concierge Program at the</p>

CONCIERGE	University of Utah is working to help community partners leverage the entire set of capabilities at the U. The program helps coordinate everything from scholarships and internships to sponsored research and entrepreneurship.
V.P. FOR RESEARCH	The Vice President for Research office at the U oversees many aspects of research and related activities across campus, including commercialization, compliance and education. The office also manages many related institutes, centers and initiatives.

APPENDIX 3

Interview questions with Mr Leo Lahteinen - former Project Manager of Wood Technology & Furniture RDI (Faculty of Technology, Lahti University of Applied Sciences)

Email sent: 10th & 11th November 2014

Reply received: 11th & 12th November 2014

- Background information regarding UBC between LUAS and furniture manufacturers: original ideas/purposes.
- What are LUAS's current weak points in cooperation with companies (furniture manufacturers)?
- How about LUAS's budget for R&D activities?

APPENDIX 4

Interview questions with Ms Katariina Peltonen – Research Manager and Lecturer at Lahti University of Applied Sciences

Email sent: 15th January 2014

Reply received: 16th January 2015

- Background information of LUAS's cooperation with furniture manufacturers. What are our objectives from the beginning?
- In your opinion, what are LUAS's current challenges in cooperating with companies? Issue of brand-awareness? Limitation in R&D facilities?
- LUAS's budget for RDI activities? Any suggested sum?
- What are our current cooperation programs/projects? Where do you see LUAS in the next 5 years?

APPENDIX 5

Interview questions with Ms Gatja Tiusanen – RDI Director (Furniture Unit, Lahti University of Applied Sciences)

Email sent: 16th January 2014

Reply received: 19th January 2015

- How has LUAS supported businesses? What has the university offered in its cooperation with businesses?
- In your opinion, what are LUAS's current challenges in cooperating with companies?
- What is the university's biggest cooperative project at the moment?