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**RUSSIAN SME TECHNOLOGY TRANSFER TO FINLAND –  
ENTREPRENEURIAL CHALLENGES AND MOTIVATION**

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## **ABSTRACT**

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The purpose of this thesis is to study the international technology transfer of transition economy SME entrepreneurs to the developed countries. The research aims to characterize the phenomenon by studying Russian SME technology transfer to Finland with the research methods from case studies. In addition to characterizing the phenomenon, the research finds out factors that motivate Russian entrepreneurs to conduct international technology transfer and what are the challenges the Russian entrepreneurs face when they enter the Finnish business environment.

The qualitative data was collected from six semi-structured interviews with the entrepreneurs and several secondary data sources, considering four different technology transfer cases. The data and the analysis showed that the case companies in Finland are mostly linked to manufacturing of physical products. The entrepreneurs are motivated to come to Finland mainly by the opportunities and support the Finnish business and innovation environment provides to the entrepreneurs and by the personal gain that they get by establishing the company in Finland. Major challenges in the process include time constraints and capital requirements, difficulties on achieving sales on the Finnish market and finding skilled personnel to support the Russian management and owners.

## АННОТАЦИЯ

<b>Автор:</b>	Котилайнен, Йоона Илмари
<b>Название:</b>	Передача технологии малого и среднего бизнеса России в Финляндию — проблемы и мотивация предпринимателей
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Целью данной диссертации является исследование международной передачи технологий малого и среднего бизнеса с переходной экономикой в развитые страны. В данном исследовании автор стремится охарактеризовать данное явление, изучая передачу технологий русских предпринимателей в Финляндию, используя научно-исследовательские метод тематических исследований. В дополнение к характеристикам явления, исследование выясняет факторы, которые мотивируют российских предпринимателей вести международную передачу технологий, и проблемы, с которыми российские предприниматели сталкиваются при входе в финскую бизнес-среду.

Качественные данные были собраны из шести полуструктурированных интервью с предпринимателями, а также из нескольких вторичных источников данных, которые рассматривают четыре различных случая передачи технологий. Данные и анализ показали, что эти компании в Финляндии в основном связаны с производством материальных продуктов. Предприниматели мотивированы вести дела в Финляндии в основном из-за возможностей и поддержки, которые предоставляет финская среда бизнеса и инноваций этим предпринимателям, а также из-за личных выгод, которые они получают путем создания компаний в Финляндии. Основные проблемы, возникающие в процессе, включают временные ограничения, требования к капиталу, трудности осуществления продаж на рынке Финляндии и поиск квалифицированного персонала для поддержки российского руководства и владельцев.

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Finally here.

For the last six years of my life, I have been on a journey that started at the very first day of university, and has lasted up until this point, the very last day of university. Along the way, my goal has been to improve my skills, collect bits of information from the best teachers available, compose them into knowledge of life and business, and in the end, to find out what to do with the skills and knowledge that I have spent six years learning. I cannot say that I have it all figured out yet, but at least I can say at this moment that the things I have learned and the people I have met have directed me towards a future that looks interesting and promising.

Some people say that the master's thesis is the culmination of their academic road, the most important thing they have written on their way towards graduation. It surely is an important milestone and sign of maturity for me too, but in my opinion, a book that will be collecting dust on a shelf in the future cannot be the culmination of the entire journey. For me, the ultimate value of all this academic sweating is in the relationships that I have managed to build up with you guys. My family, colleagues, teachers, mentors, advisors, professors and especially my wonderful classmates. You are the people that have made my journey worthwhile, and unlike the book, I would hate to see our relationships collecting dust.

I want to express my sincerest gratitude and utmost respect for all of the people who I have met and who have supported me during my journey through the university. Thank you for being there for me.

*Yours sincerely,*

Joona Kotilainen

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## 1 INTRODUCTION

Technology transfer has existed for ages. In fact, ever since humans have started utilizing tools, technology transfer has taken place between individuals. In essence, technology transfer involves people and organizations that commence in projects that aim for mutual gain through transferring some knowledge, or technology that is owned or known by one party to another. The ultimate reason to the transfer of knowledge and technologies is obvious. Even though technology transfer is known to incur notable costs for both the transferor and the transferee (Contractor & Nejad 1981), transferring or teaching certain knowledge to another entity saves the time and bother of the recipient organization of coming up with that information and knowledge himself, saving large quantities of resources (Teece 1977).

Technology transfer has also deep roots in trade between nations. Superior technologies and knowledge of them hold real value in them and transferring those technologies to other countries is one of the main drivers of global trade and foreign investments. (Krugman 1979.) A few decades ago, most of technology transfer consisted of companies from developed nations transferring their technologies through commercial transactions to the developing world (Bozeman 2000), but today, the technology transfer in the opposite direction is beginning to get much more attention and volume.

This thesis studies the phenomenon of Russian small and medium sized enterprise and entrepreneur technology transfer to Finland. The focal points of the study are the motivation of Russian entrepreneurs to come to Finland and the challenges such entrepreneurs face in their endeavors of internationalizing their business, establishing new business, or transferring their technologies to Finland.

Russia is a great example of a transition economy country who has lately turned its economic system into a market economy and begun to shift its

economic focus from raw materials to research and development and innovations with mandates from the presidential level (Medvedev 2009, Putin 2012). Finland on the other hand, has during the late decade held position of one of the 'most innovative' countries in the world by many indicators, making a good contrast on the business environments for study purposes.

The study revolves around internationalization theories and technology transfer theory and utilizes both in producing of the theoretical framework for the study. In addition, the study covers literature of transition economy companies' internationalization. The study is linked and adds relevant information to research from spheres of international technology transfer and internationalization of companies and entrepreneurs originating from transition economies.

Managerially, the study provides important information for Russian managers and entrepreneurs who are planning to internationalize their operations and transfer their technologies to foreign markets. The implications of the research can also be referred when designing support policies and programs to make the country or certain areas in it more lucrative target for Russian investments and technology transfer.

The qualitative study and its results is based on four Russian technology transfer cases to Finland. The cases involved in the research are not similar, as the differences between the cases range from company characteristics and industry to technology stage for example. The relatively small amount of cases studied is due to limited amount of realized Russian technology transfer projects in Finland. The vast difference in the case characteristics is also an intentional research design choice, as polar cases in case studies can provide good and informative results.

To form the research data, opportunistic data collection methods were utilized in the study. Primary data for analysis was gathered in Finnish,



Russian and English languages from semi-structured interviews with the company representatives, and secondary data was collected from publicly available sources, such as, company websites, press releases, magazine articles and social media profiles of the entrepreneurs.

## 1.1 Key Definitions

As was mentioned in the introductory chapter, this paper studies the Russian SME technology transfer to Finland. To open up the title of the thesis, it involves the concepts of technology, technology transfer, internationalization, small and medium sized enterprises and along with the companies, the entrepreneurs themselves. To most business researchers and managers, the concepts that are utilized and studied in this thesis are familiar, but a danger lies in presumptions of these terms, as they have very diverse meanings. This chapter is to explain the meanings of the different terms for this specific thesis.

### *Small and medium sized enterprises*

To limit the field of study and to have a better focus on entrepreneurship, only small and medium sized enterprises (SMEs) are considered in the study. For an enterprise to be considered as medium sized business, its employee count must be under 250 and its turnover less than € 50 million (or balance sheet total less than € 43 million (European Commission 2003)).

*Entrepreneurs* are usually considered as self-employed people, or the people who are the owners of small businesses. In this thesis, the concept of entrepreneurship does not only include the owners of businesses, but is a bit wider term. The thesis utilizes an entrepreneur definition by Eric Ries (2011) with a slight adaptation to its context. An entrepreneur is a manager with power to make organization steering decisions within a company under conditions of extreme uncertainty. The entrepreneurs that are studied in this

thesis are all managing companies, which have lately been established in Finland based on Russian technologies.

*Technology* as a term is the most ambiguous one. Practically one could say that technology is a tool to perform some operation (Bozeman 2000), or technology could be assessed just as knowledge of how to do things associated with an economic activity (Stewart 1985). For this thesis, the term technology means configurations, which consist of products, processes to make those products and knowledge of how to use and apply the technology (Sahal 1981).

*Technology transfer* is exchange of any technology from one party to another, or from a context to another (Reisman 2005). A technology transfer has happened when the sending party, the transferor, has sent the technology and the receiving party, the transferee, has adopted it (Souder et al. 1990).

*International technology transfer* takes place when knowledge in one country is communicated to another country with the intention to use it there (Stewart 1985). International technology transfer can, but does not necessarily lead to internationalization of the transferor or transferee, if the transfer does not build permanent relationship or permanent activities in foreign country by neither party.

*Internationalization* in this study means the process of increasing involvement in international operations of the firm (Welch & Luostarinen 1988). It does not only cover sales and export, but takes also into account other activities that might be of relevance to the company, such as research and development and manufacturing abroad.

*Transition economy* is an economy that is changing from being one under government control to being a market economy (Cambridge Dictionary 2013). The transition process has been under effect in countries such as

China, the former Soviet Union including Russia and many third world countries.

## **1.2 Research Objectives and Problems**

The research problem of the thesis is formulated around the Russian entrepreneurs' endeavors to transfer their technologies to Finland, and to establish a company utilizing the technology. The theses' main aim is to get an extensive view over the internationalization and technology transfer of several Russian businesses, focusing on the characteristics of the cases, factors that motivate the entrepreneurs to do so and the challenges the entrepreneurs face in their endeavors in Finland. Other aims for the study are to provide relevant information for policy makers and support program designers in developed countries, and managers or entrepreneurs from transition economies who are considering of launching technology transfer projects to developed markets.

In order to get an extensive view over the internationalization and technology transfer challenges and motivations toward Finland by Russian entrepreneurs, three research questions were formulated:

RQ1: What characterizes the SME technology transfer from a transition economy to a developed market?

RQ2: What are the motivational factors that drive transition economy SME entrepreneurs to transfer their technology to developed markets?

RQ3: What are the challenges faced by the entrepreneurs conducting international technology transfer from transition economies to developed markets?

The aim of the first research question is to find out some common characteristics of the technology transfer projects originating from transition economies. The second research question aims to identify the external or

macro level reasons and entrepreneurs' personal motivation for the occurrence of the cross-border technology transfer. The third research question is dedicated to identifying the challenges the transition economy entrepreneurs and companies face in their endeavors of transferring their technology to developed markets.

All of the research questions will be answered by the empirical data and its analysis of the case technology transfer projects that originate from Russia and target Finland.

### **1.3 Theoretical framework and research environment**

The theoretical framework of the thesis is presented in figure 1. The theoretical part of the thesis presents the theories of technology transfer, international technology transfer and SME internationalization in detail. The main issues and implications of the transition economy SMEs, their internationalization and entrepreneurs are also presented in this part of the thesis, based upon the literature available of them. The aspect of technology transfer involves issues related to the technology, technology stages, technology transfer stages and the international technology transfer models. The SME internationalization section focuses on the issues related to the company's internationalization and the internationally oriented entrepreneurs. Issues such as international entrepreneurship, born global companies, knowledge approach to internationalization and the internationalization stages are considered important for the study.



Figure 1. Theoretical framework

The theories and literature form the theoretical basis and determinants on the issues that are studied in the empirical research phase of the thesis. The empirical phase involves four technology transfer cases whose characteristics will be the basis for answering the first research question about characterizing transition economy SME international technology transfer. The empirical part of the study will also provide information on the entrepreneurs' motivation for internationalization and international technology transfer, followed by an assessment of the entrepreneurs' challenges along the process. The results for the motivation and challenges part are also compared to the existing literature to see if there are any special challenges or motivation factors that would be true in this study setting, but are not considered in other theories.

Figure 2 coarsely represents the environment, in which the Russian entrepreneurs are conducting the international technology transfer. The research environment is based and is adapted from the international

technology transfer models that are described in more detail in the chapter 2.5 (Figures 4,5 and 6). It should be noted that the figure 2 most likely does not represent the situations in the studied cases, but should be considered as a guideline of what the researcher had in mind when first looking for suitable cases to be taken under study.

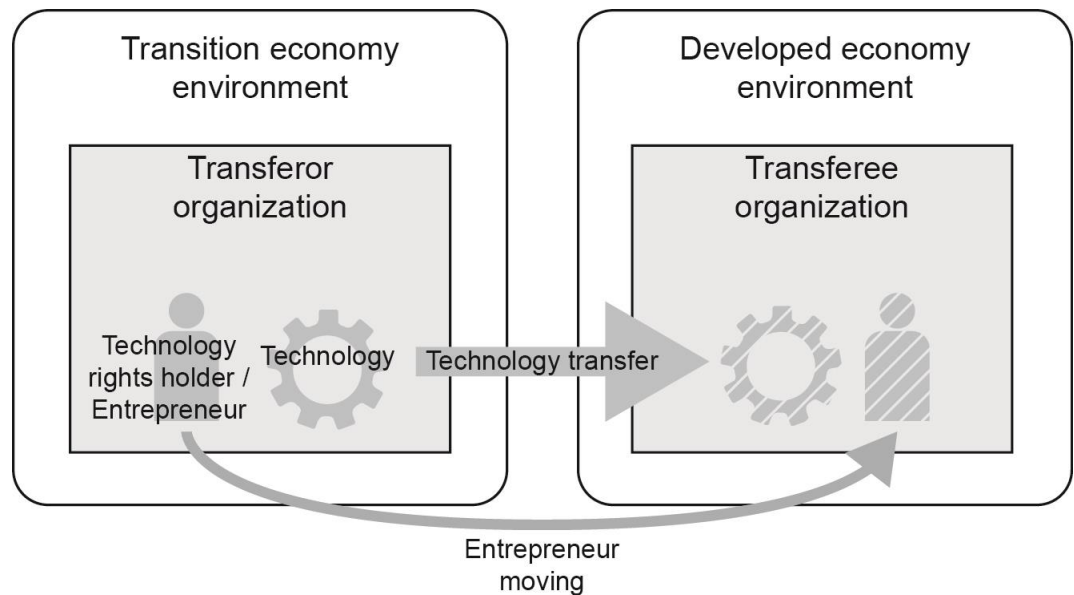


Figure 2. Research setting

The research setting is that there are two different countries, one of which is an economy in transition and another that is developed. These countries have unique environments with different powers and forces affecting the organizations within these environments. The organizations involved in the research include the transferor organization, who resides in the transition economy, and the transferee organization who resides in the developed economy. The transferor organization holds the rights for some technology, which could be suitable for transferring to the developed economy. The transferee organization is practically useless without the technology and an entrepreneur to run the business. The transferor organization decides to transfer their technology to the transferee with an entrepreneur from that organizations to overview the new establishment in the developed economy.

It could be also feasible for the transferor organization to conduct the transfer inside their own environment in the home market to achieve the goals of the organization, but somehow a decision was done to conduct the transfer to another market in different country instead. This is an intriguing issue, which calls research why it is happening.

#### **1.4 Environment comparison of Finland and Russia**

Given the fact that the business environments in transition economies and developed markets differ quite heavily from one another, it is without doubt one of the most influencing factors that drives the international technology transfer and new venture establishment from the transition economy to the developed countries. However, the aim of the study is not to study these differences in detail, but as described in the objectives of the study, to focus on the entrepreneurs and their reasoning on the decision to begin international technology transfer. This chapter presents briefly the differences of the economic environments in Finland and Russia as examples of transition economy and developed economy countries.

According to the World Economic Situation and Prospects 2014 report by the UN, Russia is classified as an economy in transition. Still, Russia is not necessarily the best example of a transition economy, as the shift to market economy was realized a few decades ago after the collapse of the Soviet Union, and the country has seen major improvements in the last few years. However, the country is still lagging behind most of the Western European countries on the innovation and business environment indicators, proving that there is much room for development in the economic condition of the country (Luukkanen 2010.), as is in other transition economies.

The Finnish business life faced a recession in the beginning of the 1990s, causing the Finnish government to engineer an innovation policy, which was to increase the number of technological innovations created in Finland. The

ultimate aim for this policy was to raise Finland's competitiveness in the globalizing worldwide economy and to end the recession. The programs and policies were successful, pulling Finland out of the recession and lifting its position on the world as one of the most innovative countries. (Science and Technology Policy Council of Finland, 2003.)

To display the differences of the two economies, a few indicators were selected that measure issues that are of relevance to organizations that are dealing with technologies and R&D. Table 1 presents the current assessment of the Finnish and Russian economies by the following indexes and rankings.

*The Global Competitiveness Report* is a report provided by the World Economic Forum. It measures the key factors that determine economic growth in different countries in the world. It ranks the nations in the competitiveness order based on twelve pillars measuring versatile issues in each economy, such as education, infrastructure, capacity for innovation, competition etc. (World Economic Forum 2013.)

*The Global Innovation Index* focuses on the ranking of the world economies' capability to innovate. It measures each economy's innovation inputs by assessing the institutions, human capital and research, infrastructure, market sophistication and business sophistication, and compares this input index into innovation output index, which is determined by the knowledge and technology outputs and creative outputs that originate from the economy. (INSEAD 2014.)

*The Ease of Doing Business ranking* measures how easy it is to conduct daily business in each of the economies. It assesses the regulations that affect domestic firms in some 189 economies, in the spheres of starting a business, resolving insolvency and establishing cross-border sales for example. (World Bank 2013.)



<b>Index / sub-index</b>	<b>Russia (rank)</b>	<b>Finland (rank)</b>
<b>Global Competitiveness Index</b>	64	3
<i>Basic requirements</i>	47	7
<i>Efficiency enhancers</i>	51	9
<i>Innovation and sophistication factors</i>	99	2
<b>The Global Innovation Index</b>	62	6
<i>Innovation input index</i>	52	6
<i>Innovation output index</i>	72	8
<b>The Ease of Doing Business</b>	92	12

Table 1. Competitiveness, innovation and ease of doing business rankings of Finland and Russia

The indexes measuring the competitiveness, innovation and regulations related to doing business convey clearly the difference of the Finnish and Russian economies. While Finland ranks in the top 10 in all innovation and competitiveness sub-indexes, Russia's ranking on these indicators is usually between 40 and 70. The easiness of doing business rank also indicates that Finland would have lesser regulations and running a business there would be comparatively easier than in Russia. However, it might not be the way that Russian entrepreneurs perceive the issue, as the entrepreneurs might not be aware of the regulations in Finland, or the cultural differences of the operators in the two countries might differ vastly.

### **1.5 The Structure of the Thesis**

The thesis consists of two different parts, the theoretical and the empirical part. In the theoretical part, the study focuses on reviewing and displaying literature on the issues that are closely related to the topic, whereas in the empirical part, the four case companies are taken under precise scrutiny and analysis.

After introducing the topic and the essential research information, the thesis is divided into six subsequent chapters. The first chapter of the theoretical part discusses the issues related to technologies, technology transfer and international technology transfer. The second theoretical chapter is dedicated to explain the relevant theories from internationalization studies. The fourth chapter is reserved to display the methodology and the design of the empirical phase. The fifth chapter and its subchapters showcase the case technology transfer projects and provides answers to the research questions. The sixth chapter discusses the results of the thesis in the light of the theory and earlier literature, and reveals the managerial and theoretical implications of the study. The seventh chapter concludes the thesis with a brief summary of what was studied and found out in the thesis, along with discussion of the delimitations, reliability issues and the suggestions for further studies.

## **2 INTERNATIONAL TECHNOLOGY TRANSFER**

Technology transfer is a difficult concept to grasp and start studying. First problem for the topic is putting boundaries around the term “technology” and explaining what is meant with it. Secondly, outlining of technology transfer process is extremely hard as the process is actually sum of multiple simultaneous processes. Thirdly measuring the impacts of technology transfer is demanding as the effects are numerous and difficult to separate from the organizational life. (Bozeman, 2000.)

*“Anyone studying technology transfer understands just how complicated it can be.”* (Bozeman, 2000)

When discussing of technology transfer, it awakens many questions, as the term itself is very ambiguous. It is unclear who is transferring, what is being transferred, whom the technology is being transferred and which channels

are used in transferring, just to mention a few issues that need clarification for more extensive understanding of the topic.

## **2.1 Technology**

To understand and study technology transfer, one must first define what technology is. Extensive literature reviews of technology transfer note that the difficulty of defining the concept “technology” hinders the discussion of the topic greatly as there is no real consensus what technology actually is (Reddy & Zhao 1990, Bozeman 2000). The concept of technology is a central topic in technology transfer research as the definition affects heavily to the research design and results, to the issues around a single technology transfer, and to the governmental policies in general (Reddy & Zhao 1990).

Technology can be described as widely as knowledge of how to do all things associated with economic activity (Stewart 1985). Another broad view would be to consider technology as information, which is a public good and free for all to use. However, this does not take into account the economic incentives of the technology right holders or the fact that technology is usually transferred between limited amounts of parties. Thus, a wide approach to technology typically is that it is a firm-specific asset, a bundle of information, rights and services that is offered for the markets. (Contractor & Nejad 1981.) On the narrow end of the scale, technology could be assessed as “a tool”, for which more assessment needs to be done by clearing out what types of tools qualify as technology (Bozeman 2000).

Reddy's and Zhao's (1990) review showed that technology is most often understood as firm-specific information, which describes the characteristics of the production process and product design/technology. The production process comprises of the equipment and means to produce the defined product, while the product design describes the attributes of the product and

manifests in the finished product. The holding of these technological assets is in most cases described to form the basis of a firm's competitiveness.

Also in Sahal's (1981) study of alternative concepts of technology, it is noted that classical views of technology either as production technology or product attributes is not enough. He sees technology as "configurations", consisting of transferrable "technology", which bases on specifiable set of different processes and products. In addition to this, the technology needs to be applied and put into use, for which knowledge of the technology use and application is necessary. (Sahal 1981.)

The technology can either be embodied onto something or remain unembodied. The embodied technologies take a physical form and unembodied technologies stay tacit and thus cannot be coded or replicated on paper. (Teece 1977.) The embodied form can be divided into three main categories, the product-embodied, process-embodied and person-embodied technologies. The categories are quite self-explanatory; thus technology can be embodied to various mediums and transferred by sending and receiving the medium. (Mansfield 1975.) Often in technology transfer, a combination including several embodied mediums is transferred at the same time. This could mean for example a transfer of some machinery and the personnel who is able to operate the machinery or to teach someone to use them to another party. (Keller & Chinta 1990.)

## **2.2 Technology stages**

New technologies and products that are created by companies are often results of processes. The technology creation process can be divided into several stages, which also results into several stages technological readiness. (Cooper & Kleinschmidt 1986.)

From a life cycle point of view, the technologies go through several phases during their existence. The set of life cycle phases is divided to four stages, characterized by the time passing and gain or loss originating from developing or using the technology. This cycle is much like the one of individual products, but the technology life cycle encompasses all of the products, which are based on a single technology platform. First, the technology is developed in the research and development, where the coming up with the technology incurs costs and the failure rate for the technology is high. Second, the technology faces ascent, where the technology begins to generate business gain for the organization through sales or increased efficiency. Third phase is the maturity, where the technology has diffused to most of markets and the gain from the technology faces the peak of its life cycle. Finally, all technologies end their life cycle in decline (or decay), where the utility and gain of the technology is reduced. (Kim 2003.)

Markman et al. (2005) focus in their classification of technology stages to the early stage of R&D in the technology life cycle. The classification includes early-stage, proof of concept, reduced to practice and prototype technologies. Where the early-stage technologies might be just ideas of a working technology, a proof of concept is a new technology that has been developed to the point that it shows signs of having the proposed effect. To be classified as reduced to practice technology, the technology needs to have been replicated several times and the intended results reliably and repeatedly reproduced. The final stage here is the prototyping, which involves the construction of the new technology, which predictably produces desired results.

What should follow prototyping are pilot applications where the functioning technology is applied in real operating environment. After the feedback of the piloting phase the technology should be finished and made ready for market tests and finally transform into market tested products. (Cooper & Kleinschmidt 1986.)

Between each steps or stages in the development of the technology, technology transfer takes place. As described before, it can occur in an intra- or inter-organizational setting between any of these stages and even across country borders.

### **2.3 Technology transfer**

The term of technology transfer has been used to describe and analyze a wide range of interactions between organizations and institutions, which have involved some sort of technological exchange (Bozeman 2000). There is no general model or structure to study the issue, but as a rule technology transfer means exchange of technology between two parties. The problem in a model generation is that it is a daunting and nearly impossible task. This is due to the fact that technology transfer is of concern to several professions and to different social science disciplines. Concerned professions include policy makers in the public, private and non-profit sectors and the decision makers at the company, institution, community, regional, and national levels. It also is of interest to the multinational economic communities, such as the European Union. (Reisman & Zhao 1991.)

As a simple approach, a transfer of technology could be described as a movement of know-how, technical knowledge and technology from organization A to organization B. However, keeping in mind the different forms and types of technology, and the vast amount of possible sources for technology, the term of technology transfer could encompass any type of technological exchange. (Bozeman 2000.) According to Reisman's taxonomy of technology transfer literatures, the role of the transferor or the transferee can be taken by scientific disciplines, professions, industries, economic sectors, geographic regions or societies/countries, which causes the interest over the topic to span over the disciplines of economics, anthropology, sociology and management (Reisman 2005). The problem

with so widely spread cross-disciplinary topic is that all disciplines tend to have different perspective on the transfer, making concise definitions a bit harder in the field of study (Bozeman 2000).

## **2.4 Stages of technology transfer**

Technology stages describe the readiness or maturity of a single technology, and thus are linked only to the technology. The technology transfer stages, on the other hand, describe how the life cycle of a single technology is carried through. The technology transfer stages also link the responsibilities of certain actors into the different stages, most often being the transferor and the transferee of the technology.

In the early literature of technology transfer, the qualitative models focused rather on the phases of technology transfer process than the influencing factors for effectiveness or success. One of the earliest models is provided by Bar-Zakay (1971), dividing technology transfer into four distinct stages: the search, the adaptation, the implementation and the maintenance. The model focuses on the responsibilities and resource requirements of the transferor and transferee in each stage, and implies that the longer the process advances, the higher the costs of the transfer become. The model also suggests that the four stages act as major points of decision where it should be decided whether to go further with the transfer or not. Another early study by Dahlman and Westphal (1981) focused on studying technology transfer in a setting of manufacturing enterprises. They developed a division of nine stages for technology transfer project execution, which companies that transfer manufacturing technology undergo in the process. The stages are preinvestment feasibility studies, detailed studies, basic engineering, detailed engineering, procurement, training, construction and assembly, startup of operation and troubleshooting. A study that has reviewed technology transfer literature, technology transfer best practice guide, suggested a four stage model,

differing a bit from Bar-Zakay's, as it included prospecting, developing, trial and adoption as the last stage. This model is represented in figure 3. The roles in the original model are not limited to transferor and transferee, but are divided to disseminator, sponsor, developer and implementer, each focusing their efforts on different stages of the process also linking the importance of feedback into the cycle (Souder et al. 1990). For the purposes of this research, the extra roles besides the transferor and transferee are not necessary.

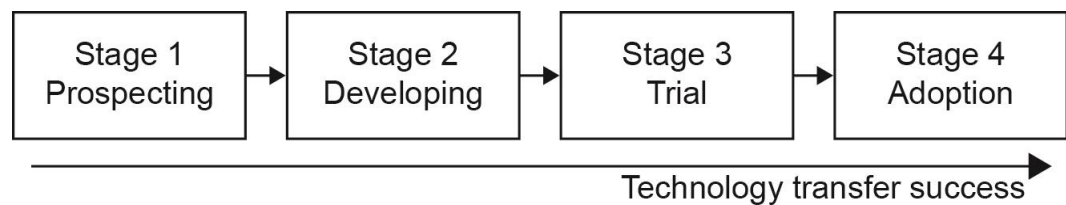


Figure 3. Technology transfer stages. Adapted from Souder et al. (1990)

The technology transfer stages relate to the development and the readiness of the technology to meet the market. In the prospecting stage, the companies usually do research, analytical and decision making activities with an aim to screen concepts or technologies to meet the users' requirements. The developing stage involves physical R&D activities which focus on enhancing, embodying and tailoring the technologies for market purposes. The trial stage involves the testing of the technology in real life situations and the adoption phase is consists of the final development and user implementation activities. (Souder et al. 1990.)

## 2.5 International technology transfer

Technology transfer between the nations has been the driver of the world economy for decades now. Technical knowledge had already during the 1960s become an important item of international trade, as the technologies and technological developments are of scarce nature. In some economies, there is surplus and in some economies deficit of technology ought to be



founded, partially explaining the volume and direction of worldwide technology transfer through the basic framework of supply and demand. (Baranson 1970.)

When the organizations involved in mutual technology transfer operate in different countries, the technology transfer changes to an international context. The international transfer of technology takes place when knowledge in one country is communicated to another country with the intention to use it there. (Stewart 1985.) The explanations for international technology transfer range from this narrow view to the very wide descriptions of international technology transfer being more comprehensive term which covers all the mechanisms for transferring information across borders and also the diffusion of the information into the recipient country (Maskus 2004).

The R&D and knowledge intensive developed world has traditionally taken the role of developer and the transferor of technology, while the developing world and the organizations there, have been the transferees and recipients of knowledge and technology (Bozeman 2000). Thus, most of the early international technology transfer literature studies place in a setting where United States is transferring technology to less developed countries and continents, such as the Soviet Union and Latin America. Only recently, has the transfer of technologies from emerging economies to developed world caught attention of the academic world.

In an international setting, the effects of the technology transfer are no longer limited to the organizations involved in the transferring, but the transfer has wider effects, as the imported technology causes changes in the technology, competition and R&D maps in the receiving nation. An international setting for the transfer also brings more difficulties to tackle for the organizations involved in the transferring. (Bozeman 2000.)

As international technology transfer is a well-studied and documented topic, the research on the subject has resulted in a locus of models and theories depicting the transfer and influential factors that affect the process and the outcome of the transfer. Earliest of the international technology transfer models date back to the 1970s. The early technology transfer literature focuses and discusses mainly international technology transfer from developed countries to undeveloped countries, and the technology transfer being a result of commercial transaction of sale and purchase. In the 1980s the research focus shifted on domestic studies and the companies' in-house technology transfer that is conducted cross the national borders. (Bozeman 2000.) Later on, the focus has shifted to multinational companies transferring their technologies inside their international network of companies, and ultimately in 2000s some articles of technology transfer by SMEs have emerged.

To create the theoretical framework for this study, several recently formed models of technology transfer and a few literature reviews of technology transfer are taken under more precise evaluation. The focus of the created framework is on the qualitative issues, aiming to find involved activities, factors and issues that influence the success and effectiveness of a technology transfer project (Khabiri et al. 2012).

The numerous models of technology transfer process vary in different forms and approaches. Bozeman (2000) suggested a model (Figure 4) for determining effectiveness and impact of technology transfer by five dimensions: transfer agent, transfer medium, transfer object, transfer recipient and demand environment. In simpler terms, for studying technology transfer it is important to understand "who is doing the transfer, how they are doing it, what is being transferred and to whom" (Bozeman 2000).

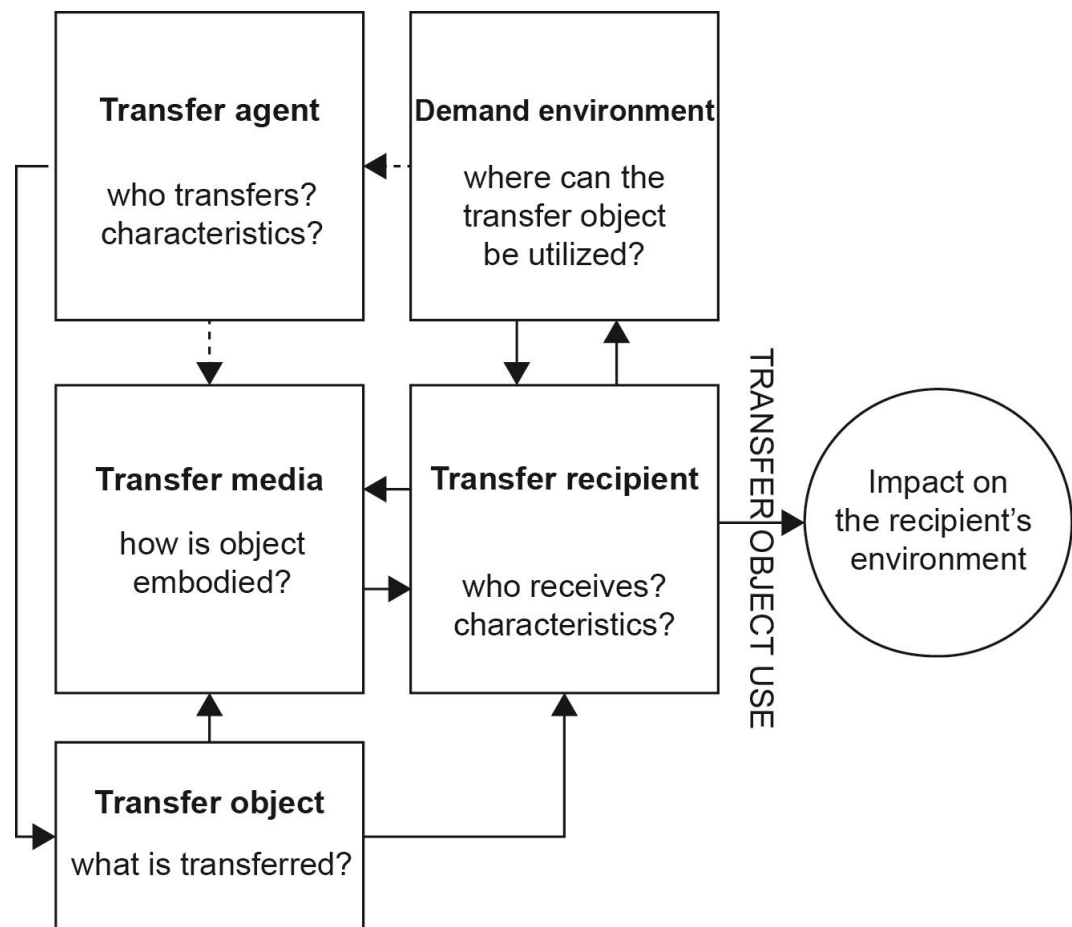


Figure 4. Contingent Effectiveness Model of Technology Transfer. Adapted from Bozeman (2000)

Keller and Chinta (1990) took an approach to assessing technology transfer in MNCs through the barriers and enhancers of it. Their model (Figure 3) implied that the environments in which the transferor and transferee reside have an effect on the success of any technology transfer. These macro level effects of the international technology transfer might cause the host or the home nation of the technology to either hinder or try to boost the international technology transfer. Another issue that effects the success of the transfer is the bonds between the transferor and the transferee, which could also either hinder or support the transfer.

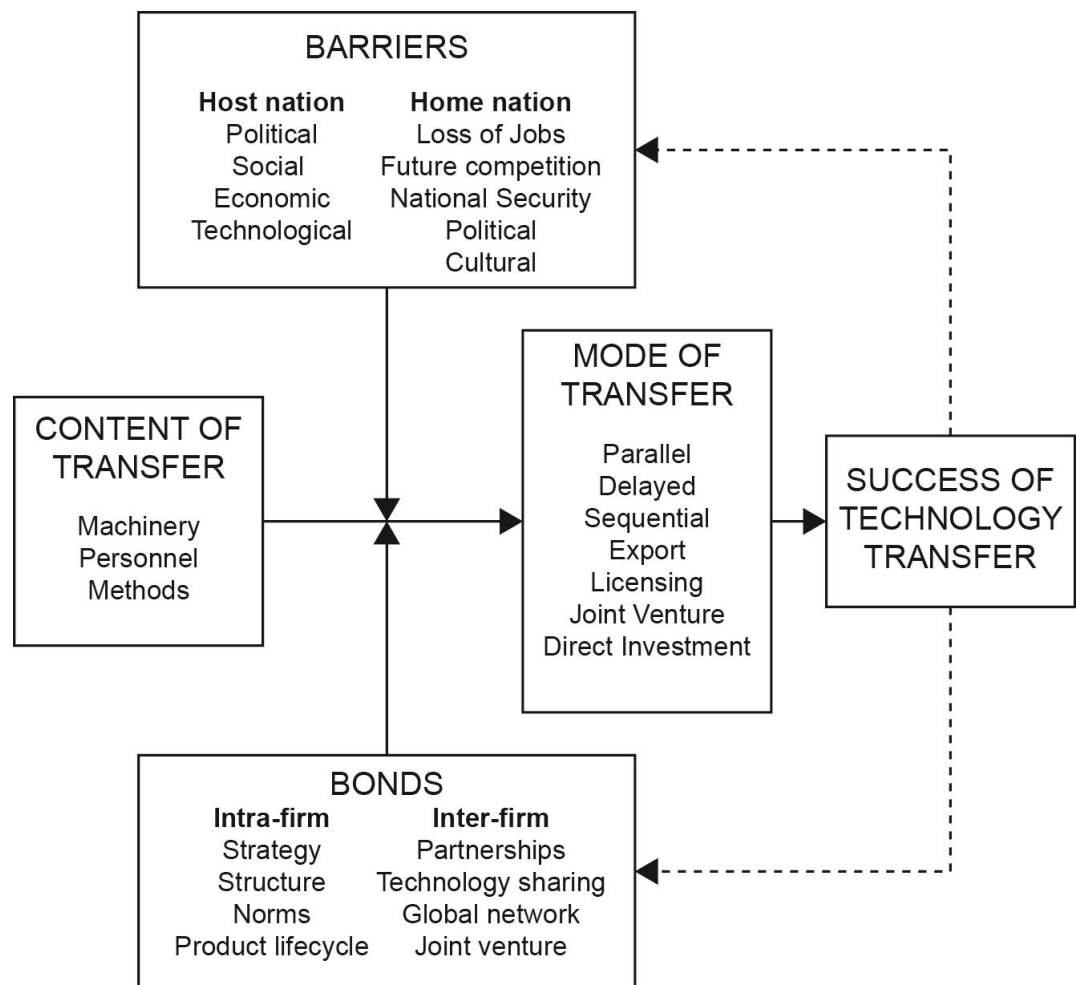


Figure 5. An Integrative Framework of International Technology Transfer. Adapted from Keller & Chinta (1990)

Khabiri et al. (2012) studied the technology transfer model literature to come up with a conceptual model illustrating effective elements of technology transfer process for a SME. The study resulted in combination of Schlie's et al. (1987) simple technology transfer model and Malik's (2002) technology transfer broadcasting model. While Schlie et al. identified seven elements (transferor, transferee, mechanism of transfer, technology, transferor environment, transferee environment and greater environment) that influence the planning, implementation and success of technology transfer project, it failed to show the relationships between the influencing factors. Malik (2002) on the other hand, based his streamlined model on the technology being a message sent from the transferor to the transferee. In the model, the interaction between the transferor and transferee is depicted

only by the technological message sent by the transferor and a feedback stream from transferee. However, this is where the model fails to picture the optimal technology transfer, as the continuous and open communication between the participants of technology transfer, and involvement of the transferee in the process are in many studies underlined as the main factors for successful transfer. Khabiri et al. (2012) sought a way to combine the strengths of the two simple models to create a more justified model for technology transfer.

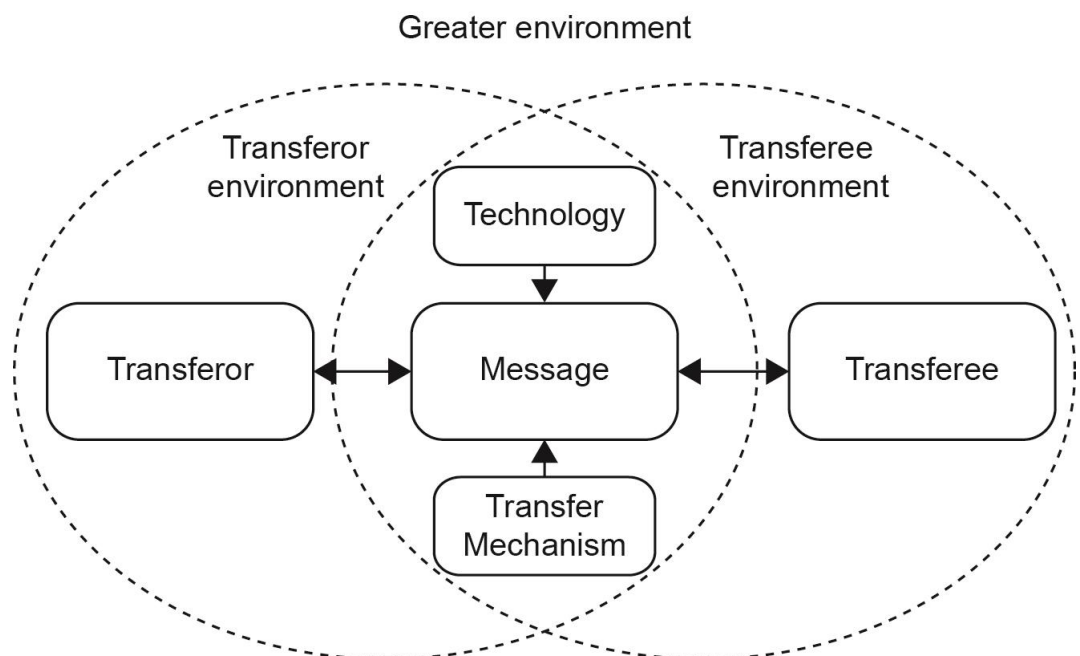


Figure 6. Justified Technology Transfer Broadcasting, a conceptual model (Khabiri et al. 2012)

On the basis of these three models, the technology transfer model, illustrated in the chapter 1.3, describing the Russian SME technology transfer to Finland was created.

### 3 INTERNATIONALIZATION OF SMES

As already the name of the term international technology transfer suggests, the transferor and transferee of the technology must reside in two different

countries. Depending on the definition of internationalization, the technology transfer between the two parties does not necessarily lead to the internationalization of neither party, if for example a technology is merely copied by the another party without establishing any relationship. However, as the study is limited to cases where there are Russian entrepreneurs who establish companies in Finland based on their technologies, it is safe to assume that the internationalization theories are of importance and relevant to this study.

The size of the internationalizing firm is a crucial factor when discussing internationalization theories. It is important to make a difference between the internationalization of SMEs and multinational enterprises, as their business setting and capabilities for establishing international activities are on wholly different levels. Thus, this chapter will discuss the internationalization and its theories from the point view of a small company.

In smaller businesses, the entrepreneur's effect and control over the company decisions strategy and operations remain high. As the focal points of the study are the motivation and challenges of the Russian entrepreneurs, it is assumed that the technology transfer projects from the emerging economy countries are also entrepreneur driven. This makes international entrepreneurship among other internationalization research domains, relevant to the study.

### **3.1 Born globals**

From a traditional viewpoint, the firms who seek to internationalize their activities are characterized by a set of advantages, such as superior technology, large size, unique products or special knowhow in marketing or management that allows the firm tackle the barriers of the international ventures (Chen & Chen 1998). However, the international markets are not of interest only to large-scale enterprises as there is enormous number of

internationalized SMEs operating in the worldwide markets. These companies are characterized by being “born global” companies, international new ventures or global start-ups, whose activities are international from the very beginning of the company lifecycle. (Oviatt & McDougall 1994, Weerawardena et al. 2007.)

The entrepreneurs that are establishing these new international ventures often possess crucial network connections that enable them to establish the international business activities providing credibility for the formation of strategic alliances and promoting cooperation among the international actors (McDougall & Oviatt 2005). In addition to be characterized by their network connections, the early internationalizing SMEs are usually also technology driven, trying to achieve sustainable competitive advantages through innovations that can be leveraged worldwide. (Autio et al. 2000, Filatotchev et al. 2009). It is also noted that the born global companies usually have superior R&D capabilities, when compared to “regular” SMEs (Knight & Cavusgil 2004), and that these abilities to transform innovation into business activities, support the born global company in their internationalization activities (Filatotchev et al. 2009).

### **3.2 International entrepreneurship**

Early on, the international entrepreneurship theory discussed the creation of new ventures in an international setting, where business organizations aim to derive competitive advantage from the sale of products in multiple countries (Oviatt & McDougall 1994). However, the combination of entrepreneurship and international business provides many different and viable approaches to study the issue, not only from the perspective of new ventures selling their products in multiple markets. Thus, the definition has been updated to it being a combination of innovative, proactive, and risk seeking behavior that crosses national borders and is intended to create value in organizations (McDougall & Oviatt 2000) and further to “discovery,

enactment, evaluation, and exploitation of opportunities—across national borders—to create future goods and services.” (McDougall & Oviatt 2005).

As described, the international entrepreneurship does not only encompass the international ventures from the point view of cross-border product or service sales. In many technology transfer cases from the transition economies, this is also not the idea. The newer descriptions of international entrepreneurship also look at other types of opportunities that can be exploited, such as the institutional environment, and overall business environment which can be of importance in technology transfer.

### **3.3 Institutional approach to internationalization**

The institutional theory is an important theoretical basis for studying internationalization of SMEs as the smaller companies face stronger pressure from the business environment and institutions, compared to their larger counterparts (Shirokova & Tsukanova 2013).

The institutional theories' main suggestion is that all organizations operating in an environment are influenced by institutional pressure which arises from external sources, or from within the organization. The external sources of pressure are for example the governmental institutions, which can affect to the operations of companies through legislation, industrial agreements and standards for example. (Scott 1995.)

The institutional environment has three key dimensions, which are the regulatory factors, cognitive factors and normative factors. The regulatory ones promote or restrict certain type of behavior through laws and regulations, cognitive are characterized by the knowledge and skills common to the people in single country and the normative factors take social norms, values and beliefs into account. (Kostova 1997, Busenitz et al. 2000).



The country institutional dimensions can be used to evaluate the differences between countries and to find out the strengths and weaknesses of the economies (Busenitz et al. 2000). This is important for the firms in transition economies, which are aiming at internationalization, as the perception of the institutional business environment of the firm's country may influence to the degree of internationalization of the firm (Shirokova & Tsukanova 2013).

### **3.4 Knowledge approach to internationalization**

It is suggested that the R&D intensity and focus on networks are necessary but not sufficient conditions for internationalization of companies (Filatotchev et al. 2009). As the technology and R&D orientation of the born global firm suggests, the new international ventures are also very often knowledge intensive organizations (Zahra et al. 2000).

The resource-based view (RBV) sees the company competitive advantage originating from the application of its available tangible or intangible resources that carry some value to the organization. The theory implies that the resources, which create the competitive advantages of the company, must be valuable, rare, inimitable and non-substitutable. (Barney 1991.) While the RBV considers all resources of the company, both intangible and tangible in the advantage creation, the knowledge approach sees the company's knowledge resources and the capability to utilize knowledge as main source in creation of sustained competitive advantages and superior corporate performance (Alavi & Leidner 2001).

The knowledge based approach suggests that in SMEs, the knowledge and human capital of the entrepreneur is an important factor, which affects heavily to the internationalization processes of the company (Westhead et al. 2001, Prashantham 2005). Especially tacit knowledge of the global opportunities of the entrepreneur and the capability to leverage such

knowledge in international markets sets the born global companies aside from the other SMEs and their entrepreneurs (Barney et al. 2001, Peng 2001).

### **3.5 Internationalization of transition economy SMEs**

To date the internationalization of emerging economy SMEs and international entrepreneurship originating from transition economies remains to be an understudied and not fully understood issue (Filatotchev et al. 2009, Kiss et al. 2012).

In the literature of international entrepreneurship of emerging economy businesses common is that the entrepreneurs' personal traits affect to the person's interest and motivation to start up an own business. The institutional environment and macroeconomic differences between emerging and developed economies on the other hand mostly explain the increasing amount of new ventures and their rapid growth on international markets (Kiss et al. 2012).

For internationalizing transition economy SMEs, networking seems to as important as to born global companies from the developed markets. To offset the hindrance of having capability deficiencies and fewer resources available, the emerging market SMEs are often seeking for alliances with foreign firms in order to perform better in the home markets, to gain more ground in international sales (Barney et al. 2001, Lee et al. 2001) or to overcome institutional burdens in the home country (Danis et al. 2011). It is also known that global networks, knowledge from markets abroad and international experience are factors, which drive transition economy entrepreneurs towards international markets (Filatotchev et al. 2009).

### 3.6 Internationalization stages

In a sense, the basic premise for all development done in the business world is finding opportunities, followed with taking an advantage of the opportunities. The same premise goes for internationalization of a company. In a very simple framework, internationalization could be differentiated into two stages: opportunity identification and subsequent opportunity exploitation (Santos-Álvarez & García-Merino 2010).

Internationalization could also be defined as a process of increasing involvement in international operations of the firm (Welch & Luostarinen 1988). From a traditional point-of-view, the process for internationalization involves stages that the company goes through, as the degree of internationalization increases. There are a few streamlined models, that depict the traditional (not born global) approach to internationalization. These models which have a slightly different point of view are represented in Figure 7. The essential message of these models is that the company and its management move gradually from low commitment activities, meaning irregular export to psychologically close countries, to high commitment activities, such as organizing overseas production and exporting goods to more difficult markets that psychologically more distant from the home country. (Johanson & Wiedersheim-Paul 1975, Bilkey & Tesar 1977, Cavusgil 1980.) These models however, are criticized of being mainly applicable to resource rich large scale enterprises, and not so much to the modern new business ventures and networked small companies that begin their lifecycle by being internationalized (Oviatt & McDougall 1994, 1995). Also, another issue that is criticized in the models is the lack strategic freedom of the managers operating in the internationalizing firms. They represent internationalization process as if the individuals in the firm would not have a choice to follow other strategies. (Andersson 2000.) However, the models still provide a decent framework for assessing how involved with international markets and activities a given company is, even though the company would not follow the suggested path towards more commitment.

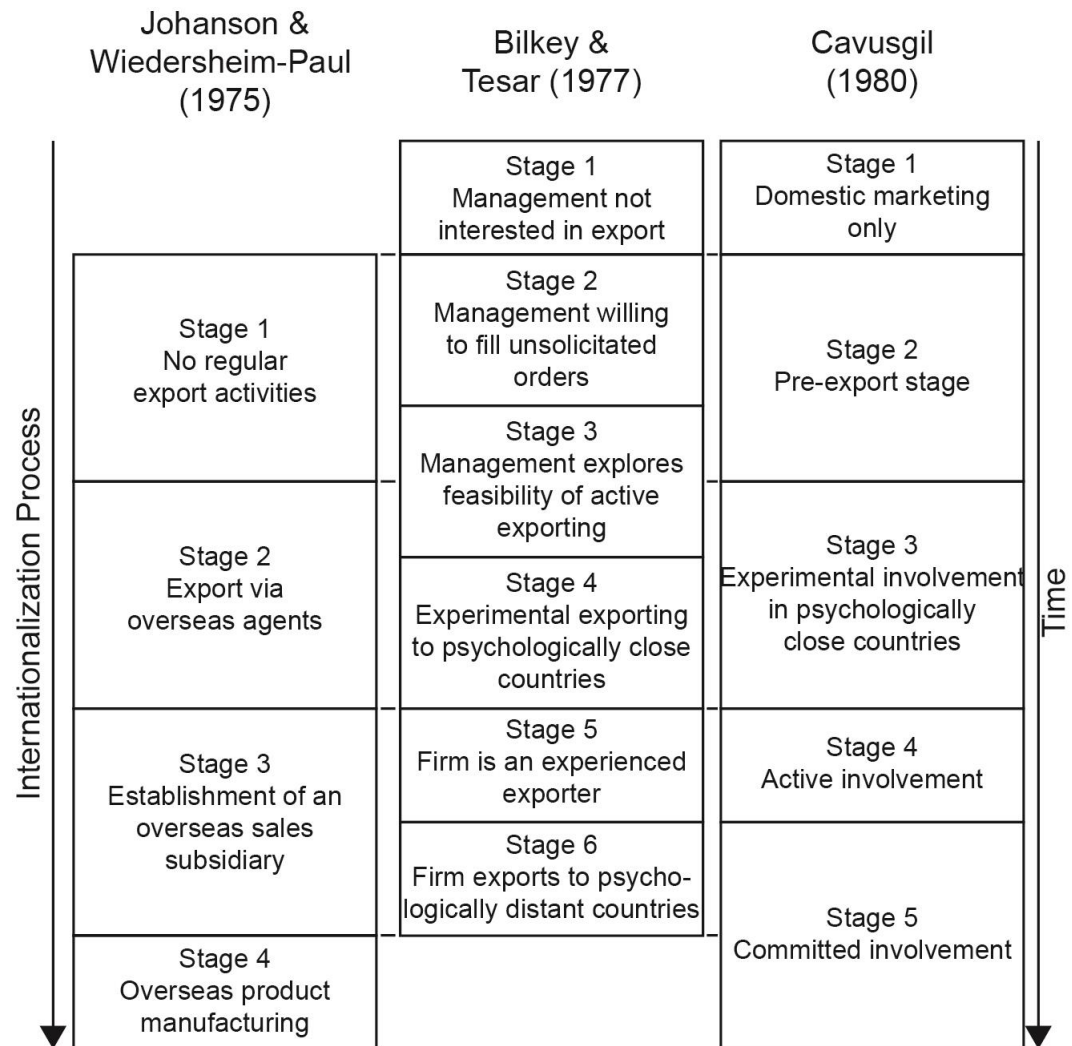


Figure 7. Internationalization process models. Adapted from Bell (1995).

## 4 METHODOLOGY AND RESEARCH DESIGN

The ultimate aim of any research is to answer a question or address a problem. The research problems are solved and questions answered usually by obtaining and analyzing relevant data of the phenomenon that is under study. The data collection however, can be done in various ways and by utilizing various methods and research strategies. (Saunders et al. 2009.) This chapter presents the methodological and research design choices that were done in order to answer to the research questions.

#### 4.1 Research methodology

To describe the methodology utilized in the thesis, a research design framework suggested by Saunders et al. (2009) is utilized. Figure 8 represents the research design choices that the author has done to tackle the research problems.

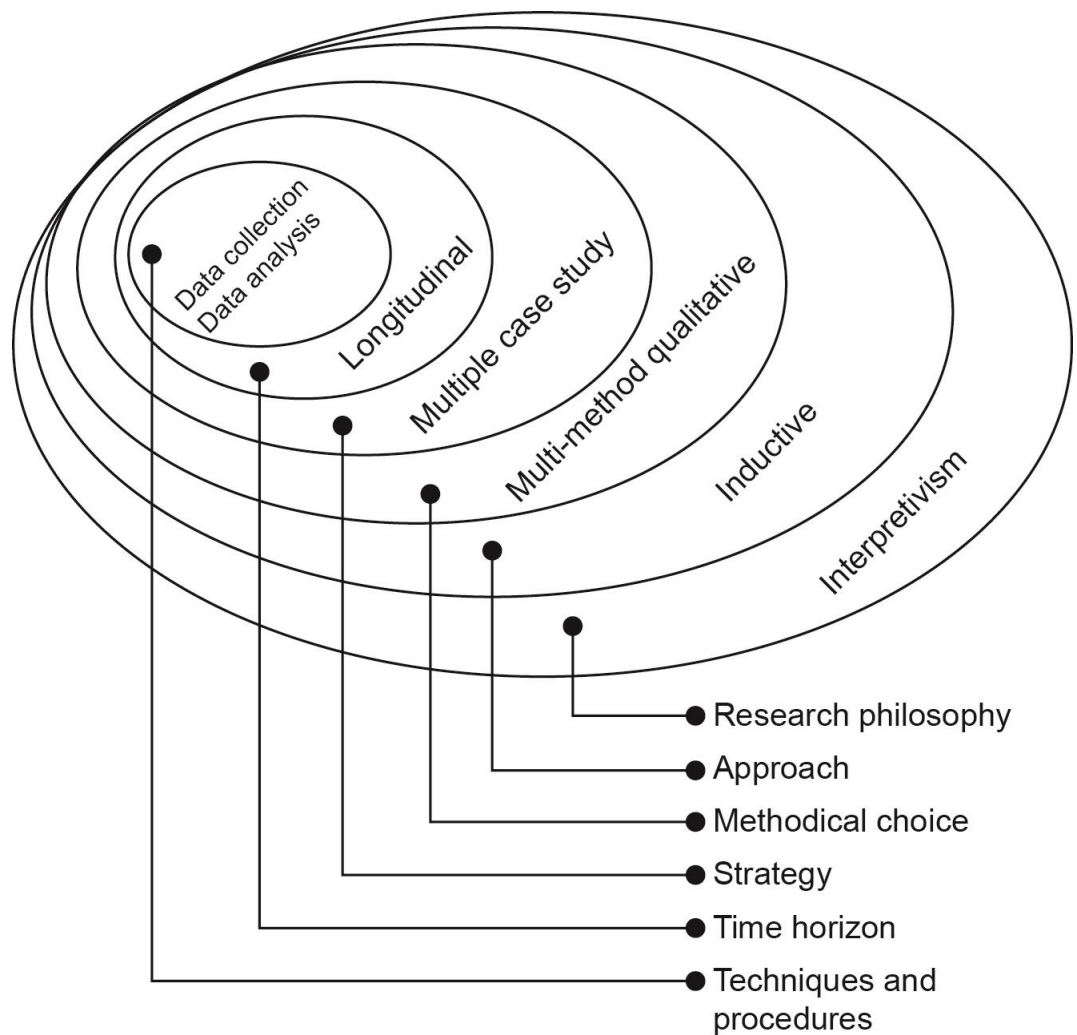


Figure 8. Research design choices of the study. Adapted from Saunders et al. (2012)

*Research philosophy*

The research philosophy is the outermost layer in the research framework. The philosophy answers to the question how the researcher views the world and what constitutes acceptable knowledge of the researcher's point of view. These assumptions will underline the research strategies and methods that are chosen as part of that strategy (Saunders et al. 2009).

The research philosophy utilized by the thesis writer is interpretivism, which usually requires an empathetic stance, as the interpretivist researcher enters the social world of the research subjects and aims to understand the world of the research subjects from their points of view. The interpretivist is more concerned with gathering rich insight into the subject, rather than coming up with law-like generalizations. (Saunders et al. 2009, Saunders & Tosey 2012.)

Interpretivist perspective is often times appropriate in business management research as the interpretivist sees business as complex and unique situations which consist of particular set of circumstances and individuals who coincide to be part of the same situation. Interpretivist studies most often utilize qualitative research techniques, focus on small samples and in-depth investigations. (Saunders et al. 2009.)

### *Research approach*

The two main research approaches the researcher may follow are induction and deduction. While deduction aims at testing existing theories through hypotheses, induction is the research approach, where the researcher aims to find out what is going on and try to understand the nature of the problem better. In induction, the researcher makes sense of the data collected, analyses the data, which results in the formulation of a theory, which is an abstraction of reality trying to depict what is actually happening. Induction usually emphasizes close understanding of research context, the collection of qualitative data and more flexible research structures, which allow changes to the research emphasis during the research process. In inductive

studies, there usually are less concerns of the need to be able to generalize the results. (Saunders et al. 2009.)

#### *Methodical choice*

The methodical choice is choice of research design, which describes the nature of data the researcher will collect and analyse. The different data is divided into quantitative and qualitative ones. Whereas the quantitative data involves numerical data, the qualitative method involves data collection and data analysis of other than numerical data, meaning words, pictures and video-clips for instance. (Saunders et al. 2009.)

The theses' methodical choice is multi-method qualitative, where several different data collection methods are utilized, instead of just one source and type of data. The aim of utilizing multi-method data collection techniques is to triangulate the data to corroborate the study findings (Saunders et al. 2009).

#### *Research strategies*

The research strategy in the thesis is case study. Case study is a strategy for research that involves empirical investigation of a certain contemporary phenomenon within its real life context, which utilizes multiple sources of evidence (Robson 2002). Given the importance of context in case studies, the boundaries of the phenomenon under study and the context within which it is being studied are not necessarily that clear (Yin 2009.)

The case studies are often used in exploratory research, which aims at finding out what is happening by seeking new insights and assessing phenomena in a new light from before (Robson 2002). Thus, the case study seems to suit the purposes of this study.

#### *Time horizon*

The time horizon of the study is either a cross-sectional or a longitudinal one. Cross-sectional studies focus on studying the phenomenon at a particular time, while the longitudinal one tries to study the phenomenon and its development over a longer period. (Saunders et al. 2009.) As the technology transfer process of a company is usually a rather long process, and the researcher wants to find out the factors which initiated the process and the challenges while the process was on going, the time horizon of the study is longitudinal.

## **4.2 Techniques and procedures**

The final layer in the research design framework is the techniques and procedures, which describe what is actually done to collect and analyze the data in the thesis. This chapter will discuss the choices that were done in the data sampling, data collection and data analysis.

### **4.2.1 Sampling**

The goal of all theoretical sampling is to choose cases, which are likely to extend or replicate the emerging theory. Thus, in case studies the sample should not be random, but chosen specifically to support the creation of the theory (Eisenhardt 1989, Yin 2009). The cases should be either selected so that they predict similar results, or that they produce contrasting results, but for anticipatable results (Yin 2009). It is often that cases from the extreme ends are the best in providing information for theory generation in case studies. (Eisenhardt 1989.)

The sample for the data collection analysis consists of Russian entrepreneurs, who have established a small business in Finland and have conducted cross-border technology transfer from Russia to Finland.



The number of such entrepreneurs is to date very small. The total number of such entrepreneurs in Finland is unknown, and somewhat difficult to find out, but the researcher was able to find out some 16 cases in Eastern and Southern Finland, which might suit the description of the Russian SME technology transfer entrepreneurs.

The initial screening for the sample was conducted through contacting several Finnish and Russian business support organizations and universities in Joensuu, Lappeenranta, Hamina, Helsinki and St. Petersburg. The persons that were contacted were asked to provide some names of companies that they would know to be based on Russian technologies, or to provide contact details of another person, who would know such projects. Secondary sources for finding the companies for the sample were web based searches, attending to Finnish-Russian seminars and reading Finnish business related newspaper magazines and articles. The result of the initial screening was the mentioned 16 companies.

The second screening round focused on the set of these 16 firms. The researcher wanted to make sure that there is enough information available from the companies, in the forms of newspaper articles, case stories and company web sites for example. This was done to ensure the possibility for triangulation, and to make sure that the company and the entrepreneurs in Finland have already some years of operation behind them, to be able to provide information related to the technology transfer process.

Out of the 16 companies, eight seemed to be distinctively suitable for the study. The companies filled the prerequisites, they had technology that was developed in Russia and transferred it to Finland, they had established a company in Finland, which had at least a few years of operation behind them, and there was at least some secondary data available of the companies.

The eight companies were contacted to ask a possibility for an interview, preferably with the entrepreneurs or the CEO of the Finnish company.

The final sample for this study was four technology transfer cases, which involved three Russian companies, one Russian university and the four Finnish companies which were the targets of the technology transfer.

#### **4.2.2 Data collection**

The data collection methods for case studies are usually very flexible and opportunistic; the data is collected from everywhere it can be. Case studies typically combine different data collection methods including archives, interviews, questionnaires and observations, where the data can take either quantitative or qualitative form. What is of essential importance in the theory creation based on case studies is the triangulation of the collected data, meaning that the collected and analyzed data from one source is compared to another, to either verify or deny the finding. (Eisenhardt 1989.)

The main data collection was conducted through semi-structured interviews with the sample respondents. The interviews were based on semi-structured interview forms with open-end questions (Appendix 2) that promote discussion. The interview form is divided into several themes, all containing some supportive questions to the theme if discussion of just the topic does not provide enough data.

The semi-structured interviews are based on a list of themes and questions to be covered, but which can vary from interview to interview, due to the different nature of the respondents and the flow of the conversation (Saunders et al. 2009).

The primary data regarding the four technology transfer cases consists of six interviews. The initial aim was to conduct interviews only with the Finnish companies' entrepreneurs, but due to different locales and rather tight

schedules, the research includes four semi-structured interviews that were conducted face-to-face, one email interview and one web conference interview, which were more focused and structured, to pinpoint the lacking of data from the initial interview.

The semi-structured interviews covered all research topics and were conducted with the persons, who run the daily business of the companies in Finland. The two supplementary interviews were conducted with the entrepreneurs, who were not available for a face-to-face meeting and focused on the topics that could not be covered in the first one

The interviews were conducted either in Russian, English or Finnish, and were located in the office premises of the companies. The data was recorded by a tape recorder and transcribed to written format for further analysis.

The secondary data gathering regarding the technology transfer cases was conducted after agreeing on the primary interviews, and before the actual interview date. The secondary data mainly consists of materials the case companies in Russia or Finland have produced (web sites, brochures, seminar presentation slides etc.), and newspaper articles written about the companies and entrepreneurs that are based on interviews of the entrepreneurs.

#### **4.2.3 Data analysis**

For each of the cases several topics were analyzed. As the theories of technology transfer and internationalization suggested, the entrepreneur, the technology and the both host and recipient environment deserve much attention in the study. The themed interview form will support the analysis phase, as the aim of the interviews is to get information related to important aspect of the internationalization and technology transfer.

For more reliable analysis results, the researcher has to go deeper than the first impression over the data (Eisenhardt 1989). In the study, this is achieved through cross-referring the impressions from the cases to each other, and to external data in secondary sources.

The data analysis of the transcribed data was conducted through a categorization process, where the primary and secondary data were read through and coded to different categories, based on the key issues of the theories behind the phenomenon.

The actual research problem of the thesis was not finalized when the interviews commenced, it was decided upon most of the interviews were conducted. This is common for inductive studies, as the research goes ahead to the data gathering early on in the study, and the issues and themes that are important to follow emerge from the data (Saunders et al. 2009).

At first, the research cases were studied individually by applying the research questions to each case. After finding out the characteristics of each of the cases and the motivation and challenges of the entrepreneurs, cross-case conclusions were drawn to address the research questions related to the whole phenomenon.

#### **4.3 Justification of the empirical methods used for research**

In the thesis, several Russian entrepreneurial technology transfer projects were analyzed utilizing the methodologies from case studies. Case studies are usually conducted utilizing qualitative research methods. A qualitative approach suits this study, as the issue at hand can be observed and interpreted, but cannot be quantified easily due to the small number of practitioners who are involved in the study issue. The qualitative approach is also supported by the fact that the phenomenon of international

technology transfer is very complex, and the context of the case study is very specifically limited (entrepreneurial technology transfer from Russia to Finland).

In addition, the issue of SME and entrepreneurial international technology transfer from transition economies to developed markets is fairly recent and understudied issue. Thus, an inductive case study method suits to the purposes of the research. The aim of an inductive study is to forge theories out of observations done of the studied subject.

Sampling of the research also calls for a flexible research structure, as at the beginning of the research it was unknown, what kind of companies or projects there are. It was beforehand impossible to decide on which type of companies or industries the research will focus.

## **5 EMPIRICAL RESULTS**

This chapter presents the empirical results of the thesis by going through the four case studies and their technology transfer projects. The chapter addresses each of the research questions separately, first looking into the characteristics of each case separately, and second combining the characteristics by some cross case conclusions. As it was found out in the theoretical findings, international technology transfer by SMEs should consider the aspects of entrepreneurship, internationalization, the technology in question and the issues related to the technology transfer.

Second part of the chapter will discuss the motivation for the case companies' technology transfer from Russia to Finland. The motivation for the company or entrepreneur to engage in internationalization and technology transfer is basically caused by two different types of motivation, the entrepreneur's or the company's own motivation and the macro level

external drivers. The empiric findings on the second part will be based on the primary data, but takes into consideration also secondary data, as the research question also aims to find out some differences in the Finnish and Russian business and innovation environments, and what causes such movement.

The third part of the findings is to answer the third research question and highlight the challenges the Russian entrepreneurs face in their internationalization and technology transfer to Finland.

Due to the reason of anonymity requirements of the cases, the author is not able to provide detailed information of the primary or the secondary data sources and their availability, thus there are no citations in the following passages. The passages considering each of the cases are all based on the interview data, the secondary data and the analysis results of the author. The primary and secondary data sources considering each case are represented in table 2.

<b>Primary data sources</b>	<b>Type of data</b>
CASE A	Face-to-face interview with the project manager of the Finnish case company
	Internet aided interview with the business development manager of the Finnish case company / Internationalization project manager of the Russian case company
CASE B	Face-to-face interview with the CEO of the Finnish case company
CASE C	Face-to-face interview with the business development manager of the case company
	E-mail interview with the CEO of the case company / technology rights holder
CASE D	Face-to-face interview with the CEO of the Finnish and Russian case companies / technology rights holder
<b>Secondary data sources</b>	<b>Type of data</b>
CASE A	Company presentation slides 2012
	Product presentation slides 2013
	Finnish case company web-site 2014
	Russian case company web-site 2014
	Entrepreneurs' professional social media profile 2014
CASE B	Entrepreneur's videotaped speech at factory opening. 2013
	Online newspaper articles 2011-2014
	Finnish case company web-site 2014
	Russian case company web-site 2014
CASE C	Product brochures 2013
	Finnish case company web-site 2014
	Online newspaper articles from 2011-2013
CASE D	Product brochure 2013
	Company presentation brochure 2013

Table 2. Primary and secondary data sources utilized in the results section

## 5.1 Characteristics of Russian SME technology transfer to Finland

The characteristics of the case companies are discussed in subchapters 5.1.1 through 5.1.4 by describing the technology transfer cases thoroughly.

The issues covered in each case are the case description, which displays the basic information of the company, industry and the technology transfer project, the characteristics of the entrepreneurs or management team in each case, the technology traits, the peculiarities of the case's technology transfer and internationalization. After covering each case individually, cross case conclusions are drawn in chapter 5.1.5 to answer the first research question: *What characterizes the SME technology transfer from a transition economy to a developed market?*

### **5.1.1 CASE A – Speech technology solutions licensee**

The first case is Finnish, newly in 2011 established company, specializing in software and hardware for versatile speech recognition and other related speech technologies. The company is independent, whose shares are not owned by any Russian companies, but the main partner of the company is a Russian, world leading company on the same sphere. The Russian company's product portfolio spans over nine categories of products and has over 20 individual product lines that they are serving to the markets, in addition to some speech analysis related services. The product portfolio of the Finnish company is not fully the same, but the products are based on the technologies of the Russian partner company. The solutions for sale are branded under the Finnish company's name, and no reference to the Russian partner company is made in the website. Also, rather than describing the technological aspect of the product in its names as the partner company does, the Finnish company utilizes naming strategy which more describes the type of customers for which the solution is intended for. The solutions that the Finnish company is selling are language independent and could be sold to any market regardless of the language there. This is due to the fact that software for language and speech recognition requires huge databases and complicated software to decipher the speech.



The Russian partner company's main functions are based in Russia, where the technological research and development and product manufacturing mainly take place. The Finnish company's aim is at the moment not to develop the technology further, but rather to promote and sell the technology to European customers. The Russian partner company has also agreed on multitude of partnerships all over the world and has established sales offices in the United States and Germany, which are directly under the Russian company's direction. The Finnish company, however, is not under the ownership of the Russian technology company and the Russian partner doesn't have stakes on the Finnish entity, even though the owners of the Finnish company are those that work also in the Russian technology partner company. In the eyes of the Russian technology partner, the Finnish company is similar to its other partnerships where the technology is licensed to use.

#### *Case A - Entrepreneurs and personnel*

The Finnish case company is managed by two persons, both also working in the Russian partner company. The CEO of the company has worked for more than 20 years in the Russian parent company and the Business Development manager, which is basically running the business on a more practical level has worked around four years simultaneously for the both companies. The CEO's role in the Russian partner organization is the vice president of sales and marketing and the business development manager is working as senior manager in international projects. The managers' business experience comes from mostly sales, marketing and management and neither of the managers have engineering or information technology background. Also contrary to the other cases in this study, the team of entrepreneurs in Case A cannot be considered as owners of the technology. In addition to business experience, both of the entrepreneurs hold a degree from higher education, and it is noteworthy, that the business development manager has done her master's degree in Turku before establishing the company. This was one of main factors of choosing Finland to base the

separate enterprise. These two factors most probably explain the role of the Finnish company as a sales oriented organization, rather than technology developing company. I would assess that the entrepreneurs in the Finnish case company are not key figures in the development of the key technology. The entrepreneurs of course are responsible for the business development and solution development of their own company, but the for the advancement of the core speech technologies the entrepreneurs do not have such control.

The company employs a variable amount of personnel. Much of the manual work done in the company is related to issues that the company's software cannot handle. These work tasks include some transcribing and translations for example, which are taken care of by freelancers and students. The company employs one permanent project manager, whose location is in the company's Finnish office. The entrepreneurs visit the company frequently, but are away most of the time.

#### *Case A - Technology*

As described in the case description, the Case A's technology bases upon software and hardware, which deals with sound and more precisely human speech. The solutions of the company are either full software or a combination of software and hardware aimed at recording, understanding analyzing and transmitting and human speech. In Case A, no manufacturing devices or research and development capabilities were transferred from the Russian technology partner to the Finnish company. The technology transferred to Finland mainly fully market tested products and solutions. The markets for only speech recording technology have already saturated, but for example automated speech analysis and biometric recognition are still taking their first steps towards larger markets from specialized use. These, more special technologies that the Russian technological partner is currently developing are still on the ascent phase and see continuous innovation and development. According to the interviews, Russian

technological partner's technology is from certain parts very advanced on the world scale, as the overall industry is claimed to be primitive by the focal parts.

The transferred technology is currently being utilized in Finland on its own, and also provided to end customers as a part of a larger composition of electronic systems. These larger systems are provided in cooperation with a Finnish consortium.

#### *Case A - Technology transfer*

As was discussed in the case description, the technology transfer in the case basically happens between a licensor and a licensee. On the organizational level, the transferor, the side which sends the technology is the Russian, well established company which mainly develops the technologies further and licenses the technology for its partners for utilization. The transferee, the receiver of technology in Finland on the other hand, is a private company, established in separation of the Russian partner company. However, there is a strong link between the two companies, as the entrepreneurs of the Finnish entity are also working on the payroll of the Russian technological partner company.

The technology was and is transferred between these two entities by licensing agreement, which does not make the Finnish entity the owner of the technology, but rather able to utilize the technology in their own solutions for financial gain. Another mechanism of transfer between the companies could be characterized as personnel exchange, as the technology was familiar to the entrepreneurs already before hand from the work in the Russian company.

Currently the transferred technologies are all in the forms of solutions that could be sold to customers without extensive piloting or trials. Some tailoring of course is needed to apply the solution for the customer, but in a sense

the products are market tested prior to the transfer. This indicates that the technology transfer stage in case A would have been in the adoption stage, where markets are already utilizing the technology and getting wider in the application process.

#### *Case A - Internationalization*

Prior to the decision of establishing a company in Finland, one of the entrepreneur was studying her master's degree in Finland, where she noted the Finnish business environment to be a well supporting one towards new businesses and technologies. The entrepreneurs also learned about the possibilities of R&D investments and support that the local institutions can offer for new businesses. These issues combined with the benefit of visa and staying permit support of owning a business in Finland were the factors that drove the entrepreneurs to establish a company in Finland.

The decision to open up an office in Finland was the decision of the two entrepreneurs, rather than the Russian technological partner's aim to internationalize its operations. The relationship of the two companies is solely that of a supplier and distributor. The interview revealed that very little support after all was given to the Finnish company by the Russian technological partner, even though the entrepreneurs are working for both of the companies.

During the early days of the business, the company took part in a project that was aimed at commercialization of Russian innovation. However, the entrepreneurs felt let down by the role of the Finnish governmental institutions in the project. The entrepreneurs claimed miscommunication of the support that the institutions were actually giving to companies. The case company however established a separate support network and found partners from Finnish universities and private consulting company, who could give more support to the entrepreneurs in growing the business up.

At the very beginning, one aim for the establishment of the business to Finland was to develop the technological solutions further and utilize the Finnish support mechanisms that aim at development of new technologies and innovations. However, the attempts to enter such programs with the case technology failed, causing the company to focus on the sales of solutions, rather than heavily developing of them. The sales in Finland however were not achieved immediately. The entrepreneur described that the company changed its customer strategy and approach several times during the first year, as they did not get adequate market responses. The results started to form up when the company launched the partnership with a private consulting agency to do market assessments and guide the company towards right kind of market and solutions to be offered for the potential customers.

### **5.1.2 CASE B – Strategic expansion of a medicine producing firm**

The Case B differs very much from the Case A when it comes to the internationalization and technology transfer issues of the project. The main parties in the case are a Russian medicine researching and manufacturing company with a history of couple of decades, and a few years back established Finnish company which is beginning to manufacture the medicine developed by the Russian company. The two companies share the same name, but the Finnish company is not in direct ownership of the Russian entity. The private owners of the Russian company are also the main owners and decision makers in the Finnish company.

The establishment of the Finnish company happened in 2009 in South-East Finland, the company aiming to become the manufacturer of medicine for the Russian markets. For the manufacturing purposes, the company needed to acquire suitable premises and adequate machinery for the manufacturing purposes. Thus, in 2010 the company purchased a vacant manufacturing space and begun massive renovation project to transform

the former engineering workshop into a medicine factory. The building project spanned over two years, finishing in 2012 and resulting to vast reforms in the inner space of the premise.

After the renovation project, the company started to ship in the manufacturing equipment to build up the production line. The finished production line is to start producing medicine in the form of capsules, according to the specifications of the Russian company and its product patents. Building up the production line and ramping up production however is not enough for the company to operate in Finland. Any facility producing medicine will have to apply and follow the standards set by the European Union. The company also started to apply for the quality certificate immediately after finishing of the renovation work. The concession was issued to the factory in 2013, allowing the factory to manufacture the medicine since then, but due to various problems in the manufacturing machinery and their installation, the launch of production had not yet started in the beginning of 2014 when the interview was conducted.

The aim of the Finnish facility currently is only to manufacture the medicine to serve the Russian market demand of the medicine. Neither of the companies hold permits to sell the products in the European Union, and this is clearly stated to not be the intention of the international expansion and technology transfer. The research and development of the medicinal products takes fully place in Russia, while the Finnish facility remains as a producing unit.

The Finnish company currently employs 14 people, out of which six are engaged in the daily production process. Currently the personnel in Finland include four Russian operators, who were transferred to Finland from the Russian production facility. The task of the Russian operators was to help in the technology transfer to establish the Finnish production line and to find the correct settings for the machinery. At the same time, these Russians are acquiring and building up their knowledge of the European Union standards

and quality management issues, as the company aim is to make most out of the personnel exchange.

#### *Case B - Entrepreneurs and personnel*

The current operations of the Finnish company are managed by a Finnish-Russian CEO, who was hired for the job during 2012 after the finishing of the building project. The current CEO is responsible now for the financial and personnel management of the Finnish company, whereas the owners of the company do decisions related to strategy and overall direction for the company.

The owners of the company have extensive knowledge and capability of organizing and establishing a medicinal factory. The Russian counterpart of the factory has been up and running since 1989 as one of the first native Russian medicine research and manufacturing companies (Secondary data CASE B 2014) The current CEO is a professional of accounting and financial management of a company, which skills are very suitable for a such position where the company has ready established markets in Russia and no actual possibility of selling the products elsewhere. The role of the CEO is bit different in this case, in other cases the CEO is the main driver of sales and business development. In this company the CEO focuses on managing the daily business, finances and personnel, and acts as an actuator of the owners' directions and wishes.

The entrepreneurs had a lot of experience from operating in foreign markets, and with different kind of standards. Contacts in Europe and United States. The CEO did not know the industry at all, learning for two years.

#### *Case B - Technology*

The main technology that was transferred to Finland was the ability to produce the different kinds of patented Russian medicine. The technology

manifests itself in these patents and the tablets that are the outcome of the manufacturing process. The manufacturing devices themselves do not hold that central role in the technology, the devices that are used are regular medicine producing equipment that are utilized by many companies across Europe. The core of the technology lies in the recipes for the medicine, in the settings on the manufacturing equipment and in the process, or the sequence of steps that are undertaken in the production of the medicine.

The manufacturing devices for the Finnish company were acquired from Italy, Germany and Finland. The devices were designed and tailored for the purposes of the Finnish company. The equipment is quite similar to those utilized in St. Petersburg, but with updates and technological improvements. To assemble the manufacturing line and set the machinery to work in correspondence to the Russian regime of medicine manufacturing, some personnel skilled in the Russian company's manufacturing processes were required to come to Finland. For the technology to work, intensive testing was required of the producing process and the end results.

The acquired machinery is planned to be capable of manufacturing at least five different patented medicine for the Russian company. Most likely, any other medicine of the same type could be manufactured with this equipment, leaving much room for business development for the Finnish facility.

#### *Case B - Technology transfer*

The transferor in the case is the Russian medicine researching, manufacturing and selling company, and as the transferee a separate Finnish company, who is only manufacturing the given medicine. The common management and owner base links the two companies together.

The technology transfer between the companies did not manifest in any physical form. The knowledge to manufacture the medicine was in the form of recipes and knowledge of the Russian company's personnel. There was



no physical technology transferred from Russia to Finland when building the new factory. In order to create the production line in Finland, all equipment were newly purchased from Germany, Italy and Finland. Even though the machinery between the company differs, both of the facilities are required to produce exactly similar medicine. This requires a lot of attention, testing and quality management, and puts a lot of stress on key employees.

The main mean of technology and knowledge transfer between the companies was conducted through personnel exchange. Four operators were brought from the Russian facility to the Finnish one, with their task to begin utilizing and testing the new manufacturing equipment. The four operators are to stay in Finland for a few years to ensure the continuous functioning of the medicine plant and learn the quality management issues and European standards for medicine production facilities.

The case involves also a separate, outside consulting partner, who was to help the Finnish company to form a facility according to the strict European standards for medical facilities. The technology transfer speed and success depends heavily on the knowledge of these standards, and on how to put them into action in an actual, live setting. The operation of the newly established facility is exceptionally well documented, as the strict standards require strict codes and instructions for every day work in the facility. Vast amount of time was spent in the late days of the facility in this process of writing rules and operation schemes for the workers to follow in the facility.

So far, the capability to manufacture the already existing medicine has been the only aim of the technology transfer between the companies. The CEO of the Finnish company mentioned that there was a tryout to bring part of the research process of medicine to Finland to a third party laboratory, but without success, as the cooperation with the laboratory did not yield wished results. Currently the aim of the facility is to increase the production amounts and focus only on the manufacturing of the medicine.

### *Case B - Internationalization*

Initially, the Russian medicine company was not looking towards foreign markets for the factory establishment. The intention was to build a new facility somewhere in Russia, but for certain reasons the company decided to launch a building project in Eastern Finland.

As was mentioned before, the Finnish manufacturing company is a separate company and not owned by the Russian company and origin of the technology. The Russian company has a few shares in the Finnish company and has loaned some money to the establishment of the factory, but in a sense, it does not have power over the actions of the company. However the newly established business has the same owners as the Russian company, linking the two entities heavily together.

The internationalization of the Russian company to Finland is interesting, as the Finnish company was established solely to manufacture the same medicine as the Russian company. The market for the manufactured products is only in Russia and the company is not aiming to achieve sales in other markets by this move. The ready established markets for the products also support the decision to hire an accounting and personnel management professional as a CEO.

The internationalization and technology transfer is hindered vastly by the registrations and licenses required in the medicine manufacturing business. The process of registering a product to market takes a lot of time.

All of the R&D capacity is retained in Russia at this time. The Finnish facility is to only produce the given medicine. The plans include only testing the manufacturing capabilities with new medicine from Russia, not to develop them in Finland from the beginning. Being a manufacturing unit, the CEO also recognizes the possibility of operating as a subcontractor in the medicine production for other companies of the same industry, as the capacity of the premise is currently not being utilized to its full potential.

According to the CEO, one of the main challenges in the establishment of the manufacturing was the registrations and licenses the company had to acquire in order to be approved as a medicine producing company in the European Union. The company first utilized the help of a consultant from Czech Republic who had run similar technology transfer projects from Russia to Czech Republic, but in lack of knowledge over the Finnish business environment the project dried out quickly. As the European Union standards were still not familiar to the managing team, they decided to hire a Finnish consultant from the medicine industry to guide them during the building and testing process. Another organization which guided and helped the internationalization and technology transfer was the Finnish technology agency TEKES, which input monetary help and connections into the development of the company. The finances were covered by the entrepreneurs and loans from the Russian company, fully from Russian sources.

### **5.1.3 CASE C – Full technology transfer of heat exchangers manufacturing**

The third case displays perfectly how a single entrepreneurial person studying technology can benefit greatly from two very distinct innovation and business environments. This case company was established in Finland in 2009 by a young Russian doctor of technical science, who currently is the sole owner of the technology rights and patents which the company is currently utilizing. Other important personas in the early journey of the company include two Russian private investors and a Finnish-Russian management consultant. The firm currently is manufacturing its patented stainless steel heat exchangers in its rented premises in North Karelia, Finland, and running the sales operations from the same locale.

This currently operating company however, was not the first company which aimed at the commercialization of the same technology. The same Russian

entrepreneur had a previous tryout in Finland, which also aimed at manufacturing the products, only with a different composition of managers. The first company tryout however failed in the early journey, and was shut down.

Soon after, joined by the Finnish-Russian management consultant and the private investors, the Case C company was established in 2009. For the purposes of establishing and managing the newly created company, the entrepreneur made a decision (which was not the case in the failed company) of permanent moving from Russia to Finland. This allowed the entrepreneur to use more time in the development of the company and also made it possible for him to participate in other company projects.

The first year and a half of the company operations were basically building relationships, networks and acquiring funding from the Finnish governmental support services. The company started renting a manufacturing and office premise in 2010. The space itself was formerly in manufacturing use so it did not require a lot of changes. The main challenge in the establishment of the production line was in acquiring and building up the machinery required in the process. Most of the machinery in the manufacturing line was developed internally, and built in Finland to suit the purposes of the company. In late 2011 an opening ceremony was held in the factory, as the plant achieved full functionality by then. In early 2012, the company could begin selling their core products, the stainless steel heat exchangers. In late 2012 first full heating systems based on the heat exchangers of the company were shipped and built to the premises which were to pilot the operation of the full heating system.

An important factor in the success of the case company is a separate business venture managed by the previously mentioned Finnish-Russian management consultant and the Russian technology owner. The aim of this consultancy is to search, assess and evaluate the validity of Russian technologies and help to bring them to Finland for commercialization. Being

established at the same time as the case technology company, the two entrepreneurs begun growing and managing two businesses at the same time, another solely focusing on the stainless steel technology and manufacturing and another on supportive tasks that a Russian owned venture in Finland would require. The common management in the two companies allowed certain financial flexibility and security, as in the early days of both of the company projects time and money were scarce resources.

The main differentiating factor from the rest of the cases is that in Russia, there was no company that would have been utilizing and operating based on the same technology. The main innovation was created in an academic setting without a company to drive the innovation forward. The Russian entrepreneur sought after establishing of a factory and commercializing of the technology in Russia, but was faced with serious difficulties and restricting issues, mainly from the financial and infrastructural sides, which caused the decision of establishing the company abroad instead of Russia.

Another differentiating factor from the rest of the cases is that the company practically had very little to transfer from Russia to Finland technology-wise. There was only a basic concept of how to make such a heat exchanger, one piece of key machinery and couple of prototypes that could be tested for initial results and efficiency. The starting position of the project was clearly at disadvantage as there was no supportive organization across the border that would have an idea of how to manufacture, use and sell the technology products further. These basic issues were something that the case company entrepreneurs had to come up during the process of establishing the factory and sales of the products.

### *Case C - Entrepreneurs and personnel*

As mentioned before, there are two entrepreneurs in the case, a Russian doctor of technical sciences and a Finnish-Russian management

consultant. The doctor of science had come up with the technology during his work in the university, and had written his doctoral thesis on the subject. The doctor currently acts as the CEO of the Finnish company, is the owner of the patented technology and is permanently living in Finland. The second entrepreneur also has Russian heritage, but she has been living in Finland for around 20 years now. Having degrees of engineering, business and entrepreneurship from both Finland and Russia, she is a crucial person in the management of the company, as she understands both the Finnish and Russian culture and way of operating in these two countries. Currently she is a minor owner in the company, and mainly deals with the development of the Finnish side of sales and cooperation. The CEO had little experience of operating in foreign countries before entering in Finland, but the development manager had in previous work positions operated in international projects, mainly in Finnish-Russian context.

In addition to the entrepreneurs, the company practically employs five other people, a technical designer, a Finnish-Russian project worker/management assistant and three employees who are mainly involved in the manufacturing of the products. The technical designer was in a critical role in the early development of the manufacturing line, as many some devices and many parts to existing machinery had to be developed uniquely for the new manufacturing line. The designer also was a part of the team that was developing the machinery to produce the prototypes in Russia.

### *Case C - Technology*

The core technology of the case company is embedded in the machinery that produces the stainless steel heat exchangers, and more specifically in one single device, which differentiates the production method from other similar types of production and products on the market. The innovativeness of the product is in the manufacturing method, which allows the forming of the extremely thin stainless steel sheet. The so-called cold forming of a thin

stainless steel sheet is the central method in creating the products. Basically, the production line of the company turns a roll of stainless steel sheet into heat exchangers of various sizes. The heat exchanger in itself is formed out of two formed steel sheets welded together, with connecting piping in two corners of the product.

Some machinery for the production line was acquired from Finland as brand new, some of the manufacturing machinery is old equipment imported from Europe, and mounted with refurbished parts manufactured in Finland and some of the machinery were built up from scratch by Finnish machine shops. The core product itself is of no use, it must be installed in a system where some forms of heat transfer are required. For the purpose, the company has negotiated a wide supply and installation network, which provide the components for different kind of heat systems.

The CEO holds a worldwide patent, which protects both, the manufacturing equipment and the outcome products.

From the lifecycle approach, the technology is either in its development phase or the ascent phase. The product could be applied in transferring solar thermal energy or transferring energy between two different mediums. Solar energy technology is not diffused among the public too widely yet, the market for those solar application is far away from the saturation point. The heat transfer technology on the other hand has been utilized widely in many applications, but extremely thin stainless steel as a material technology has only in the recent years seen crucial development as a heat exchanger material

### *Case C - Technology transfer*

By the technology transfer characteristics, the case C is an interesting one, as the technology was transferred fully to Finland. The transfer resulted in the technology leaving Russia to the full extent, leaving no right holders,

tacit knowledge, blueprints, patents or anything that could result in the replication of the technology in Russia. This was due to the entrepreneur's drive towards establishing the manufacturing business in Finland and wish to permanently stay in Finland.

In case C, the technology transfer did not necessarily happen between two distinctively different organizations, but rather the exchange was done from a context to another. Before establishing the Finnish company, the technology was under research and development at a Russian university. The CEO had written his doctoral degree out of the most crucial part of the manufacturing process, and come up with the technology there. The initial machinery at the time was capable of making a couple of prototype products, which could display the efficiency of the stainless steel heat exchanger. To actually commercialize the product, it was necessary to start serial production and to find suitable markets for the product. The development of the technology however stopped in Russia, as the project did not get grants, investments, loans or support from the Russian business environment. To advance further with the commercialization, the technology sought out to launch the project in another country. Thus a decision was done to establish a company in Finland and start commercializing the technology and establishing the mass manufacturing there.

The case C also differentiates itself by the stage where the technology transfer was conducted. The technology in question had gone through the prospecting phase in Russia. The material selection, form creation and key manufacturing process equipment were done when the technology transfer to Finland begun. The Finnish company begun the development stage by building up the manufacturing line and transferring the technology into marketable products as heating system components.

There were several transfer objects in the project. First of all, both the manufacturing technology and the product was under a Russian patent (which was later on extended to a worldwide patent). Along with the patent,



the technology rights holder shipped the core piece of machinery, which makes the creation of the product possible, and finally the entrepreneur brought a few prototypes of the product for testing and display purposes to convince the Finnish authorities.

The technology transfer project of case C also acted as a pilot project for the two entrepreneurs and their second company, the internationalization consultancy, which seeks for innovative technologies in Russia, checks their validity and helps them in company establishing and technology transfer to Finland. Having succeeded in the factory establishment of the heat exchanger producing company, they also attracted other Russian technology projects to enter Finland with their projects. According to the CEO of the consultancy, one of the projects is soon beginning its production and the second is in the phase of fund raising.

#### *Case C - Internationalization*

As there was no company in Russia from where the technology was transferred, there also was no organization that would have sought out internationalization through the establishment of the Finnish entity. One could characterize the case C's coming to Finland as an 'escape' from the Russian business and innovation environment, as the CEO was seeking out to a country which would be more supportive towards new technologies and new business ventures.

Even though there is no company of origin, so to speak, there still are issues related to the market entry of a foreign person and the internationalization characteristics of the new Finnish company that can be assessed.

According to the CEO of the case company, the opportunity identification of the possibility to enter the Finnish market and establish a company in Finland became evident when a representative of VTT Technical Research Centre of Finland had invited the CEO to Finland to present his project at a

university event. After the seminar he learned of the Finnish innovation system and the opportunities for investment support and R&D funding mechanisms, awakening interest towards the Finnish market entry. At the beginning of the project, the case company had utilized many of the Finnish support services, both financial and non-financial help organized by the Finnish support organizations as Tekes - the Finnish Funding Agency for Innovation, Finnvera and Centre for Economic Development, Transport and the Environment.

As mentioned in the personnel chapter, the case involved people from both cultures, the Finnish and Russian one with both language capabilities. The development manager considers the involvement of the bilingual and cultural personnel necessary and one of the factors, which allowed the success of the project in a rather short period. The skills and knowledge of Russian markets allowed also rapid internationalization of the Finnish company.

As the initial prototypes were developed in Russian Federation, the CEO of the company naturally has made connections in Russian markets already before establishing a company in Finland. In fact, contrary to the common issues of Finnish companies' problems of establishing sales in Russia, the Russian owned and established Finnish company can tackle many problems in the Russian market that are difficult for the Finnish companies. The key personnel in the company ought to know the behavior of Russian consumer and business environment, they speak the same language and are able to take advantage of business opportunities in their 'home markets' more efficiently than in the Finnish market. Main parts of the turnover the company in the case C generated in the first two years came from the Russian, Ukrainian and Canadian markets. All of which are markets where either the CEO or the private investors had contacts in.

The rapid internationalization of the Finnish case company was not only related to the sales of the products in foreign markets. The company also

utilized foreign operators in their supply chain and had foreign companies to ship crucial system components and even partially develop tailored components for the heating systems.

#### **5.1.4 CASE D – Strategic expansion of gas compression machinery manufacturing**

The case D is another example of two companies that are operating in both sides of the Finnish-Russian border, under the same name and owner base. On the Russian side of the border, there is a company which was established in 2002 to operate as a project development operator and contractor in the sphere of industrial refrigeration. In 2004, the company shifted its focus from being a contractor to manufacturing and selling of turnkey packaged compressor units for industrial refrigeration purposes, which is still today the main source of revenue for the Russian company. On the Finnish side of the border, the company shares the name and owner with the Russian one, but contrary to all the other cases, the life of the Finnish company begun already in the year 1995.

At the end of the 1990s, the entrepreneur had a company in Finland, which purchased, packed and canned Finnish fish products. These products were shipped and sold to Russia for wholesalers and further to retail markets. The operations of the fish canning business lasted until the early 2000s, facing an end in 2010 when the company changed its name to mark belonging to the same brand with the Russian refrigeration equipment producer and quitting the fish business. This also marked the “entry” of the entrepreneur into the Finnish market with the industrial refrigeration component manufacturing business.

The refrigeration industry had faced large restructuring in the early 2000s, as company ownerships had changed a lot. Large multinational corporations, who own businesses in a very versatile number of industries,

acquired the companies that were specializing only in industrial refrigeration. Prior to these acquisitions, the case entrepreneur was working as the director of a Danish refrigeration equipment manufacturing company. Soon after the company was sold to a larger controller, the entrepreneur quit the job and began working on his company in Russia. In a sense, the case technology transfer involves three countries and three companies, as the origin of ideology and technological know-how was learned by the entrepreneur in the Danish company, transferred to the personnel in Russia, and finally to Finland.

As the business of the Danish company was fused into the operations of a much larger international organization, the market had a need for very focused providers of equipment. The entrepreneur went on and continued operating in the same manner as the Danish company did, providing extremely focused services and equipment for specific purposes and working as a specialist subcontractor in larger projects. This operation method was not only tested to be functional by the markets, but allowed the company to serve also the customers of the Danish company, as the new Russian company, along with the entrepreneur, had the knowledge of these customers, their systems and equipment.

#### *Case D - Entrepreneurs and personnel*

The case D is the only case where there is only one entrepreneur running the operations of the case companies in both countries. The businesses he runs in Finland and Russia are self-managed and funded by him and banks. There are no investors or other personnel that could be considered to be part of the entrepreneurial team or senior management in the company.

The entrepreneur is originally from Ukraine, where he got altogether three different degrees from electrical engineering and digital systems, the highest one of them being a doctoral one. Later in St. Petersburg, the

entrepreneur took additional courses on refrigeration and got acquainted with the business that he is engaged today.

Starting from the year 1995, the entrepreneur had been a partial owner in a Finnish-Russian fish canning business. In 1997, the entrepreneur started working as the director of the Danish refrigeration component manufacturing company, gathering a lot of hands on experience from the industry. The acquisition of the company caused the entrepreneur to start his refrigeration business in Russia in 2002, expanding later in 2010 to Finland as well.

Currently the Russian and Finnish case companies are owned and run by the single entrepreneur has a staff of around 60 people. Most of the personnel are situated in Russia, while ten of the people are working in Finland. All of the staff is Russian speaking, also in the Finnish company, because refrigeration market in Finland is not that attractive for trying to achieve sales in Finland. As all of the staff speaks Russian, the internal communication in the company is easier to organize and many misunderstandings can be avoided.

The staff in the companies consist only of project developers, designers, engineers, service engineers, welders and metal processors. What is notable here is that there is no sales or marketing personnel in the company. These functions are carried out by the engineers and project developers, who are experienced technology experts and know all the details of the technology. It is also noteworthy that most of the personnel are not educated in refrigeration, but in compressor and turbine technologies which deal with compressing and moving gases around in the systems.

The entrepreneur stresses the importance of flexibility of the organization and staff to work in different situations and projects. This is emphasized by the continuous personnel exchange between Finland and Russia. Most of the workers in Finland have at some point worked also in the Russian organization. The possibility to move personnel in cross-border

organizations is also a good way to keep the people employed in case of shifts in demand on other markets. Also as noted in the other cases, the personnel exchange is a crucial part of technology transfer.

#### *Case D - Technology*

The equipment that case D companies produce and sell are central pieces of any refrigerating system. The company produces gas compressors, which could be described as the engines of the refrigerating systems, pumping up the cooling gases around the system. The equipment in itself is of no use. The compressor must be connected into a refrigeration system for the equipment to provide benefit to customers. The narrow field of technological focus was a conscious decision done by the entrepreneur in the early days of the business, as it was a way to differentiate from the large, multinational organizations who acquired many of the refrigeration equipment providers in the early 2000s and are in consequence very stiff organizations to develop further.

Most of the components in the case companies' manufactured equipment are purchased from other manufacturers in the supply chain of the company, but the most crucial elements in the technology are developed and manufactured in the house. The parts that are the most crucial in the compressors are the ones that are in touch with the oil that is utilized as the running force of the compressor. Thus, all of the case companies' products are equipped with in house developed oil separators, pressure valves and frame design, as these components are the ones that have a large effect on the efficiency of the full product.

The components that the product is comprised of naturally play an important part in the technology of the company, but the key technological asset in the company is the knowledge that the entrepreneur and his subordinates possess. Their knowledge of turbine and compressor technologies and applications allow them to combine the standard and self developed

components into the form of an efficient compressor for industrial refrigeration purposes. The manifestation of this knowledge is apparent in the final product.

The entrepreneur himself characterized his technology to not being an innovative one, as he claims that all other smaller manufacturers are operating in the similar way and utilizing the same components as he does. Thus, the entrepreneur has not applied for any patents to protect his designs or products.

From the life cycle point of view, the technology is in its maturity stage. The refrigeration industry is currently divided into large multinational operators and smaller, focused equipment manufacturers and providers who fill in these niches. The compressor technologies are also well established in the markets, seeing currently incremental innovations on the component level.

At the moment, the case D technology is specialized for the use of the refrigerating systems, but according to the CEO, the plans are to expand the product portfolio and start providing the same equipment for different purposes as well. The heavy-duty gas compressors of the company could be utilized also elsewhere with minor changes done to the structure of the equipment.

#### *Case D - Technology transfer*

The technology transfer of the case D is also an interesting issue to characterize. The technology in the case companies is embodied in the machinery that the company provides to its customers and in the knowledge base of the personnel and the entrepreneur who are involved in the compiling and manufacturing of the product. As the product in question is a packaged solution which is compiled out of several different components, there actually are no manufacturing equipment to transfer between the organizations. The technology transfer between the organizations takes

place through personnel exchange and through exchanging of technical documents.

As mentioned earlier on, the idea and core knowledge utilized in the business today, originate from Denmark from a company where the entrepreneur was working as a director. From Denmark, the market approach of the company and the knowhow of how to manufacture the gas compressors was taken to Russia along with the entrepreneur that quit the position in Denmark after the company was acquired. At this stage, there was no technological documents nor anything physical to support the technology transfer. Those documents were the property of the company who acquired the business.

After the transformation of the 1995 established Finnish business to extend the sales network and manufacturing capability of the packaged gas compressors, the Russian company and the entrepreneur had an easier task to set up a new business based on the same business model and operations. The technology transfer and business establishment were easier due to the fact that was already a brand to continue working on, existing product line to begin manufacturing and personnel that could with relative ease to move to Finland and start working on similar projects as their worker counterparts in the Russian establishment do. The aim of the Finnish facility is first to act as a “twin facility”, to be on the same technological and efficiency level as the Russian one. Later on, the aim of the Finnish facility however is to act as a test bench for new production methods, storage solutions et cetera. The new methods are then to be transferred to the Russian facility through the means of personnel exchange.

The technology transfer in the case happens between the two organizations, the Russian manufacturer and the Finnish manufacturer, who share the name and brand of products. Rather than just doing a one time transfer to get the production started in Finland, the entrepreneur is



promoting continuous technology transfer through personnel exchange and knowledge sharing.

The case's technology transfer stage was at the level of adoption. The brand and the products that the Finnish facility began to manufacture were already market tested, and sold to many locations from the Russian facility.

#### *Case D - Internationalization*

Both, the Russian and Finnish company in case D were clearly born global and had international sales from the very beginning. After the establishment of the Russian company, the entrepreneur could provide the new company's services and spare parts to service the customers of the Danish refrigeration company. The newly established company could take the benefit of the situation, as the smaller organization was a lot more flexible and knew the customers and the equipment they utilized well. Thus the role of the Russian organization began to clear out to the entrepreneur. It was to support the existing customer base, fill up the niches, and provide services for those companies who need equipment and care from a narrow field in refrigeration.

The entrepreneur currently is in a position where the company representatives and previous co-workers of the large conglomerate contact the entrepreneur ask for help and guidance in difficult technical questions and problems. The same goes for companies that were once customers of the Danish company, they rather stay in contact with a smaller, more flexible and focused organization than a large corporation who isn't necessarily even capable of providing the help needed for the customer.

As soon as the Russian case company started to deliver their own production, the turn-key gas compressors for foreign markets, they were faced some restrictions from the logistics side of business. Many of the importing and exporting duties in Russia are based on the weight, rather

than the value of the product. Thus, a seemingly low technology and low value equipment which is heavy weighted, faces in proportion larger duties than if there was a product with much more value and same weight. As the turn-key project sales to foreign markets started rolling out, the entrepreneur needed more space and a way to tackle the duty problems. The solution was to establish a facility with similar capabilities to the neighboring country Finland.

The Finnish market however is not a lucrative one for the company. The entrepreneur has evaluated that the demand in Finland for industrial refrigeration equipment is quite low, compared to other countries, due to the saturation of the markets and lower amount of businesses operating in Finland. Thus, the Finnish facility aims fully at foreign markets with its production. The division with the sales and service between the two companies is clear; the Russian facility and personnel takes care of the Russian speaking part of the world, and the Finnish one supplies equipment to the rest of the world.

From sales perspective, the Russian speaking part of the world is currently more important for the companies, as the entrepreneur has clear benefits of operating in home markets with technology products.

In the early days after the transformation of the Finnish business to correspond the gas compressor manufacturing, the entrepreneur did not seek help or support from the Finnish governmental organizations. This was because he was already familiar with the Finnish business environment and legislation, as the original company was established already 15 years ago in 1995. The transformation and setting up the manufacturing business was also done without any external help, the only network partners that participated in building up the premises were suppliers of equipment. After a couple of years of operation with the new scheme however, there emerged an opportunity to apply for funding for product development from

the local center of development and Finnvera, but the project never went through due to busyness of the entrepreneur at that time.

### **5.1.5 Cross-case conclusions on characteristics**

As the study is a qualitative one, and only four distinctively different cases were analyzed during the process, it is impossible to draw conclusions that could be applied to all of Russian SME technology transfer cases to Finland, or even less to other transition economy SME technology transfer cases. However, remembering that the initial screening of case companies in Eastern Finland resulted in only 16 companies that are based on technology developed by Russians, the sample of four companies can quite effectively point out some characteristics, motivational factors and challenges, which could be true for some of the Russian technology transfer cases. Similarly, it could be argued that the study findings have some relevance and similarity to other technology transfer projects, that originate from a transition economy SMEs and target newly established businesses in the developed countries, as the business environments in the transition economies are quite much alike.

The characteristics of all four cases that were discussed in the chapters 5.1.1 through to 5.1.4 are represented in a table format in Appendix 1. The characteristics analysis focused on the critical components of the international technology transfer. The issues that were looked into are the traits of the transfer leading entrepreneurs, including their amount, education, international experience, and roles of other personnel. The technology related issues include the type of technology, which embodiments the technology takes place, what is the core that is essential to the existence of the technology, where the technology can be applied and an assessment of the lifecycle the technology is in. Technology transfer characteristics describe the transferor, transferee added with the content, mode and stage of the transfer. Finally, the internationalization

characteristics describe the transferor's motive to internationalize their actions to Finland, the relationship between the two organizations, support utilized in the process, the functions which the Finnish company begun to fulfill and the markets that the Finnish establishment will aim to satisfy.

If we look at the common characteristics of the entrepreneurs/owners in the cases, it needs to be noted that the responsibility over the internationalization and technology transfer are usually shared among a few persons. Only case with only one single entrepreneur is the case D, where the entrepreneur had an existing business in Finland before turning it into the extension of the Russian facility. Team entrepreneurship is a good way to share the risk of a new venture, not only financially, but also by sharing the strategic responsibility, and psychological issues such as stress.

Second issue related to the entrepreneurs in the cases is that all of the entrepreneurs are highly educated, most of them having a doctoral degree from their subjects. All of the entrepreneurs, except for the case A, were also the original inventors or researchers of their respective technologies. Prior coming to Finland, the entrepreneurs had also gained a good deal of international experience, mainly from their own industries. It should also be noted, that the Finnish business environment was familiar for most of the entrepreneurs in the given cases, except for case B, where the entrepreneur/owners had only tourism related experience of Finland before setting up the business there.

Regarding other personnel, the case companies employ a little of Finnish personnel. In the cases B and C the manufacturing/production personnel mainly consist of Finnish people, but regarding management support and other office related tasks, the employees in the case companies are most often either Russian or Finnish-Russian personnel.

The technologies of the companies are quite versatile; all of the cases are operating in completely different industries. Three of the companies are

engaged in production with the Finnish facilities, producing some physical products and one, case A, is the only one focused solely on sales of the Russian products and services. In the production oriented cases the entrepreneurs are also the right holders of the technologies, which makes the relationship of the two companies a bit more entwined than in the case A. Out of the four cases, the case A's Finnish company is the only one operating under a license agreement of the Russian technology, whereas in other cases the right to utilize the technology in Finland is a self-evident issue, due to common owner base of the case companies and technology rights.

The case technologies are not only different by their industries. The technologies are at different stages also from the lifecycle point of view. The cases B and D are working with technologies that are already well diffused into the market, they have steady demand base and the customers do not have many uncertainty factors regarding the technology. The case A's technology is oriented on the B2B markets, and deals with the combination of human speech with software and machinery. These technologies have seen growth in the last few decades and the possibilities of utilizing the technology are quite vast, which shows also on the product range of the company. The case C's technology is the most undeveloped one in this set of cases. The transfer to Finland included the core manufacturing process, but everything else needed to be developed from scratch.

Transferring technology and establishing a new company around it is never an easy task, but the fact that the case C's technology and its application methods were still quite undeveloped at the beginning of transfer caused even more of hurdles on the company's way. In the other three cases, the technology transfer was conducted in the adoption phase, where the technology has been tested and sold to many clients, making it easier to enter a new market and establish a new company. The case C's technology transfer was conducted on the developing phase, where there's still many uncertainties regarding the technology and the markets, leaving a lot of

issues to cover before market success can be achieved. This was also to be done without a supporting organization at the Russian side of the border, as in the transfer nothing was left into Russia.

The content of the technology transfer between the Russian and Finnish organizations varies among the cases. A common factor here is that the technology transfer in each case involves personnel from the transferor organization. The specialty of the personnel seems also to be dependent on the reason for the internationalization and transfer, the case A's entry to Finland was sales oriented, which could be linked to the background of the entrepreneurs being in positions of sales development and marketing in the Russian organization. In the case B, they transferred several people from the manufacturing to help launching the production facility in Finland. In cases C and D, the technology rights holder himself came to Finland to develop the facility and technology further.

If we examine the relationship of the Russian organization and the Finnish organization in the cases, it is interesting to see that none of the Russian organizations hold shares of the Finnish companies. Thus, the Finnish establishments are not daughter companies of the Russian organizations. In cases B and D the organizations are however tightly linked together, as they share the same owner base, and the production of the Finnish facility is linked to the supply chain of the Russian one. In case A the two entrepreneurs also continue working for the Russian organization, but according to the business development manager, the Finnish company does not receive much help from the Russian company. The case C is the only case where the technology was transferred from a university research setting under a company in Finland. Thus, there is no ongoing relationship whatsoever between the Russian transferor organization and the Finnish transferee company.

An interesting point in the internationalization aspect of the case company characteristics is that all of the case entrepreneurs regarded the Finnish

market as a small, quite difficult to approach and in a longer perspective, not that important for the company. The cases A and C are the only ones that are trying to attract sales in Finland, the case A probably due to the technology being quite service oriented, and case C due to their technology being in the development and trial phase where they need reliable test results and early adopters to start utilizing their products. However, most of the sales for case C are done outside Finland, mainly in places where the CEO of the company has contacts.

Final interesting issue related to the case characteristics is the utilization of government or private support in the forms of consulting or funding. The cases B and C utilized the Finnish governmental funding programs heavily in their operations in Finland. Both of the companies were eligible for investment support, as they both established a factory, where large investments were needed to make the production line under operation. The case A entrepreneurs were in belief that they would be eligible for government funding intended for product development, but their applications never went through when they actually had established the company in Finland. The case D entrepreneur had invested his own money to change his business in Finland to suit the strategic needs, and he didn't feel that he would need any support from the government. Also, the case D did not utilize any private companies for support in launching the technology transfer and establishing a manufacturing facility in Finland. All of the other cases sought out to specialists to help them in some part of the process of establishing manufacturing, acquiring clients or fulfilling standards set by the European Union.

## **5.2 Entrepreneurial motivation for international technology transfer**

The reasons and the entrepreneurs' motivation that caused the case entrepreneurs to transfer their technology from Russia to Finland under a new company are discussed in this chapter. The chapter aims at answering

the second research question: “*What are the motivational factors that drive transition economy SME entrepreneurs to transfer their technology to developed markets?*”, by studying the motivation of the group of Russian entrepreneurs’ international technology transfer to Finland.

As the technology transfer and internationalization theories suggested, there are several issues that affect the entrepreneur’s motivation to extend company operations to foreign countries. These reasons are most likely related to the home business environment, the internal situation in the company and the personal traits of the entrepreneur and how internationalization oriented they are. The other side of the discussion related to the motivation is why the entrepreneurs chose namely Finland to be their target of international technology transfer. The results of this section will be first presented case by case, and on the last chapter combined by the division of external drivers and entrepreneurial motivation. The external drivers are macro level forces that drive the company and the entrepreneur towards internationalization and thus to international technology transfer, whereas the entrepreneurial motivation is more related into the company’s internal situation, strategy and the entrepreneur him/herself.

It is important to note that the thesis studies the motives of people. The results presented in this chapter are not to be considered as a detailed analysis of the macro environment of Russia or Finland, but rather a description of how the case entrepreneurs perceive the environments they are operating in and how they personally assess the benefits of establishing the company in Finland.

### **5.2.1 CASE A – Entrepreneurial drive and mobility**

As described in the characteristics section, the decision to open up a company in Finland, which would utilize the Russian company’s technology base was solely done by the entrepreneurs. It cannot be considered as a



strategic choice that the Russian company would have done, but rather a result of the entrepreneurial drive that the CEO had.

The decision to open up a company, which provides technological solutions with two non-engineers in charge, was possible, as the newly established company could practically utilize the whole technology base of the Russian partner through the licensing agreement. The initial aim of the establishment was to tap into the Finnish support systems and develop the technology further, but these plans were changed to a more sales oriented strategy early on, as the early plans didn't work out.

The case A entrepreneur's interest towards the Finnish business environment rose up during her master's degree studies in Finland. At that time, she got to know what kind of support the Finnish governmental organizations had to offer for technology oriented companies. The perceived supportiveness of the economy and the connections to the business life that the entrepreneur had done during her studies were most probably the main personal motivators for opening up a company in Finland.

At the time when opening up the business in Finland was topical, there was a regional program in a Finnish city in Eastern Finland, which aimed at the transferring of Russian technology oriented companies to Finland and helping them to commercialize their technology in Finland. Participating in the program, the city selection for the entrepreneurs was clear.

Owning and running a company in Finland also opens up several personal and business possibilities for the entrepreneurs. The personal mobility of the entrepreneurs is increased, as owning a company in Finland helps in getting permits to stay in Finland and move around the Europe. From the business development point of view, owning a Finnish limited company makes it possible to apply funding not only from Finland, but from the European Union as well. Participating in larger European development

projects as a supplier is also much easier for a Finnish company than a Russian entity.

The other macro level factors that affected the motivation to open up the company in Finland were the state and reputation of the Finnish market as an innovative one. The business infrastructure and more importantly the technological infrastructure is in good condition in all of the regions in Finland. These issues combined with a market that is from the entrepreneurs' point of view more ready to adopt innovative technological solutions were supporting the decision to come to Finland with a technology that's lifecycle is in the growth phase.

In their business, the entrepreneurs also aim to utilize the locale of their new venture in their marketing, stating that the company is a European IT company, providing high quality solutions for different kind of speech technologies from Finland. This is not unique among the cases, as case C also considers the fact that they are operating in Finland as one of their main marketing arguments.

Another personal motivation factor, which appeared in all of the cases, was Finland's geographical distance from Russia. In the cases, it was not a question of the product or material logistics, but the people preferring to stay close to home, relatives and their Russian businesses.

### **5.2.2 CASE B – High standards and quality of infrastructure**

Out of the four cases in this study, the case B's motivation to internationalize and transfer technology to Finland is the most related to strategic expansion of the Russian organization.

The Russian organization was in a dire need of new capacity for the medicine production as the company faced increasing demand from the

markets. The company was unable to expand the premises they had in St. Petersburg, the real estate prices had soared up radically in a couple of decades and renting of industrial premises was considered as a risky choice due to the volatile markets. The surroundings of St. Petersburg could have provided some premises for the company, but the local infrastructure and premise requirements for a medicinal factory would have caused too much of additional work and changes in the original structures, making that option not attractive.

Thus, the decision of the entrepreneurs was to purchase a premise from Eastern Finland, and build up the production facility there. This solved a few problems that the company would have run into in Russia. The price of real estate was relatively low to make a purchase, the facility has secured streams of electricity and pure water, and the transparency of the Finnish local government and business actors reduced the risk of establishing a new facility.

Another major motivator in case B's coming to the European Union and especially Finland were the standards set for medicine production facilities and the products itself. Even though the products that the company is manufacturing are quite traditional and sold only on the Russian market, the Finnish facility still needs to fulfill all of the standards set by the European Union for medicinal facilities. In fact, the medicine that the company produces is not licensed for any other markets, except for Russia, making it currently impossible for the company to internationalize through sales.

Knowing that the standards of the European Union and the Finnish mentality on following them affected the decision making actually towards selecting Finland as the place of production. Currently there is a debate in Russia, whether to adopt the same medicinal standards as in the European Union. If the new legislation comes through, the Russian medicine producers are going to have to make changes in their production in a quick regime to fulfill the new standards. By establishing a factory in Finland already before the

possible change of legislation ensures the supply of allowed medicine if the legislation was to change in a rapid manner.

It also in the interests of the entrepreneurs to educate their personnel in Russia to work under the standard EU requirements. For this, the personnel exchange that the companies conduct in the technology transfer is an optimal way.

Establishing a production facility in Estonia was also on the list of possible target countries due to a lower price level and belonging to the European Union, but the Finnish option was preferred due to Finnish reputation of clean raw materials and preciseness to fulfill the standards.

As did in the case A, the initial interest and motivation towards establishing a facility in Finland rose when the case B entrepreneurs learned of the Finnish governmental support mechanisms and especially the investment support towards that is aimed at companies who are establishing facilities that will produce some products and thus have a positive effect on Finnish employment. Contrary to the case A's experience of these support mechanisms, the case B entrepreneurs were extremely delighted of the functioning of the support system.

The decision to establish the factory in the Eastern Finland in case B was purely a question of investment cost and logistics. A close to Russian border location provides easy access to the facility from Russia and the premise costs in Eastern Finland are much lower than the more highly populated Southern Finland.

### **5.2.3 CASE C – Reputable innovation and business environment**

The case C's main difference to the other cases is that the company was established in Finland after a result of academic studies and coming up with

a new technology. The initial setting in the case differs much from the others, as transferring the technology fully to a foreign market could be seen as a last resort. The technology was developed until the point that the first prototypes could be established in Russia. This point is where the entrepreneur, or the technology right holder faced difficulties in finding risk capital and suppliers to finish the rest of the production line.

The selection of the country for the entrepreneur was clear after he got to know of the government support. The entrepreneur characterized Finland as a country where there's a clear interest towards knowledge intensive technologies and innovation development, especially in the cases of SMEs.

He argues that in Russia, there are systems that aim at supporting entrepreneurs, but they are too bureaucratic and not transparent to be trusted and relied on. These are issues where Finland excels at when compared to the Russian environment.

The entrepreneur perceived Finnish companies, along with the people who work in them, to be eager problem solvers, who like to take on challenges. The "Finnish quality" in technology and infrastructure was definitely a critical motivational factor for the entrepreneur to enter Finland, as he conducted the transfer in the developing phase and not in adoption phase as the other cases did.

As in case A, the case C also utilizes the reputation of Finland as a country providing quality products to its advantage. The company, its technology and products are represented as Finnish ones in the company marketing, even though the origin for the technology is in Russia.

#### **5.2.4 CASE D – Risk avoidance and worldwide sales expansion**

The case D's entry to Finland could also be assessed as a strategic entry of the Russian organization to another market. The situation is similar to the

case B's entry in the sense that there is a corporate need to expand manufacturing facilities due to increasing market demand and limitations of the Russian facility.

According to the case D entrepreneur, the opportunity to seize and catch part of the worldwide markets is too big to ignore. The rapid sales increase for the company in the recent years has been caused by the inability of the giant companies to serve the industrial refrigeration market efficiently. The Finnish facility was established to fulfill the demand on other markets than Russia those that are tightly linked to Russia.

The main economic driver for the case D technology transfer to Finland was the Russian customs fees for heavy machinery. Border crossing fees for heavy machinery are collected by the kilograms and not the actual value of the equipment, making exporting of heavy machinery relatively more expensive than exporting of other kind of machinery. Manufacturing the similar equipment in Finland under a Finnish limited company and exporting it from Finland can potentially save a lot of money for the case company.

Another part of the entrepreneur's personal motivation to establish a twin facility and expand the same manufacturing to Finland was a fear of the volatility of Russian politics. The entrepreneur stated the volatility of the home market and the wish for the long-term safety of the business to be one of the main motivators in expanding the production to Finland. The two companies the entrepreneur owns are also not in any way related to each other, except for their owner and name. This is a solution to spread the entrepreneur's personal assets and lower the risk of losing the operations due to a risky political situation. For the entrepreneur, Finland is like a safe haven, where the security of the business and the entrepreneur is secured. As mentioned earlier, the entrepreneur had a functioning business in the food industry in Finland since the mid of 1990s. Thus, the entrepreneur was already very familiar with the Finnish business environment and knew how to cope with the authorities and requirements of business in Finland before

establishing the manufacturing facility, which is probably why the entrepreneur could start conducting business in Finland with relative ease without any external help.

The main macro level reason that the entrepreneur stated to have an effect on him choosing Finland to be the target country of technology transfer are the technological infrastructure and the sophistication of companies in Finland. As stated before, the aim of the entrepreneur is to ultimately make the Finnish facility to be better and more sophisticated than the Russian one, and to transfer those improvements to Russia.

The closeness to Russia is also a personal preference of the entrepreneur due to family reasons. Operating in South-East Finland has a distinctive logistics benefit over other Finnish locations, due to the closeness of St. Petersburg. Additional benefit of establishing factories close to the Eastern border of Finland is the cheap real estate, which was also very relevant factor in the decision making of the case B entrepreneurs.

### **5.2.5 Cross-case conclusions of entrepreneurial motivation**

The four cases that were under study, show some clear factors that motivate the entrepreneurs to launch their technology transfer projects from Russia to Finland. Even though the projects are very different from their characteristics, the entrepreneurs seem to value similar issues in the Finnish environment, and seem to be somewhat likeminded by the personal motivation factors.

The case entrepreneurs' personal motivation to establish the company in Finland is explained by several factors. First, all of the entrepreneurs have an entrepreneurial mindset. What that means, is that the entrepreneurs are actively seeking for new business opportunities and are willing to seize them when one is identified and assessed to be lucrative one. The entrepreneurs

from the cases A and C were ready to establish a new venture in Finland when an opportunity showed up, and the entrepreneurs from cases B, C and D showed an entrepreneurial mindset through a risky move of establishing manufacturing facility in a foreign country.

Another personal motivation factor is that the entrepreneurs gain some personal benefit of owning a Finnish establishment. As the entrepreneurs own and run the company in Finland, they are eligible for a permanent permit of residence in Finland, and thus their mobility along the European Union and the Schengen area is made easier. Even though only two of the cases, C and D, had the Russian entrepreneurs permanently staying in Finland, the benefit is great for all of the entrepreneurs. Also related to the mobility, an important factor the entrepreneurs is that Finland is so close to Russia and especially St. Petersburg. The fact that the entrepreneurs may drive their own cars or take the train to Finland from Russia in just a few hours is a huge benefit for them. If Finland would be located further away from Russia, it would be likely that the motivation for Russian entrepreneurs to enter the country would be lower.

Third factor that motivates the entrepreneurs to establish companies in Finland is the standards of living, schooling and overall quality of life in Finland. This issue arose to conversation especially in the interviews of the case C and D entrepreneurs, those who also made the decision to stay permanently in Finland. They claim that as they are receiving a lot of support from the Finnish government for their businesses and personal lives, they also are willing to pay a high amount of taxes for these benefits.

The fourth factor from the personal side of the motivation factors is the safety that the Finnish environment provides for the people and businesses operating there. As business practitioners and developers of technologies, the entrepreneurs value the transparent bureaucracy and legal system in Finland, which protects the owners of the technology rights from possible



abuse. In Finland, the technologies are also not likely to leak to parties that would copy technologies.

In addition to the personal factors, the entrepreneurs' motivation is affected by the macro level issues of the Finnish business environment. The first, and one of the most important environmental reasons for the entrepreneurs to establish a company in Finland were the governmental support mechanisms. The initial interest towards the Finnish business environment arose for the case entrepreneurs of cases A, B and C when they learned of the financial support mechanisms that the Finnish government organizations are giving to companies that develop their technologies or build manufacturing premises into Finland.

The second business environment related factor is the technological sophistication of Finnish machinery suppliers and high level of technological infrastructure all over Finland. The entrepreneurs in cases B, C and D gave much value to the fact that working with Finnish suppliers does not cause any technology related problems and that the operators are reliable with their shipments and quality. The overall good level of technologic infrastructure got also praises from the entrepreneurs. The entrepreneurs considered steady supply of electricity, clean water supply and the condition and maintenance of real estate crucial for example.

Finland's belonging to the European Union also holds value to the case entrepreneurs. In addition to the free movement of people inside the union, the free movement of goods across the borders also was considered to be an important factor. As the characteristics of the cases showed, all of the cases had already established international sales, and only minor part of the turnover of the companies came from sales to Finland. These issues support the statement that Finland is utilized as a gateway to the world markets. For example, the Finnish company in case A is participating in a Finnish consortium, which provides solutions to projects elsewhere in the European Union and case D ships its products to worldwide markets from

Finland due to the Russian border and customs policies. Cases B and C sell most of the goods they produce to Russia.

Finland has also a reputation of a country of quality in the minds of the Russian business people and consumers. This is the fourth of the most important macro level driver for the international technology transfer. The cases A and C utilize the image and reputation of Finnish technology companies in their marketing, stating that they produce Finnish services and products. On international markets, and especially on the markets close to Russia, this ought to be a powerful marketing statement.

### **5.3 Entrepreneurial challenges in international technology transfer**

The final chapter describing the results of the empirical part answers to the third research question *“What are the challenges faced by the entrepreneurs conducting international technology transfer from transition economies to developed markets?”*, by displaying the challenges that the entrepreneurs have faced during their process of internationalization and technology transfer to Finland.

By studying the challenges the entrepreneurs have faced in their planning, entry process and running operations in Finland, we can identify some shortcomings in the Finnish business environment, and learn from the troubles and mistakes that the Russian entrepreneurs have met during their endeavors in Finland. This information is valuable to the entrepreneurs and managers that are planning to establish facilities in Finland in the future.

#### **5.3.1 CASE A – Understanding the market and a lack of support**

The case A entrepreneurial challenges at the beginning of the Finnish company’s lifecycle were related to the wrong approach on the markets as a technology and solution developer. The entrepreneurs relied on the

Finnish governmental support, but they perceived that there practically was none available for them. An ill approach to markets combined with the characteristics of the Finnish market for speech technologies hindered the functioning of the company during the first couple of years.

The size of the Finnish market is one issue, but the other is that the Finnish company cannot utilize the technological partner's products and solutions in the Finnish market to full extent. A large part of the speech technologies are language dependent, meaning that the software should have coded information of the Finnish language to provide results. Finnish language belongs to such a small language group, with a small amount of speakers, that developing of language dependent software for them most likely is not worth the investment.

After a strategy pivot and re-focus of the efforts, the company started to achieve sales. The office manager however lists as one of the greatest challenges for the foreign led company the difficulty of convincing Finnish corporate customers to purchase the solutions. The entrepreneurs feel that the Finnish customers are a bit reserved towards foreign led companies in Finland, and that the evaluation and decision making process is longer than in Russia for instance.

The entrepreneurs stress that understanding the Finnish business culture and the mentality of the Finnish customer is of extreme importance when selling technology products in Finland. As proper understanding of the market was assessed as a challenge for the entrepreneurs, they decided to tackle it by relying on a consulting agency to do market research and find suitable channels and industries to achieve sales.

An issue, which the business development manager brought up in the interviews is that even though the Russian technology partner of the company is considered as a high level actor in the industry of speech technologies, the support the Russian company gave to the Finnish entity

was on the same level as with any other licensee selling their technologies. Seems to be that the entrepreneurs of case A were expecting a lot more business development support from both Finland and Russia for their sales endeavors.

### **5.3.2 CASE B – Planning and personnel issues**

The challenges that the case B entrepreneurs faced in their operations are quite different from those of case A's. The markets and customer acquisition did not pose any problems for the new established company, as Finnish facility is to export all of its production into Russia, to be distributed by the Russian company.

Until this spring, the company has been building its premises, training personnel and applying for the EU certification for its facility and products. According to the entrepreneurs, these phases have taken a lot more time than was evaluated when commencing with the project.

One of the early challenges in the company was the absence of the entrepreneurs during the early days, when the renovation of the facility was ongoing. The entrepreneurs had not hired anyone to represent the company in decision making while the project was in the early stages. Getting confirmations, signatures and instructions were thus hindered a lot. The absence of such monitoring also caused the building of many solutions that have later on needed to be repaired or radically changed. This situation was fixed when the company started to hire personnel to monitor the development of the facility, one of the most important hires being the current company CEO who is a Finnish-Russian accountant from her earlier profession.

The CEO commented that a crucial mistake in the early on was not to plan the whole building process through. In her opinion, the lack of careful early

planning hindered the building process and the certificate application process, as many issues had to be tested through trial and error. To minimize the time spent on the standardization and certificate applications, the company utilized a Finnish private consultant to guide them through the process.

As the company operates in a very specialized industry in a small market of Finland, the personnel acquirement has caused trouble for the company and the current CEO. The close locale to the Russian border is a positive thing from the logistics, labor and real estate costs' point of view, but from the Finnish personnel's point of view, the location is bad. The area where the company is located does not have any medicinal laboratories or production facilities, reducing the amount of local people who could be working in the company. The offset locale of the company also reduces the willingness of potential personnel to move after work opportunities to the city.

Another labor related challenge the company faced was the integration of the Russian production personnel and the Finnish production workforce, as the Russians were to practically learn how to utilize the machinery and teach the medicine production regime to the Finnish workers. In the words of the CEO, it took some time for the personnel to learn how to operate in the bi-cultural company and to create a common work rules and ethics.

### **5.3.3 CASE C – Management clashes and technology issues**

The case C's challenges in starting up the operations in Finland were heavily related to the different operating cultures in Finland and Russia and to the issues with the technology that was not ready for commercialization when the transfer happened, as was the case with the other cases.

The case involves actually more than one Finnish case company, as the technology rights holder's first entry to Finland happened a couple of years before the establishment of the current company. At that time, the entrepreneur stayed in Russia and relied on some other people in the development of the technology. However, the first tryout company failed to develop the technology to a decent enough level, but still incurred high costs for the entrepreneur. The company was dissolved after some disagreements and a clash of the people involved in the company.

To establish the second case company, the entrepreneur moved permanently to Finland to ensure the development of the company and the technology. To help the Russian entrepreneur to cope and succeed in the applications for grants and government support, he established a partnership and a separate consulting company with a Finnish-Russian management consultant. The case entrepreneurs consider the involvement of Finnish-Russian personnel and management crucial for the success of the technology transfer and further development of the company, as the people who have operated in two different cultural settings and know the peculiarities of both are capable of mitigating communication and dissolving probable misunderstandings that are caused by different cultures.

However, the new establishment was also not spared from the management and investors' relationship problems, as one of the private investors tried to pull off his funding and take the company to bankruptcy. The company was able to solve the liquidity crisis and avoided bankruptcy, and the claims of the private investor were ruled false in Finnish court. Still, the disagreement took around a year of valuable time from the development of the company.

As mentioned earlier on, when the technology transfer happened, only the most essential core of the technology was transferred to Finland. Everything else that was needed for a manufacturing line and commercialization of the technology the newly established company had to build from zero level. This meant that the company was to heavily invest in premises, machinery and

product development to be able to manufacture and ship out products with a clear function and benefit. Private investors and the Finnish governmental development loans and grants supplied the funds for this development until the company could sell its own products.

High debt and problems with the investors caused a lot of unnecessary stress and ambiguity for the entrepreneurs. The fact that the entrepreneurs owned two companies, the case company with the technology and the management consulting firm, relieved a part of this personal stress by providing flexibility in money streams between the companies and management salaries.

The company did not face trouble only in the development of its upstream activities. As the technology in itself is new to the markets, the entrepreneurs also faced a lot of doubt from the side of the markets. The approach to establish a heating system utilizing the company's heat exchangers is new to the market, which increases the fears, uncertainties and doubt of the potential customers to make the purchase decision. Topped with the resource constraints of the company and entrepreneurs, developing the new technology in a foreign market is a great challenge already in itself.

#### **5.3.4 CASE D – Slight problems with finding personnel**

The international technology transfer in case D did not seem to cause as much trouble or challenges as the transfer did in the other three cases. The entrepreneur told that most of the challenges in his entrepreneurial ventures related to gas compression machinery were faced when the entrepreneur left the Danish company, transferred his and his personnel's knowhow to Russia, and started to operate based on the Danish company's business model.

The entrepreneur described the market at Russia to be reluctant to utilize his company's services or products at the time, forcing the entrepreneur to seek sales from abroad and from the prior customers of the Danish company. Achieving decent sales on the Russian market took according to the entrepreneur several years, and currently, the Russian market is the most important market from the sales perspective for the entrepreneur's companies.

Looking at the problems related to the entrepreneur's entry to Finland, he recognizes the main problem to be related to the personnel. He has not been able to recruit Finnish specialists of refrigeration industry or gas turbine manufacturing industry to work for the company. The problem is, as in case B's situation, partially at the location of the company in a smaller town outside the main industry and population centers, and the small amount of such specialists in Finland. The lack of available personnel has led the entrepreneur to transfer more personnel between the Russian and Finnish facilities. The entrepreneur's preference is also to have the staff to speak Russian. It is not a problem to find Russian speaking staff in Finland, but they should be also highly educated specialists to be able to work in a technology intensive company.

### **5.3.5 Cross-case conclusions of entrepreneurial challenges**

The study of the four cases displayed that the two most crucial challenges the new venture entrepreneurs face in operating in Finland are the time constraints of the technology transfer project and the capital requirements. In the case of new manufacturing ventures, the capital investments to premises and machinery can build up to very considerable amounts. In addition to the investment, the entrepreneurs face a lot of time pressure to start generating profit to overcome the investment cost. All of the case companies struggled a couple years to be able to make sales, and a couple more to become profitable in their operations. However, the time constraints



and issues with the capital are common challenges for all new ventures, regardless of origin and country of operation.

The entrepreneurs of cases A, B and C discussed in the interviews that they have done a lot of redundant work and functioned on the basis of trial and error development in their operations. The entrepreneurs commented that they should have studied the process requirements and the markets in more detail and should have planned the transfer process and establishing of sales in more detail. The lack of planning and market knowledge most definitely affect to the length of the time period when the company is not profitable.

Related to the lack of planning and market knowledge, the case companies who started to sell services or products in Russia have faced difficulties of achieving sales in Finland. The case A has approached the Finnish market with IT service and solution sales and the case C with its newly developed heat exchanger solutions, both facing trouble from the Finnish market. The troubles of breaking sales in Finland probably are caused by the fact that the technologies the companies are selling are not that familiar to the market yet, and that the companies' main personnel is of Russian origin, causing some uncertainty to the purchase decision from the customers' point of view.

The final major point of challenges, which is common to the case companies is the issues with the personnel. As the management of all of the companies is of Russian origin, their preference is to have the people working closely with them to be fluent in Russian language and culture. The problem with this is that there is a lack of people in Finland, who would be highly educated professionals of a certain sphere, and capable of communicating efficiently in Russian with the Russian management. In addition, as case C entrepreneur assessed, it is not only important for the company to have people who are able to work in Russian language with the entrepreneurs,

but also to work efficiently with the Finnish operators and network collaborates.

It should also be noted that case D did not according to the entrepreneur face that many challenges in his technology transfer endeavors to Finland. A few points in his entry to Finland could explain this. The company that was transformed to fill the purpose of new manufacturing facility had been established already in the year 1995. Thus, the entrepreneur had already almost twenty years of experience of operating in the Finnish environment and did not need to establish a wholly new company to Finland. The facility that he started building in Finland was to become initially a twin facility with the Russian one, having the exact same machinery and purpose, only different target markets. Third reason is that the company does not target the Finnish market at all with its products and services. This practically eliminates the need for Finnish personnel in the company, and makes it a viable solution to exchange the personnel with the Russian facility. Also, the entrepreneur could himself cover all the capital requirements for the project, reducing the obligations to the investors, debtors and the Finnish government. Thus, the Finnish facility can develop its operations without much time pressure, as there is no need to cover loans in a rapid pace. The fact that the case D entrepreneur did not utilize any private consultancies or Finnish government organs for support also supports the suggestion that his entry to Finland was “the easiest” one out of the four cases.

## **6 DISCUSSION**

The aim of the thesis was to assess the phenomenon of SME international technology transfer from transition economies to developed markets. The phenomenon was studied in a context of Russian entrepreneurs entering Finland by establishing companies around technology that has been developed in Russia. The theoretical phase of the thesis sought to clarify

the issues related to international technology transfer and SME internationalization to create a basis for the empirical phase and further study. The empirical phase of the thesis considered four technology transfer cases from Russia to Finland in high detail. The studied issues covered the characteristics of the technology transfer cases, the motivation of the entrepreneurs to commence such a project, and the challenges the entrepreneurs have faced during their operations in Finland.

This chapter discusses the findings of the empirical phase in the light of the previous theories related to international technology transfer and SME internationalization. The chapter will also point out the benefit of the study for practitioners who are planning to commence such projects. The final sub-chapter of discussion will discuss the theoretical contributions of the study.

### **6.1 Findings of the study and the internationalization theories**

The concept of technology transfer practically encompasses any type of technology exchange between organizations or contexts (Reisman & Zhao 1991). The cases studied in this thesis show a good variety of different projects and compositions how cross-border technology transfer can take place in the context of the transition economy SME and entrepreneurial technology transfer to a developed market. The projects' main aims spanned from being a technology licensee, which is seeking sales, to strategic expansions related to manufacturing and to full technology transfer of a new to the world technology.

It is evident in the studied cases, that the case entrepreneurs can be described by the parameters of international entrepreneurship. All of the entrepreneurs have initiated risky cross-border operations that aim at maximizing value creation for an organization. In the cases of strategic expansion by cases B and D, the value created by the Finnish facility is

aimed at providing benefit for the company from which the technology originates, and its owners. The technology licensees of case A and the full technology transfer of case C however are not oriented to provide value for the Russian organizations, but are tools for personal gain.

If we take a look at the antecedents of the case entrepreneurs it is clear that these individuals are highly educated, have much experience from operating in international context and are eager to establish network connections that are crucial in the operations of international SMEs. In addition to the suitable traits of the entrepreneurs, the Russian organizations, from which the technologies originate, are technology and innovation driven. The technology orientation is also passed to the Finnish entities along with the actual technologies, which enables the newly established companies to compete on the market with sustainable competitive advantage through technology and innovation. Thus, as McDougall & Oviatt (2005), Autio et al. (2000) and Filatovchev et al. (2009) have described these Finnish newly established companies could be assessed to be part of the born global phenomenon, even though the Russian organization would not be.

The RBV and especially the knowledge based approach suggested that in the internationalization of a company, the human capital is an important factor (Westhead et al. 2001, Prashantham 2005), with a special stress on the tacit knowledge and the ability to utilize that knowledge on the international markets (Barney et al. 2001, Peng 2001). It is fair to assume that none of these ventures would have been established, if the entrepreneurs had not had such deep knowledge of the technologies and the business that the technologies allow to practice.

The special traits regarding the international technology transfer of the cases is that they originate from a transition economy and target a developed market. According to Kiss et al. (2012), the motivation to start up an own business for the transition economy entrepreneurs is based on the

personal traits, but the rapid internationalization or full establishment abroad is mostly explained by the institutional differences between the emerging and developed economies. According to the research done on the four cases, this seems to be the case here as well. The entrepreneurs' interest towards Finland arose when they heard of the possibilities to get governmental financial support for the development of their technologies or the establishment of the manufacturing premises. Other macroeconomic factors that affected the entry of the companies were the difference of the level of infrastructure and the business sophistication of the supplier network. However, the institutions in the developed countries are not only to the benefit of the transition economy entrepreneurs, as the entrepreneurs in Finland faced trouble coping with the normative factors, which describe the social norms, values and beliefs. This issue is visible in all of the cases personnel issues, and in the sales tryouts of the cases A and C.

Even though the case entrepreneurs entered to Finland to conduct activities that require very high commitment, the development of their technologies and manufacturing, it is interesting to see that the Finnish market and the possible sales that could be achieved in Finland are considered only as minor benefit of the entry. The case companies that are active on the Finnish market see the market as more difficult one to approach and to achieve sales. The entrepreneurs seem to be utilizing Finland as a gateway to the world, which is supported by Finland's reputation of producer of quality goods and the membership in the European Union. For transition economy entrepreneurs, which also aim to conduct sales in the target country of technology transfer, it might be best to evaluate the alternatives also from the market perspective and the perspective of psychological distance, to ensure the possibility to achieve sales.

## 6.2 Overcoming the challenges

Even though all of the entrepreneurs have faced challenges in their operations in Finland, it is good to keep in mind that all of the studied technology transfer cases are successes, as the Finnish organizations have successfully adopted the technologies of the Russian organizations and begun to create revenue out of the technologies transferred from Russia. If we compare the challenges that the Russian entrepreneurs face in Finland in conducting technology transfer with challenges that entrepreneurs regularly face in internationalization activities, it could be said that the difference of the challenges is not that radical.

Manufacturing oriented international technology transfer project require more time than similar projects in home countries, due to the foreign operating environment and time spent on coping with the bureaucracy and regulations that are not necessarily known to the entrepreneurs. Initializing manufacturing in a foreign market as the first step of entry also raises the firm's and entrepreneurs' commitment to the market extremely high. I would advise the entrepreneurs that are looking forward to commence such projects to put some focus on planning the process of technology transfer thoroughly before entering the developed country.

Second suggestion is to hire a consulting company or person, who is capable of operating and understanding in both, the transition economy entrepreneurs and the developed market operators. The person should be able to guide the entrepreneurs through process, and to stay as a linking person in between the entrepreneurs and the foreign country operators. This suggestion is backed by the cases A, B and C who besides employing Finnish-Russian personnel had hired a private consultancy to help them in the process. These people were considered as one of the main success factors in the establishment of the cases.

### **6.3 Theoretical and managerial contribution**

This thesis contributes to the literature of the spheres of transition economy entrepreneurs, their internationalization and international technology transfer. The thesis showed in detail how several Russian entrepreneurs have come to a decision to establish a technology oriented company abroad, and what challenges do they face in the process. In the domain of internationalization research, the issues that are covered in this thesis are part of motivation studies and barriers studies for SMEs and entrepreneurs. The internationalization studies, as well as international technology transfer studies have only recently started to focus on single entrepreneurs and SMEs in the context of transition economy entrepreneurs and SMEs (Kiss et al. 2012). Thus, the study holds some value to the theoretical spheres.

I would assess that the study contributions are greater for managers and practitioners of business than for the theories. The study holds value especially for transition economy managers, who are planning to establish technology based operations in developed markets, namely for Russian entrepreneurs who are planning to enter Finland.

The characteristics study shows that success in international technology transfer to developed market is not dependent on the type or stage of technology. What matters more is the readiness of the entrepreneur to go through with the transfer and the ability to establish network of partners or collaborators to complement lacking skills, resources and knowledge. The motivation factor study provides information of the conditions and support possibilities of the Finnish business environment, and confirms that also Russian entrepreneurs are eligible for Finnish government support, as long as they have a company in Finland, which will eventually be profitable and provide the benefit back to the Finnish government. The study of the entrepreneurial challenges shows the managers the pitfalls and major problems that can occur in endeavors like these. Studying them carefully

and planning accordingly can save a lot of resources and effort in the future cases.

The information on this study could also direct the policies and government led development programs in developed countries to a direction. As the study found out, in the Eastern and Southern regions of Finland are several Russian entrepreneur led technology projects that are registered under Finnish companies. The companies are often manufacturing related, which need real estate and machinery. The funding for these practically comes from Russia, so the projects that Russians are building can be thought as foreign direct investment. In addition to purchases of Finnish machinery, real estate, and consulting services the entrepreneurs are also providing some highly wished industrial work places to Finland.

The current support policies in Finland seem to be attractive as is. Combined with the benefits of a shared border and proximity to St. Petersburg, Finland is a very competitive in attracting the Russian international technology transfer projects. The Finnish government should keep the support policies on the current level, or even increase the level of support provided for Russian technology entrepreneurs. Other developed nations that are close to economies that are in transition could also try to attract technology projects from the transition economies through competitive support policies and programs that aim at seeking interested technology oriented entrepreneurs and small businesses.

## **7 CONCLUSIONS**

Technology transfer is an issue which takes place around us all the time. It is studied very extensively in the literature, but still it is impossible to create a single model that would encompass all of it into the same frame. It is also a very intriguing subject study. As the world continues to integrate, the



amount of technologies that are passed through country borders increases. The different development stages of countries in the world and the differences in technology supply and need are on global level the driving forces for this phenomenon.

The Russian entrepreneurs that were studied in this study are pioneers in their endeavors as they are among the first ones to enter the Finnish market with technologies of their own. These entrepreneurs probably face the harshest cultural problems in Finland, as the infrastructure to support namely the Russian entrepreneurs in Finland has not yet been developed. The increasing amount of Russian technology projects in Finland ought to cause positive growth and learning in Finnish organizations, which in turn makes it easier for more of Russians to enter the system.

This thesis studied these pioneers and found out the main motivating factors and the main challenges these entrepreneurs face in their endeavors in Finland. The main motivation factors that caused the entrepreneurs to come to Finland were the peoples' entrepreneurial mindset, the personal gain of owning a company in Finland, decent technologic infrastructure, high level of government support, and Finland's belonging to the European Union, which makes it easier to export goods out of Finland and to take part in multinational supply chains. The entrepreneurs were challenged by the time and capital constraints, lack of planning and market knowledge, and the problems of hiring educated, culturally aware Finnish or Finnish-Russian personnel.

Thus, it seems that from a transition economy setting, it makes very much sense to transfer technologies to developed markets for further development and operation. The R&D capabilities and support for SME companies and entrepreneurs seem to be on a better level in the developed markets than in the transition economies, which drives some of the entrepreneurs to shop for the best opportunities that are provided for them.

My assessment is that the phenomenon of international technology transfer from transition economies to developed countries has only seen its beginning.

### **7.1 Scope and delimitation**

The study focused on the Russian entrepreneurs' entry to Finland with their technologies, and by doing so, aimed to extend the characteristics, motivation and challenges of the phenomenon also to other international technology transfer projects that originate from transition economies.

Major limiting factor in the thesis is that with the given resources, the author was able to study the phenomenon only in the context of two countries that reside close to the author, Finland and Russia. Choosing only projects of Russian origin, however, was a conscious choice done by the author, as it links the study well to the researcher's study environment, previously acquired skills and future aims.

Further, the thesis study is limited by the small amount of technology transfer projects of Russian origin in Finland. In optimal case, case study researcher would choose the cases himself to ensure interesting and versatile results. Given the potential sample size, the author was not able to make a free selection.

Also, the locale of the projects acts as a limiting factor for the study. Organizing face-to-face interviews in further away locations would have not suited the study by its budget and timeframe, thus the study focuses only on the projects found from the Eastern border of Finland, and neglects possible projects in other parts of Finland.

The thesis focused intentionally on small and medium sized companies and smaller scale technology transfer projects. Small scale study subjects allow

the researcher to get everything needed from a case company from just one or two interviews per company. The choice towards small scale enterprises and projects was done due to two reasons. First, the existence technology transfer projects conducted by large Russian companies is unknown, and the second is the increased difficulty of studying larger projects, as they tend to involve more people and more factors that are needed to be taken into account.

The thesis considered only the perceptions of challenges and motivation of the entrepreneurs that are part of the study. The study did not aim to verify whether the factors that motivate the entrepreneurs to enter Finland hold true in a larger scale. The perceived challenges might also be factors that hinder the work of only these entrepreneurs.

Finally, the study relies only on qualitative data collected from the interview respondents of the four cases. What could have been done also in the frames of this research, is a short quantitative survey to the whole potential sample that was discovered during the research. Interviewing a single entrepreneur from a single company might bias the results to a direction. With a survey or questionnaire, the researcher could have triangulated the data more effectively.

## **7.2 Reliability of the study**

The case study approach and sampling of the research posed many possibilities for biases and errors in the study. First, the sample amount of few entrepreneurs might be too low for characterizing the phenomenon and forming an overview of the topic. Secondly, the low amount of prospective cases limited the choice between the cases, the researcher could not freely choose the cases he wanted to interview.

Another problem in data acquisition is the possible lack of trust between the interviewer and interviewee. The technology oriented Russian entrepreneurs might have been reserved when talking of their technologies and the transfer of them abroad from Russia. The threat with lack of trust is that the interview data from might be too superficial for the purposes of deeper analysis.

The extension of the research to other markets and contexts is compromised by the fact that only Russian entrepreneurs entering Finland are considered in the study. Most definitely, there are hundreds of technologically oriented transformation economy entrepreneurs in Russia who have conducted, or have aims to conduct technology transfer to other countries than Finland.

Finally, the personal bias of the researcher might have partially influenced the research results. The researcher worked several years in a company which helped a few Russian technology projects to get established in Finland during the bachelor studies. This might have driven the researcher towards certain type of results.

### **7.3 Suggestion for further study**

The phenomenon of transition economy technology transfer to developed countries is extremely wide. Even in the context of Russian SME entrepreneurs and the Finnish market as a target, there is much that still needs covering.

To cover the whole phenomenon from the focal point of motivation and challenges, further studies should be directed to other markets than Finland and Russia. Similar studies could be conducted for example for cases in China, Brazil or India to see whether the entrepreneurs there are motivated

by the same factors and faced with similar challenges in the developed markets.

As the existence and increasing amount of the technology transfer projects originating from the transition economies is established, further studies could also assess the effect of such entries to the regional or country wide economy in the developed nations. This kind of study could effectively reason the benefit of attracting transition economy entrepreneurs to developed countries and could effectively point out suggestions for support policies and programs.

Another point requiring more focused studying is the different types of the technology transfer projects that were found in the study. The technology licensee entries must differ much from the strategic expansions and full technology transfers. Further studies could focus on either one of these types to provide more focused insights on the subject.

Furthermore, a study focused on the process of the technology transfer entries could be of benefit for the transition economy entrepreneurs who are planning of establishing facilities in developed countries.

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#### **From interviews:**

Case A Worker. (2014) Project manager of the Finnish case company. Face-to-face interview in English. 30th of January 2014.

Case A Entrepreneur. (2014) Business development manager of the Finnish case company, internationalization project manager of the Russian case company. Internet aided interview in English. 10th of February 2014.

Case B Entrepreneur. (2014) CEO of the Finnish case company. Face-to-face interview in Finnish. 18th of February.

Case C Entrepreneur 1. (2014) CEO of the internationalization consulting company, Business development manager of the Finnish case company. Face-to-face interview in Finnish. 21st of March 2014.

Case C Entrepreneur 2. (2014) CEO of the Finnish case company, technology rights holder. E-mail interview in Russian. 1st of April 2014.

Case D Entrepreneur. (2014) CEO of the Russian and Finnish case companies. Face-to-face Interview in English. 25th of March 2014.

**From secondary data sources:**

CASE A Company presentation slides. (2012)

CASE A Product presentation slides. (2013)

CASE A Finnish case company web-site. (2014)

CASE A Russian case company web-site. (2014)

CASE A Entrepreneurs' professional social media profiles. (2014)

CASE B Entrepreneur's videotaped speech at factory opening. (2013)

CASE B Online newspaper article. (2011)

CASE B Online newspaper article (2012a)

CASE B Online newspaper article (2012b)

CASE B Online newspaper article (2013a)

CASE B Online newspaper article (2013b)

CASE B Online newspaper article (2014)

CASE B Finnish case company web-site. (2014)

CASE B Russian case company web-site. (2014)

CASE C Product brochure. (2013a)

CASE C Product brochure. (2013b)

CASE C Case company web-site. (2014)

CASE C Online newspaper article. (2011)

CASE C Online newspaper article. (2012)

CASE C Online newspaper article. (2013)

CASE D Company presentation brochure. (2013)

CASE D Finnish case company web-site. (2014)

CASE D Product brochure. (2013)

Case	Characteristics Entrepreneurs and personnel (amount, education, role, international experience)	Technology (type, embodiment, core technology, application, lifecycle)	Technology transfer (transferor, transferee, content of transfer, mode of transfer, transfer stage)	Internationalization (reason, relationship, support utilized, internationalization stage/type, target markets)
Case A – speech recognition technology sales	Amount: 2 Education: Higher Roles: CEO and Business Development Manager in FIN, VP of sales&marketing and international project manager in RUS Intl. experience: high from the case industry Other personnel: RUS – few hundred, FIN – One Latvian, several Russian freelancers	Type: Software + hardware / service Embodiment: Coded software, little physical embodiment Core: Speech processing (recognition, analysis) Application: Versatile possibilities Lifecycle: Growth	Transferor: RUS R&D, production and sales company Transferee: FIN sales agency Content of transfer: Physical products, user manuals, software access, sales personnel Mode of transfer: Licensing Transfer stage: Adoption	Reason: Entrepreneurial drive, new sales channel Relationship: RUS company has no ownership, entrepreneurs also workers of RUS company Support: FIN support programme, FIN private consulting company Stage/type: Sales office Finnish and Scandinavian markets Markets: Finland, Baltic, Scandinavia
Case B – medicine production	Amount: 3 Education: Higher, doctoral Roles: Owners in FIN and RUS, strategic responsibility Intl. experience: High from the case industry Other personnel: RUS – few dozens, FIN – 14, Finnish-Russian CEO, four Russians in manufacturing	Type: Production equipment + physical product Embodiment: Recipes, patents, production sequence, personnel Core: Combination of medicinal ingredients Application: capsular medicine for illnesses Lifecycle: Saturated	Transferor: RUS R&D, production and sales company Transferee: FIN production facility Content of transfer: Recipe, production sequence, personnel exchange Mode of transfer: Direct investment Transfer stage: Adoption	Reason: Expanding of production Relationship: RUS company has no ownership, entrepreneurs own both companies Support: Government funding, FIN private consulting company Stage/type: Manufacturing, no sales Markets: Russia
Case C – stainless steel heat exchanger manufacturing	Amount: 2 Education: Higher, doctoral Roles: CEO and Business Development Manager in FIN Intl. experience: moderate, not from the case industry Other personnel: Five, one Russian tech designer and one Finnish-Russian project worker	Type: Manufacturing equipment + physical product Embodiment: Patent, person, equipment Core: cold forming of stainless steel sheets Application: Heat exchangers Lifecycle: Development/Growth	Transferor: RUS university Transferee: FIN manufacturing, R&D, sales organization Content of transfer: Key manufacturing equipment, patent, technology owner + tech. designer Mode of transfer: Full transfer Transfer stage: Developing	Reason: Development problems in Russia Relationship: No relationship Support: Government funding, FIN private consulting company Stage/type: All functions Markets: Russia, Ukraine, Canada, (Finland minor)
Case D – gas compression machinery manufacturing	Amount: 1 Education: Higher, doctoral Role: Owner&CEO in FIN and RUS Intl. experience: High from the case industry Other personnel: RUS 50, FIN 10, Only Russian speaking	Type: Knowledge + physical product Embodiment: Product, person Core: Knowledge and capability to combine components Application: Systems in need of gas compression Lifecycle: Saturated	Transferor: RUS manufacturing and sales company Transferee: FIN “twin facility” Content of transfer: Personnel, product assembly schemes Mode of transfer: Direct investment, continuous Transfer stage: Adoption	Reason: Sales channel to worldwide markets, manufacturing capacity Relationship: RUS company has no ownership, entrepreneur owns both companies Support: No support utilized Stage/type: Manufacturing, sales, development Markets: Worldwide (not Finnish)



**Basics of the company:**

In which industry does your company operate in?

What are your products/services that you sell?

What is the structure of your company? (Are there any host companies/daughter companies/sister companies in Russia or elsewhere?)

Approximately how many people work in these companies?

**Entrepreneur/team related:**

The managing team's or entrepreneur's education shortly?

The managing team's or entrepreneur's business experience shortly?

What are the international backgrounds of the team/person?

Did the entrepreneur have any networks or contacts in Finland before setting up the business in Finland? What kind of?

Is this the first time you have established companies in foreign countries? (or conducted international technology transfer?)

**Technology related:**

What is the key technology related to your business?

How was the technology acquired initially?

By whom was the technology created?

Where was the technology created?

Is the technology still utilized/commercialized in Russia?

In what stage was the technology in Russia when you did bring it to Finland (basic research/applied research/blueprints/prototyping/functional product/market tested product)?

Did you develop the technology further in Finland? (if so, how?)

Are there any patents or certificates for the technology?

Technology ownership (who owns the technology rights)?

**Before the internationalization:**

Could you elaborate on the situation the company/you had when you decided to internationalize actions and bring technology to Finland?

How did you hear of Finland? Did you seek for any external information?

What were the main reasons for you to internationalize?

Whose initiative was it to start internationalization and bring technology to Finland?

Why did you choose Finland over other countries?

**Transfer and internationalization related:**

Timeframe in which the technology was transferred/internationalization happened? (how much time was required from the idea of internationalization to company establishing and to making profit out of the business?)

Did you use any intermediaries for the technology transfer or the company establishing? What kind of? In which stages?

Did you use the services of any private companies in Finland when establishing business here?

Did you use the services of any institutions in Finland? (TEKES, Ely-Keskus, Finnvera for example)

Did you transfer everything related to the technology to Finland or is there still something left in somewhere else? (Is the technology applied in anywhere else?)

Did the inventor of the technology/patent holder come to Finland with the technology himself?

How long did it take to get revenue out of the technology in Finland? Time-to-profit?

Is the transfer export oriented, do you plan to make sales also abroad? Target markets for the product/service?

How was the transfer of technology or internationalization funded?

**Challenges:**

What challenges did you meet in running business in Finland?

What technological challenges did you meet in Finland?