TALLINN UNIVERSITY OF TECHNOLOGY
Tallinn School of Economics and Business Administration
Department of Business Administration
Chair of Organization and Management

Andres Ida

TWO PARTICULAR DYNAMIC CAPABILITIES AND THEIR EFFECT ON COMPANY'S PERFORMANCE

Data of world top 2000 companies based on research and development expenditures

Master's thesis

Supervisor: docent Mait Rungi

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I hereby confirm that I have written and compiled the thesis independently.

All of other authors' work, statements and data have been adequately referred to.

Andres Ida

……

(signature, date)

Student ID: TATM121768

Student's e-mail address: andresida1@gmail.com

Supervisor docent Mait Rungi:

The thesis is in compliance with the requirements of thesis

……

(signature, date)

Chairman of the defence committee:

Permitted to the defence of the thesis.

……

(profession, name, signature, date)

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LIST OF ACCRONYMS

API - Application Programming Interfaces

FDI – foreign direct investment

GPM – global profit maximization

ICB-3D – Industry Classification Benchmark by industry sector

ICT – Information and Communications Technology

IRR – internal rate of return

M&A – mergers and acquisition

MNE – multinational enterprise

R&D – research and development

RBT – resource-based theory

RBV – resource-based view

ROI – return on investment

SEC – US Security Exchange Commission

ABSTRACT

Moderate amount of literature has covered ambidexterity and company's performance in light of dynamic capabilities, although research covering leading companies in the range of industries have yet to be established and ambidexterity concept within same type of capabilities have not gained ground in broader research spectrum. The aim of the thesis is to identify the effect of explorative capabilities research and development and export on company's performance. The complimentary goal is to identify the bilateral effects of the same type of explorative capabilities - research and development and export. The results are based on the data of top 2000 world companies ranked by research and development expenditures. The sample comprises world leading companies such as Volkswagen, Google, General Electric and Pfizer. The results show that explorative capabilities research and development and export have positive effect on company's performance and that the bilateral effects of research and development are mild-positive. Few insights explicitly show that there are equilibrium points in both export and research and development spending that ought to optimize company's profits. The research results may bring emphasis to further research of equilibrium points and give indication to senior management of short-term and long-term strategy optimization.

Keywords: dynamic capabilities, explorative capabilities, research and development, export, performance

INTRODUCTION

In the field of strategic management multiple scholars have used dynamic capabilities approach in order to identify key elements of the firm that are essential to sustain competitive advantage. (Teece et al 1997, Teece 2007, Winter 2003, Eisenhardt, Martin 2000, Helfat, Peteraf 2003). The dynamic capabilities can be defined as firm's ability in changing environment to integrate, build and reconfigure internal and external competences. (Teece et al 1997) There is wide range of dynamic capabilities that exist within firms for example research and development (R&D), export, marketing, strategy, logistics, collaboration and networking, M&A management, open innovation etc. (Eisenhardt, Martin 2000, Knudsen, Madsen 2002, Kolk, Rungi 2012) One path to dynamic capabilities approach is through the lens of explorative or exploitative concept (March 1991) where all capabilities fall in to the one or the other category. The explorative capabilities with regard to previous example are R&D, export, and open innovation. (Kolk, Rungi 2012)

The different nature and incompatibilities of explorative and exploitative capabilities can be the cause of underlying tension in the company. (Tushman, O'Reilly 1996, Gupta et al 2006) Prior research suggests that separating the explorative and exploitative capabilities structurally (Gupta et al 2006) and integration of capabilities by the senior-management (Tushman, O'Reilly 1996) can be solution to the previous problem. Although to some extent the relationships between explorative and exploitative have gained ground in the research field, less focus have been applied to the aspect of interrelationships between same types of capabilities.

Dynamic capabilities effect on company's performance is another research path that had been pursued during prior research agenda. Some prior research cover current topic, although comprehensive empirical study covering leading global companies have yet to be established.

Whether the competitive advantage gained with assistance or due to the dynamic capabilities can be translated into company's performance and thus shareholders satisfaction is another aspect of the research that might be interesting to the broader audience. The underlying

question here is whether it is profitable to invest resources into developing capabilities that are frequently intangible and tacit in their nature with limited liquidity?

Second problem addresses co-existence of the same type, explorative or exploitative, capabilities. Whether two same type capabilities can co-exist synergistically or tension may arise? When the same rational as for different type of capabilities is applied, it can be hypothesized that there can be tensions also amongst same type of capabilities. The same type of competition for resources may occur which may lead to competition in the company. The dynamic capabilities can change underlying resources which may lead to counterparts steering in different direction and ultimately leading the company to astray. On the other hand if the overall strategy of the company is flawless and executed perfectly co-existence of the same capabilities might occur. The flipside of previously stated hypothesis would be that two same type capabilities can co-exist synergistically and even enhance each other's performance. This kind of relationship may thrive for instance in knowledge accumulation, where accumulated knowledge by one capability might be sheared with the second one and therefore enhancing overall performance of the firm.

The research and development and export were chosen as explorative capabilities in the scope of the study. The preference of explorative capabilities over exploitative is due to explorative capabilities being concerned with company's long-term strategy (March 1991) and competitive advantage, thus being key to sustainability. The rational of R&D and export being in the focal point of the study is based on the capabilities being most essential capabilities driving company's profits and key to competitive advantage (Cooper 2000a, Johanson, Vahlne 2009) and most frequently mentioned in academic literature on current topic.

Based on the inquiry of the keywords "R&D", "export" and "profit" in the well-established academic database *EBSCO* no research results were identified. With regard to keywords "R&D", "export" and "ambidexterity" similar results with no findings were identified. The inquiry result stresses the gap in the current academic body of literature.

The aim of the thesis is to identify the effect of explorative capabilities research and development and export on company's performance. The sub-goal of the thesis is to identify bilateral effects of explorative capabilities research and development and export.

The main research question of the study is formulated as following:

- What are the effects of the research and development and export on company's performance?

The following complimentary research question reflects sub-goal of the study:

- What are the bilateral effects of research and development and export capabilities?

In order to answer the research questions the research tasks were formulated. The research tasks comprise analysis of academic literature, defining key terms, construction of research model based on prior academic literature, selection of methodology, determining databases and data for selected approach, determining sample size and analysis, interpretation and presentation of the results.

The quantitative method was selected in order to tackle the research question. The empirical approach comprises regression and correlation analysis of the firms' data. The sample is based on top 2000 world companies ranked by research and development expenditures. Most of the world leading companies from range of industries are in the scope of the study. Few of the companies in the scope of the study are listed here: Volkswagen, Samsung, Microsoft, Intel, Novartis, Johnson & Johnson, Pfizer, General Motors, Google, Siemens, IBM, Sony, General Electric.

The study comprises following elements:

The first chapter covers theoretical fundamentals of resource-based view, defines dynamic capabilities and thoroughly describes concepts of dynamic capabilities and ambidexterity. The second chapter deals with research and development capability concept, it effects on company's performance and different approaches to measure current capability. The third chapter elaborates on concept of export capability, it effects on company's performance and different way of measuring current capability. The fourth chapter explains the bilateral effects of research and development and export as explorative capabilities and illustrates research model. The fifth chapter describes methodology of the undertaken research, illustrates selected sample with variety of metrics and selection of the variables that were in the scope of the research. The sixth and final chapter elaborates on the research results of the study and there coherence with prior studies.

1. DYNAMIC CAPABILITIES

1.1. Introduction into the resource-based view

There are substantial differences noted by number of studies between the performances of firms in the same industry (Rumelt 1991, Roquebert et al 1996, Mauri, Michaels 1998, Ruefli, Wiggins 2003, Bou, Satorra 2007). The core of the resource-based view (RBV) is based upon many scholars findings that previously acknowledged differences in performance is due to the factors that are firm specific and the effect of which on profitability of the firm is known as firm effect (Wernerfelt 1984, Barney 1991, Peteraf 1993).

The resource-based view of the firm is considered to be significant theory for many scholars in order to incorporate the causes and sustainability of long-term competitive advantage of the firm and methods of achieving it into the framework (Wernerfelt 1984, Barney 1991, Nelson 1991, Peteraf 1993, Teece et al 1997). The RBV explains the cause of heterogeneous nature of competition by referring to company's resources and capabilities. This in turn explains competitive advantage and disadvantage of some players in the market. (Helfat, Peteraf 2003) The resources are following elements that are controlled by the firm: all assets, capabilities, organizational processes, firm attributes, information, knowledge etc. (Barney 1991)

Many researchers have theorized based on previously described observation that firms are required to have VRIN: valuable, rare, inimitable and non-substitutable resources in order to have sustainable competitive advantage. These resources are not easily imitable by competitors and can be used in order to create long-term value-creating strategy (Wernerfelt 1984, Barney, 1991, Peteraf 1993, Nelson, 1991).

After multiple decades of research resource-based theory is considered to have reached the maturity as theory. The academic consensus is skewed towards using resource-based theory (RBT)

instead of resource-based view. The precision and sophistication are key criteria's that form such broadening consensus amongst researchers. (Barney et al 2011)

As previously stated heterogeneity of resources and capabilities is at the basis of RBT (Peteraf 1993, Hoopes et al 2003). Although RBT is essential framework explaining competitive advantage of firms in the market, the model has its shortcomings. In the RBT approach there is gap in theory explaining how companies cope with upcoming changes in the environment. This gap hinders researchers from fully explaining how firms use resources and capabilities to create competitive advantage. This in turn makes much harder for researchers to give sound advice to managers. The dynamic capabilities approach tends to fill the gap in the RBT theory. (Helfat, Peteraf 2003)

Markets tend to go through disruptive and fast paced changes in current era which leaves RBT seem as static and inadequate to explain firm's competitive advantage in turbulent markets (Priem, Butler 2001). Teece et al (1997) have introduced academic field with dynamic capabilities framework in order to fill the missing peace. The dynamic capabilities approach serves as extension to RBT (Barney 1991). Multiple other scholars have also investigated current topic and during recent decades substantial amount of research has been performed. The following chapter elaborates on the topic of dynamic capabilities more thoroughly.

1.2. Defining organizational and dynamic capabilities

Collins (1994) defines organizational capabilities as the socially complex routines that determine the efficiency with which firms physically transform inputs into outputs.

The organizational capability is defined by Winter (2003) as a high-level routine (or collection of routines) that, together with its implementing input flows, confers upon an organization's management a set of decision options for producing significant outputs of a particular type. Routine is defined as behaviour that is learned, highly patterned, repetitious, founded in part in tacit knowledge - and the specificity of objective. For instance improvisation is not a routine (Winter 2003).

Based on Helfat and Peteraf (2003) the organizational routines can be broken down into operational or dynamic. Such segmentation is also supported by Winter (2003) referring to broader

consensus on the academic ground. The dynamic capabilities are being distinguished from operational or ordinary capabilities by being concerned with change (Winter 2003).

For instance one example is provided to illustrate difference in operation and dynamic capability segmentation with regard to R&D capability in the firm. Firms that do their own R&D alongside with their main operational activity, the R&D is first-level capability, thus dynamic capability. If the companies main operational activity is to provide R&D services for other companies the firms, the developing new products is zero level activity, thus not dynamic capability and can be referred to as operational capability (Winter 2003)

McDonalds and Starbucs are used as other example with their market expansion strategy. The operational capabilities in one market are replicated into other targeted markets. The following operations are executed by dynamic capabilities. (Winter 2003) The operational capabilities are not within the scope of current study.

During recent decades there has been variety of scholars who intended to define dynamic capabilities. From the vast majority of work some of the definitions have been outstanding according to citations and overall popularity of the articles and the scholars. Here are few examples of definitions of dynamic capabilities that have gained ground in academic field:

- The firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments (Teece et al 1997)
- The firm's processes that use resources — specifically the processes to integrate, reconfigure, gain, and release resources — to match and even create market change; dynamic capabilities thus are the organizational and strategic routines by which firms achieve new resource configurations as markets emerge, collide, split, evolve, and die (Eisenhardt, Martin 2000)
- Processes that operate to extend, modify, or create ordinary capabilities (Winter 2003)
- The ability to sense and then seize new opportunities, and to reconfigure and protect knowledge assets, competencies, and complementary assets with the aim of achieving a sustained competitive advantage. (Augier, Teece 2009)

Within scope of current study the author intends to define dynamic capabilities by using Teece et al (1997) definition. Current article might be considered as critical for on-going research and evolvement of dynamic capabilities theory.

1.3.The dynamic capabilities approach

The dynamic capabilities approach focuses on two critical points that were not in the scope of resource-based view. The first part of the coined term gives indication of firm's ability to renew competences in order to respond and be in line with business and market environment. In the environment where technological change is fast paced, the long term outlook of competition is vague and the response speed to market demand and preferences fluctuations is essential certain innovative responses are crucial. The second part of established term "dynamic capability" refers to the role of strategic management and its role in adapting, integrating and reconfiguring internal and external organizational functions, skills and resources to fit the external environment of the firm. (Teece et al 1997)

Dynamic capabilities can be significant element of supporting firm's long-term business performance by enabling firms to create, deploy, and protect the intangible assets. The key elements of dynamic capabilities or how Teece (2007) puts "micro foundations" are distinct skills, processes, procedures, organizational structures, decision rules and disciplines. These elements are core of enterprise ability to sense, seize and reconfigure capabilities which are difficult develop and deploy. There is a substantial short-term return to be made in case firm possesses resources or competences even though there is a lack in dynamic capabilities. In this case the long-term return is hard if not impossible to maintain. (Teece 2007) Developing dynamic capabilities can be crucial to firm's long-term strategy in order to satisfy firm's long-term competitiveness.

The dynamic capabilities framework suggests that competitive advantage of firms lies with its managerial and organizational processes, shaped by its (specific) assets positions and paths available to it. Teece et al (1997) stresses that balance sheet items such as fixed assets like plant and equipment which can be purchased by the every competitor form the market cannot be source of competitive advantage. It also argued by the Teece et al (1997) that typically financial balance sheet items such as fixed assets are shown in the financial statements, at the same time items that significantly influence competitive advantage of the firm are infrequently recognized. There are some terms that should be more broadly explained. Managerial and organizational process means routines, patterns of current practice and learning which stand for how the things are done in the firm. The asset position stands for fixed and intangible assets such as developed technology, intellectual property, customer base and other contingent assets not reflected in financial statement

of the firm external relations (agreements and tacit element in relations) with suppliers. The path is company's strategic choices shaped by path dependencies. (Teece et al 1997)

One way of conceptualizing dynamic capabilities is to see them as tools to manipulate resource configurations. Based on RBV's path-dependency strategy one way of gaining competitive advantage is to use dynamic capabilities to enhance existing resource configuration and to strengthen existing position. (Eisenhardt, Martin 2000)

Dynamic capabilities are management level activities that are related to management's ability to sense and seize opportunities, navigate threats. Also combining and reconfiguring specialized and cospecialized assets to respond to shift in market demand qualify under the term of dynamic capability. These are the activities that enhance long-term value for the investors. (Teece 2007). Some examples of dynamic capabilities are organizational and strategic processes like alliancing and research and development. Their intrinsic value from strategic perspective is ability to manipulate resources into value creating strategies. These capabilities are idiosyncratic, although commonalities exist amongst competitors and are set as best-practice examples in the industry. (Eisenhardt, Martin 2000)

As previously defined dynamic capabilities ought to respond to changes in market conditions. It is also noted that the dynamic capabilities may shape the competition and the market by implantation of innovation, entrepreneurship, business reconfiguration and asset orchestration. (Teece 2007)

Eisenhardt and Martin (2000) researched market volatility and dynamism effect on dynamic capabilities. Based on their research the dynamic capabilities tend to be different in dynamic and stable markets. In markets with low extent of dynamism the capabilities are embedded in cumulative existing knowledge. They manifest in analysis using existing knowledge and rules of thumb which is then acted upon. (Eisenhardt, Martin 2000) In case the existing knowledge is codified, the routines that are derived from the codified information are detailed and with predictable outcomes. (Helfat 1997) In moderately dynamic markets dynamic capabilities possess characteristics described by broader research field being robust and efficient. (Eisenhardt, Martin 2000)

With regard to dynamic capabilities in high-velocity markets, capabilities rely on special new knowledge for unique situation. Although not completely unstructured routines are simple enough in order enhance emergent adaptation. While in moderately dynamic markets analysis

prevails, in high-velocity markets it is substituted with prototyping, multiple options, real-time information and experimenting in order to rapidly gain knowledge in each new situation. The linear routines are substituted with iterative and mindful routines in order to be able adapt to changing flow of information. In this environment the routines are simple although there may be bundles of detailed routines where existing knowledge is relevant. These types of routines in high-velocity environment are quickly adaptable to shift in the market. There is a down side to these routines, their outcomes are not predictable. (Eisenhardt, Martin 2000)

In both high-velocity markets and in markets that are moderately dynamic the competitive advantage is threatened by overall external competition. The factor of dynamic capabilities possible collapse in high-velocity markets adds up to already existing potential external threat. (Eisenhardt, Martin 2000)

Helfat and Peteraf (2003) focused in their research on capability lifecycle. They identified three initial stages of a capability lifecycle - founding, development, maturity - followed by possible branching into six succeeding stages. These branches, the six Rs of capability transformation (renewal, redeployment or recombination, replication, retrenchment or retirement), reflect the notion that the lifecycles of capabilities and therefore capabilities itself may manifest themselves beyond the firms and industries in which they originated. They may also go beyond the products that they originally were applied to. (Helfat, Peteraf 2003)

Important extension of dynamic capabilities framework is the concept of exploration and exploitation. The exploitation can be defined as the refinement and extension of existing competences, technologies, and paradigms. Its returns are positive, proximate, and predictable. The exploration concept grasps activities that are related to experimentation with new alternatives, therefore distant, uncertain and often negative. (March 1991) Here it should be stressed that March (1991) had referred pessimistically towards explorative capabilities throughout the research paper. Here the author can argue that the statement of negative outcomes can be disapproved by further research into the explorative capabilities in later chapters.

Exploration includes activities captured by terms such as search, variation, risk taking, experimentation, play, flexibility, discovery, innovation. Exploitation may refer to activities such as refinement, choice, production, efficiency, selection, implementation, execution. (March 1991).

Here it seems natural to bounce back to sensing and seizing concepts of Teece (2007) referred previously. Teece (2007) argues that that they are related to but different from concepts

of exploration and exploitation. According to Teece (2007) sensing implies following activities: scanning, creation, learning, and interpretive activity. When the new opportunity is sensed, it is ought to be approached through new products, processes or services. Author argues although Teece (2007) makes a statement of sensing and seizing being different from exploration and exploitation there is significant overlap regarding these terms.

Based on extensive research there have been tensions and incompatibilities noted between exploration and exploitation capabilities. The argument follows that the exploration and exploitation capabilities tend to compete for the limited resources in the firm. Second aspect is that the organizational routines and mindset needed for them are different which makes coexistence intolerable. (March 1996)

This discussion leads to the concept of ambidexterity in the organization. The ambidexterity is defined by Birkinshaw and Gupta (2013) as an organization's capacity to address two organizationally incompatible objectives equally. The dilemma between exploration and exploitation and ambidexterity issue in the firm is described in the Figure 1. (Birkinshaw, Gupta 2013)

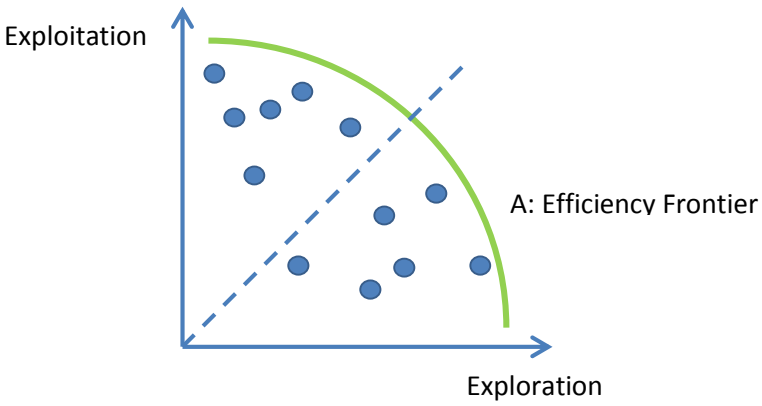

Figure 1. Different approaches to managing ambidexterity in the firm
Source: (Birkinshaw, Gupta 2013, 295)

The graph describes some of the firms being more ambidextrous than others by being able to deliver both dimensions at same moment. Companies are unlikely to deliver the highest level of performance on both frontiers and are limited by line A, so called “efficiency frontier”. The efficiency frontier can be pushed further by technological developments and innovations in management techniques. (Birkinshaw, Gupta 2013)

Although there might be tensions between exploration and exploitation some of the scholars have suggested several solutions in order to address this strategic problem. Based on Gupta et al (2006) exploration and exploitation may coexist in different domains. This means that if the exploration and exploitation capabilities are structurally separated which leads to lower interference and such coexistence in the firm is possible. Second one is by the Tushman and O'Reilly (1996) that suggest that integration of exploration and exploitation should be carried out by senior management in order to coexist. Second possibility is also supported by Birkinshaw and Gupta (2013) that emphasize managerial role in addressing issues related to ambidexterity.

With regard to previous concept it is interesting to assess whether the same type of tensions can be observed amongst of capabilities of the same type, explorative or exploitative, or the capabilities of the same type can co-exist synergistically by enhancing each other's performance. The hypothesis of possible tensions between same types of capabilities can be formed on the rational of exploration and exploitation concept. It might be possible that the same type of capabilities might compete for internal resources in the firm. The dynamic capabilities frameworks explicitly states that capabilities morph or change resources in order to gain competitive advantage of the firm. What if same type of capabilities try to steer the same type of resources onto different paths or morph them in different directions? Following this thought patter it is possible for same type of capabilities to compete inside the firm. On the other hand it is also possible that the same type of capabilities, given that firms strategic plan is implemented flawlessly by senior management, can co-exist. Furthermore, it can be hypothesized that they can co-exist synergistically by enhancing each other performance. For instance knowledge accumulated by one capability can be used by the both capabilities, which can enhance overall performance of the firm.

The continuous market change and substantial amount of investments in R&D made in high-technology sector can be noted (Hill, Snell 1988). This leads to strategic question, whether these costs are justified? At the same time there is significant trend of globalization of the markets. Is it risk rewarding for companies to internationalize or is it so called liability of outsidership for the company to serve only domestic market (Johanson, Vahlne 2009)? These questions and the context of previously mentioned theory and discussion lead to selection of R&D (Helfat, Peteraf 2003) and exporting (Knudsen, Madsen 2002) the dynamic capabilities those are in the scope of further research.

Based on initial research author did not find thorough academic ground with regard to co-existence of same type of capabilities explorative or exploitative. It is in the scope of further research to identify whether selected explorative capabilities have any effect on each other, whether positive or negative, either resources are competed away by neighbouring capability or the co-evolvement is encouraged and performance of each capability thrives in symbiotic relationship with same type of dynamic capability.

2. DYNAMIC CAPABILITY: RESEARCH AND DEVELOPMENT (R&D)

Continuous flow of innovative products and services are essential for firms in order to sustain competitive advantage in today's economy (Kor 2006). From the RBV perspective innovation is key element of competitive advantage of the firm (Hall 1993). Prahalad and Hamel (1990) suggest that long-term competitive advantage lies in capability of the firm to create essential technologies and skills that build innovative products more quickly and with less cost than the rest of the market. Some industries such as ICT (Information and communications technology) rely heavily on research and development especially on product innovation in order to gain superior returns (Hill, Snell 1988). The investment in R&D has been accepted industry wide as essential input for development of intangible assets and source of differentiation in the market (David et al 2001). As innovation and R&D are different concepts but sometimes used synonymously it is essential to define them.

. Based on Keeley et al (2013) extensive research of 2000 innovation incidents there are 10 key types of innovation which can be broken down into 3 segments: configuration, offering and experience. Configuration innovations are focused on the innermost workings of an enterprise and its business system and comprise profit model, network, structure and process innovation. Offering innovation is focused on an enterprise's core product or service, or a collection of its products and services and comprises product performance and product system innovation types. Experience innovations are focused on more customer-facing elements of an enterprise and its business system comprising service, channel, brand and customer engagement innovation. (Keeley et al 2013) R&D can be considered as a segment of the total innovation that theoretically can be initiated and performed in the organization. In terms of underlying framework R&D can be referred to as offering segment of innovation which comprises product performance and product system innovation.

Product performance innovation stands for activities related to quality, value and features of firm's product line. It involves new products, updates and product line extensions that add ought to add value. New product innovation is widely spread example of dynamic capability. (Winter 2003) It is not uncommon for product performance innovation to be mistakenly referred to as the sum of total innovation and used as idioms which with respect to definition is misleading. The basic outline of this kind of innovation can be simplification of product in order to satisfy customer needs, change the products to make them environmentally friendly, customize product to fit customer's needs according to specifications provided by the customer and enhancing the performance metrics of the product. Keeley et al (2013) uses examples such as year by year enhancement of the cars performance by car manufacturers, the on-going enhancement of hygiene products such as tooth brushes as typical examples of product performance innovation. He also argues that this kind of innovation is short-term and long-term competitive advantage in these cases is rather exceptional. (Keeley et al 2013) Enhancing performance of electronics appliances and computer devices, customizable offerings of cars, footwear and other products might serve as additional illustrative examples of product performance innovation.

Product system innovation refers to the system of individual products and services that are bundled together. The robust and scalable system is achieved by interoperability, integration and other means that connect otherwise separate elements into interconnected grid. This is the basis on which the ecosystem of products and other offerings is built by the firm. These integrated systems tend to appeal to customers and therefore might be another element of competitive advantage. (Keeley et al 2013) One of the most common examples of the product system innovation is bundled sets of product line elements which are sold as packages to the customers. In ICT industry it is wide spread practice for firms develop platforms to allow other participants to build platform specific software products. The mobile application stores (app stores), developer kits and APIs (Application Programming Interfaces) are the examples that this notion is manifested through. Other example of product system innovation is providing complimentary elements for existing products or product and service combination. In these cases products perform better together, although they can be separately used. (Keeley et al 2013) In this case there is a synergistic element to the system which creates additional value to the customer, therefore can be priced at premium.

There are eight characteristics of R&D that are considered to be best practice and are implemented by market leaders in different market segments. The characteristics are explored further in the chapter.

Company's ability to offer product that is differentiated, with unique customer benefit and superior value is top success factor for the company. The products that are developed bearing in mind previous characteristics are more successful than their counterparts without those qualities. These products have five times higher success rates, are four times more profitable and have four times market share than analogue products than products lacking those qualities. (Cooper 2000b) The Cooper (2000b) found that there are two aspects that drive current issue: (a) copying existing products with little differentiation and (b) engineering products for sake of ideal engineering by building the perfect product not taking into account customers. Ries (2011) has also stressed the importance of continuous checking product for actual market fit. In the light of previous argument Cooper (2000b) found that wide range of companies lack "product superiority" as selection criterion and the processes that should encourage such action are not in place. The companies tend to favour simple, inexpensive projects and reduce cycle-time which hinders the projects that lead to product superiority.

Second one is research and development division ability to perform thorough market and competitive analysis. It involves research of customer preferences, technical and operations feasibility and concept testing. (Cooper 2000b) This is also in line with Ries (2011) build-measure-learn cycle concept which involves continuous prototyping and experimenting that leads to enhanced product. Cooper (2000b) sees that multiple companies tend to bypass extensive research and prototyping stages and jump into development. R&D processes that are built that way tend to be with rather unsatisfying outcomes. There is positive correlation to be observed between well-established pre-development stages and financial performance. The data shows that companies tend allocate unsatisfyingly 16% of R&D project time on to pre-development stages. (Cooper 2000b)

Third in the list is the company's ability to define the product before development begins. Product definition implies four key components: (a) target market definition (b) product concept and benefits to be delivered (c) positioning and pricing strategy (d) product features, attributes, performance requirements and high-level specs. The definition should be driven by market data.

Failing to define product can lead to new product failure and significant product launch delays. (Cooper 2000b)

Fourth best practice element is an implementation of Go/Kill decision points throughout product development process. This requires portfolio management approach, where each new product project is viewed as an investment. Cooper (2000b) finds that usually there are many projects that the firm shouldn't have proceeded with. He also notes that there is a tendency not to kill the project once the project has been proceeded with. This usually results in selecting marginal projects which leads to impractical allocation of the resources by the firm. Correlation between established Go/Kill funnel in R&D project management is correlated with profitability of new-product launches. (Cooper 2000b)

The fifth element is with regard to company's ability to leverage its core competences in new product development. This strategic approach implies that the R&D projects needs and the company's resources and accumulated knowledge are in line. (Cooper 2000b)

Sixth is the company's ability to build international orientation into new-product development. The international orientation seeks to design products to fit domestic and international market. There are two outputs as a result of current strategy: glocal or global product. Glocal product is built upon one product concept with one development effort, but usually has several product variations in order to satisfy different market segments. In case of global product one version of the product is assembled for the global market. International orientation also implies the processes and project teams that are international and gathering product's design from multiple targeted geographical markets. Cooper (2000b) finds that the strategy of building product for domestic markets and later adapting for international markets tends not to work. With that in mind, he finds that North American companies often fail to consider international dimension. (Cooper 2000b)

The eight is senior management's perspective to commit to R&D as a source of growth. It involves developing a strategy, setting goals and the vision for R&D. It implies resource allocation and resisting temptation to divert allocated resources from projects to cover short-term financial needs. Sticking to the initial plan of launching new products and supporting project development teams by mentoring and facilitating is an essential part of overall R&D strategy. Although it is important for senior management not to get involved in daily management of the projects and not to micromanage the initiated projects. (Cooper 2000b)

Helfat and Peteraf (2003) identified three initial stages of a capability lifecycle - founding, development, maturity - followed by possible branching into six additional stages. These branches, the six Rs of capability transformation (renewal, redeployment or recombination, replication, retrenchment or retirement) as mentioned previously. With regard to previous framework R&D capabilities may be altered to different courses in capability life-cycle. The R&D capability may enter renewal stage in case new techniques for conducting R&D become at firm's disposal. In case there are markets that require similar knowledge base the redeployment of R&D capability might occur in the firm. Helfat and Peteraf (2003) share the example in the U.S oil industry, where many petroleum companies undertook R&D on synthetic fuels because it allowed them to redeploy an R&D capability in oil refining, where similar production processed were utilized. The capabilities which face retrenchment or retirement may be replicated or recombined by the firm. (Helfat, Peteraf 2003)

As noted by Helfat (1997) the existing know-how within the firm which is accumulated through R&D and operations may serve as useful source of accumulation of knowledge. This process might be an important input in producing economies of scope which in turn might lead to reduction of unit costs of products. Helfat (1997) stresses that economies of scope tend to be largest in case speculative technologies draw knowledge from established technologies. The speculative technology lacks accumulated knowledge that it can rely on. In this case firm might consider relying upon established R&D practices and operations in technologically related business application. This kind of practice of relying upon R&D and other knowledge in related established technologies rather that related but less developed technologies tends to provide most significant potential for economies of scope. This is due to the nature of less established technologies not being reliable enough and having knowledge that is usable in a lesser extent. (Helfat 1997)

2.1.R&D effect on profit

New products account for about 32% on average of company sales as of 2000 up significantly from the 1980s. Here new products are defined if they have been on the market by the company for five years or less. Corporate profits are influenced by new products in similar fashion. From the period of 1976 to 1981 to 1990s the average new products contribution to corporate profits is up by 7% from 22% figure of 1976 to 1981 period. By 2000s new products

contribute one third of corporate profits on average. By comparing average numbers with industry leaders even greater gap is observable. The share of profits and revenues derived from new products amongst market leaders in both cases is 49,2%. (Cooper 2000a) The profitability of new products is also emphasized by the Cooper (2000a). The research of 203 representative new product launches of U.S businesses shows that two thirds of the new product launches can be considered commercial success. The average ROI for successful new products is 96.9%, the average payback period is 2.49 years and the average market share in their defined target markets is 47.3%. (Cooper 2000a) Astebro (2003) research supports (although not in the same magnitude) the profitability of new inventions based in Canada with finding that average IRR of inventions portfolio was 11,4%, findings also suggest significant skewness of the returns. Out of 1091 inventions 7-9% reached the market, six realised returns above 1400%, 60% of those that reached the market obtained negative returns and the median was negative. (Astebro 2003)

Cooper (2000a) found some deviation in portion of new products contribute to company's sales and profits on industry by industry basis. The highest contribution was in high-technology sector while other industries were closer to previously stated mean.

There is substantial amount of research evidence that confirm R&D and innovation effect on company's performance. With respect to previous statement following studies describe representative research ground on R&D effects on corporate profits.

Geroski and Machin (1992) find that there are positive effects of innovation of company's profits based on the study of UK firms. Their findings suggest that these effects are relatively small and transitory but their indirect effects are larger and long-term. It is stressed that process of innovation is important rather than returns of individual innovation.

Other UK based study suggests that non-innovators are less profitable than innovators. The findings emphasize that the gap is even greater between persistent innovators and non-innovators. (Cefis, Ciccarelli 2005) Cefis and Ciccarelli (2005) also suggest that innovation has positive effect on company's profits although they stress the fact that the effect decreases over time.

One US based study of pharmaceutical industry found that high innovative propensity tends to result in temporary monopoly positions at the product level which translate into persistent profitability when aggregated to the firm level. The results of the study clearly demonstrate that innovative propensity influences in extent that abnormal profit outcomes persist over period of time. (Roberts 1999)

Leiponen (2000) study reveals results of process and product innovation on company's profits based on the study of Finnish manufacturing firms. The results show that process innovation has a positive effect on profitability. Product innovation has interestingly negative effect on company's profits. The findings also suggest that the innovators and non-innovators profitability is determined by different factors. The knowledge based factors were more important for competences built by innovators.

Mata and Woerter (2013) investigated the impact of internal and external innovation strategies on the profitability of firms. Based on the study of Swiss 5 963 firms during 1999-2005 year timeframe they found that external strategies (contracting external R&D or cooperating with external partners in R&D projects) exert a positive impact upon performance. (Mata, Woerter 2013)

The research conducted by Hanel and St-Piere (2002) result seem to confirm that R&D and innovation have positive relationship on profitability of the firm based on the research conducted amongst Canadian companies. They underline that R&D capital effect is positive although lagged. The effect was especially strong in the industries where the firms were able protect the results of R&D execution for instance in the industries where patent protection was effective. The initial author raised the question of whether the persistent high profits of innovators relative to non-innovators were due to notion that the products of innovators were protected from the competition or that the firms produced successful multiple innovation over time which allows companies to maintain high profits. (Hanel, St-Piere 2002)

The ambiguous result from previous study had been clarified by Robert (1999) study performed amongst US pharmaceutical firms. The findings of the study suggested that the pharmaceutical firms produce so called "conveyor belt" of the new products each which provide only temporary monopoly position. Collectively in succession these products provide persistently high profits for the firm. It can be argued whether the results can be generalized. The pharmaceutical industry is known for on-going research of new products and these kind of pace is not representative for other industries. (Love et al 2009) Although it can be argued that for instance pace of product change in the ICT sector is substantially high and can be comparable with pharmaceutical industry.

One study found that in pharmaceutical industry the concentration of company patents within a few patent classes had positive effect on company's profits and sales (Henderson,

Cockburn 1996). The patents are generally accepted as adequate measure of R&D capability. Current topic is thoroughly covered in next chapter.

Hundley (1999) study suggests controversial result with respect to previous research papers. The study found that Japanese companies tend to increase its R&D expenditures when profitability of the company declines. Seemingly decreased profits indicate to the management overall downturn of the company. The decreased profitability indicates the need to invest in development of new products and services as source of long-term growth strategy. In case increasing profits it may indicate the lesser need for sustaining or increasing R&D levels. This notion of Japanese firms to increase R&D spending when profits are down is in line with shearholders policy in Japan that tend to have significant interest in the long term prospects of the company (Hundley et al 1999) The R&D expenses are considered to be one of the metrics that is widely used in research field and by the industry to measure R&D capability (for more detailed analysis refer to the next chapter). The finding by Hundley G. (1999) can be interpreted that R&D capability may not have positive effect on company's profits at least in the short-term or that the effect is lagged. These findings might not be considered as generalizable due to the notion of specific shareholders strategy in Japan. The diversified finding might refer to heterogeneity of current notion across the global markets, although vast majority of previous researches might indicate to marginal distribution of current notion across the global markets.

Table 1. Summary table of R&D effects on performance

Industry	Country	Effect on performance	Source
Manufacturing	Finland	Positive	Leiponen (2000)
Pharmacy	US	Positive	Roberts (1999)
Range of industries	US	Positive	Cooper (2000a)
Range of industries	UK	Positive	Geroski and Machin (1992)
Range of industries	UK	Positive	Cefis and Ciccarelli (2005)
Range of industries	Switzerland	Positive	Mata and Woerter (2013)
Range of industries	Canada	Positive	Hanel and St-Piere (2002)
Range of industries	Japan	Short-term negative, long-term positive	Hundley (1999)

Source: made by the author

2.2.Measuring R&D capability

There are vast amount of variables established by previous research (Griffin, Page 1993, Schumann, Ransley 1995, Brown, Svenson 1998) that can be used in order to measure R&D capability. The substantial amount of research was studied during course of literature review to determine R&D metrics for optimal R&D measurement. There were two goals that the review of the literature intended to meet: (a) to establish the most popular metrics and (b) to cover input and output variables as suggested by Brown and Svenson (1998) framework. The selection of variables is planned in the methodology chapter based on findings in current chapter.

Many researchers use research and development expenditures, patents or a combination of the two as indicators of firms' technological capabilities (Coombs, Bierly 2006) It appears that, certainly in large parts of the economics literature, raw patent counts are generally accepted as one of the most appropriate indicators that enable researchers to compare the inventive or innovative performance of companies in terms of new technologies, new processes and new products (Hagedoorn, Cloodt 2003). Patel and Pavitt (1994) also found that within U.S. industrial sectors, most firms had patents clustered in technologically related fields. The research by Hagedoorn and

Cloodt (2003) uses number of patents held by firm and R&D expenditures as metric in order to measure R&D performance of the firm.

In the study of Helfat (1997) the R&D intensity (R&D expenditures divided by firm sales) was one of the indicators to measure R&D performance. Researchers frequently use an R&D intensity variable (R&D expenditures divided by sales) to measure an effect of organization size on R&D expenditures. (Helfat 1997)

Oriani and Sobero (2008) use R&D capital and book value of intangible assets as measurements of R&D capability. The R&D capital has been computed as a perpetual inventory of the past R&D expenditures. The authors thought that capitalization of R&D investments is needed because annual R&D costs are not capitalized in the balance sheet, but they are normally expensed when they occur (Oriani, Sobrero 2008).

In the research paper of Levitas and Mcfadyen (2009) the R&D intensity and patent value are used as independent variables describing R&D performance. Although the authors define and calculate R&D intensity by dividing the firm's yearly R&D expenses by total assets in the same year. Current approach is consistent with wider spectrum of academic studies and industry practices. R&D investment intensity is typically calculated as the level of investments divided by the firm's sales, assets, or number of employees. (Kor 2006) The rational to standardize R&D expenses by total assets might be that some firms do not have sales in the early years of product development. Patent value is calculated as function of patent citations with elaborate approach created for the specific research study needs. (Levitas, McFadyen 2009)

Bremser and Barsky (2004) suggest that most frequent metric to measure R&D is R&D intensity the R&D spending as percentage of sales ratio. One of the most frequent is also patent count and change in R&D headcount (Bremser, Barsky 2004). As the change in R&D headcount is a function of number of employees on the specific date, current metric might also be considered as metric used in wide range of research studies. Tomiura (2007) used R&D intensity and number of patents owned by firm in order to describe R&D performance.

Kerssens-van Drongelen and Cook (1997) suggest that such financial metrics as IRR and ROI can be used to measure R&D performance. Based on Daspit (2012) the R&D capabilities can be benchmarked to the competitors. Therefore benchmarking of such financial metrics as ROI to industry average can be important indicator in order to compare R&D capabilities of the firm to the rest of the industry.

Griffin and Page (1993) described that ROI can be used as one of the financial performance metrics as well as cost of developing the product or more holistically R&D expenditures. Schumann et al (1996) brought out measurements such as R&D expenditures, R&D intensity and ROI as indicators of R&D capability.

Table 2. Summary table of R&D metrics

Metric	Source
R&D expenditures, patents	Coombs and Bierly (2006)
Raw patent count, no of patents	Hagedoorn and Cloodt (2003)
R&D capital, book value of intangible assets	Oriani and Sobrero (2008)
R&D intensity	Helfat (1997)
R&D intensity, patent value	Levitas and Mcfadyen (2009)
R&D intensity, no of patents, R&D headcount	Bremser and Barsky (2004)
R&D intensity, no of patents	Tomiura (2007)
IRR, ROI	Kerssens-van Drongelen and Cook (1997)
ROI, R&D expenditure	Griffin and Page (1993)
R&D expenditures, R&D intensity, ROI	Schumann et al (1996)

Source: made by the author

3. DYNAMIC CAPABILITY: EXPORT

There are few models that tend to explain company's internationalization behaviour into the export markets.

The empirical research performed within the scope of Uppsala internationalization model based on Swedish companies form range of industries that the first step in internationalization process was ad hoc (spontaneous) exporting. The next step in the internationalization was engaging in formalized operations through intermediaries. The intermediaries in the form of agents represent companies in the foreign markets. In case the performance of the company in the foreign market is in upward trend and having positive outlook the subsequent step in the internationalization is replacement of agents with companies own organization in the foreign market which might manifest in the form of overseas sales division. Further step in internationalization involves substantial investment in foreign markets and involves allocation operations in form of manufacturing. The strategic move involves overcoming trade barriers and thus lowering product costs. (Johanson, Vahlne 1977)

Another essential aspect of the framework is concept of physic distance of the foreign markets. The theory suggests that companies tend to start their foreign operations in the foreign markets that are close in terms of physic distance. Further internationalization steps involve gradual expansion with respect to physic distance. It is explicitly noted in the theory that it is more complicated for companies to understand foreign environment with increased distance. The notion is rooted in liability in foreignness concept which explains why foreign investors need to have firm-specific competitive advantage in order to offset this liability. The liability of foreignness increases with psychic distance. (Johanson, Vahlne 1977)

Bounded rationality can be considered as the fundamental assumption of Uppsala model. Thorough description of the dynamic aspect of the firm's capability to internationalize is further examined. There are two mechanisms involved (refer to the figure 2) when it comes to how companies change. First mechanism involves knowledge accumulation are change through current

activities which involves in most part current operations. Second mechanism involves making commitment decisions in order to strengthen company's strategic position which involves making investment decisions. The degree of investment indicates the degree of commitment although there are some exceptions. The investments made in assets that have active after-market do not indicate high commitment as they are easily disposable. The commitment is in that case is substantially lower as than if the investments were made in assets that are not as liquid. The accumulation of knowledge through experience builds the knowledge base of the firm that is relied upon when scales of investments are determined. These investment decisions feed successive actions thus encourage more learning which leads to perpetual loop. (Johanson, Vahlne 1977)

It might be interesting to once again refer to Helfat and Peteraf (2003) capability lifecycle development stages - founding, development, maturity - followed by possible branching into six capability transformation stages (renewal, redeployment or recombination, replication, retrenchment or retirement) and Winter (2003) concept of hierarchy of dynamic capabilities. Based on perpetual knowledge accumulation as described by Johanson and Vahlne (1977) the McDonalds and Starbucs can be used as example with their market expansion strategy of zero level capability redeployment or replication into foreign markets which is executed by higher order capability. (Winter 2003).

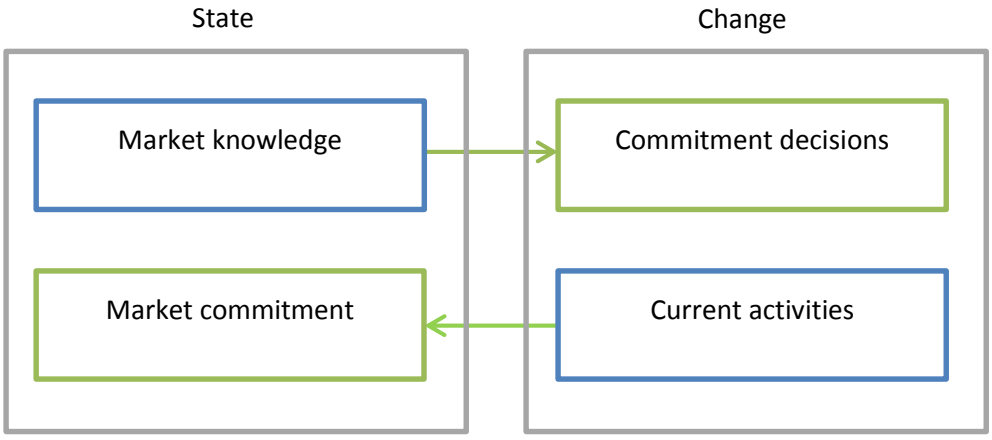

Figure 2. The basic mechanism of internationalization: state and change aspects
Source: (Johanson, Vahlne 1977, 26)

After the criticism of the model (Oviatt, McDougal 1994, Knight et al 2004) and significant changes in the market conditions over 40 year period the model was tweaked by the same authors. The 2009 Uppsala model deals with business networks where actors are engaged in enabling and constraining at the same time which leads to a grid of wide variety of interdependent relationships. The actions of strengthening network position by the firm are seen as internationalization in current model. In current model the distinction between expansion and entry are vague and less relevant as networks are borderless. The traditional view of entry which involves overcoming various barriers is less important. The strengthening of firm's position in the network is main goal of the company with regard to current framework. The existing business relationships markedly impact the geographic market the firm will decide to target and which entry mode to execute. (Johanson, Vahlne 2009).

Similarly with initial Uppsala model 2009 model consists of two sets of variables: state variables and change variables as shown in figure 3. The variables affect each other, the change having impact on current state and inversely. The same dynamic and knowledge cumulative effect is at the basis of the model as in previous one. The increasing knowledge may have positive as well as negative effect on trust building. (Johanson, Vahlne 2009)

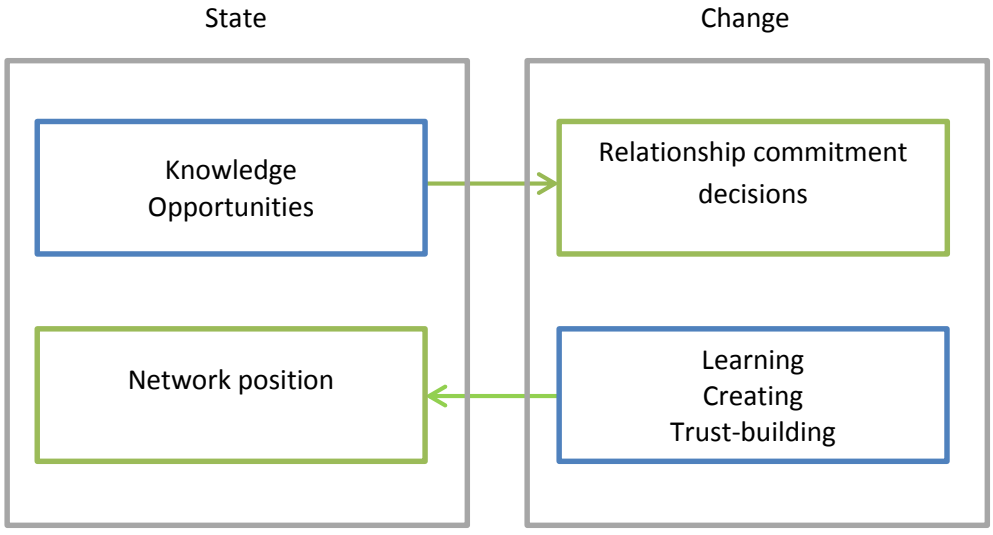

Figure 3. The basic mechanism of internationalization: state and change aspects
Source: (Johanson, Vahlne 2009, 1424)

The first state variable recognition of opportunities as subset of knowledge is essential piece of the framework. Needs, capabilities, strategies and networks of directly or indirectly related firms are also important components of knowledge. (Johanson, Vahlne 2009)

The second state variable the network position represents the model paradigm that internationalization process is performed within the network of relationships. Knowledge, trust and commitment characterizes relationships which are possessed on different levels by parties and are unevenly distributed amongst them which in turn may affect how the internationalization is pursued by the firms. (Johanson, Vahlne 2009)

The both change variables are adopted from the initial model but now more explicitly stated. The relationship commitment decision variable implies that the focal firm decides either to increase or decrease the level of commitment to one or multiple relationships in its network. The processes of learning, creating knowledge, and building trust are more explicitly stated in current model although implied in previous model. Learning capability is at higher level of abstraction and is more than experiential learning although is regarded to be the most important kind of learning. (Johanson, Vahlne 2009)

There are two models that argue with initial Uppsala internationalization model. The international new ventures and born global academic approaches argue that due to rapid change in market conditions during 40 years some significant adjustments should be made to a model. Authors argue that Uppsala initial model describes only a sub-segment of enterprises.

The international new ventures are defined as business organization that, from inception, seeks to derive significant competitive advantage from the use of resources and the sale of outputs in multiple countries. These firms are distinguishable by their international origins which are manifested through significant commitments of tangible and intangible resources. The focus in the framework is on the age of the firm and not on the size. (Oviatt, McDougal 1994)

The framework stresses that in order to organization to qualify for International New Venture there has to be (a) internationalization of some transactions (which distinguishes transactions that are governed by markets from the ones that are performed in the organization) (b) alternative governance structure and (c) foreign location advantage (which distinguishes transactions in domestic market from the ones that are performed internationally). In order for International New Venture to qualify as Sustainable International New Venture which

differentiates from short-lived enterprises, it has to perform extra step and have (d) competitive advantage defined by authors as unique resources.

Alternative governance structure is stressed in the framework by the authors due to lack of sufficient resources to control many assets through ownership by the new ventures. Alternative governance structures may be manifested in hybrid structures such as licensing and franchising. (Oviatt, McDougal 1994)

The location advantage element of the framework distinguishes international from domestic organizations. The authors argue that key for International New Venture is to overcome barriers to entry. As the stress MNEs often rely on economies of scale to overcome such barriers whilst international new ventures usually rely on private knowledge. Despite that fact private knowledge may be the source of differentiation for both MNEs and international new ventures and might establish competitive advantage in order to successfully compete with well-established foreign firms in multiple markets. The authors refer to example of software creation as example of private knowledge. The software creation might require timespan of multiple years for development and afterword copied and sold the infinite amount of time (of course restricted by market demand) and distributed with fraction of cost. (Oviatt, McDougal 1994)

The model suggests that knowledge is at some degree a public good which means that knowledge-based international new venture competitive advantage can be diluted. The competitive advantage can be retained by such measures as patents, copyrights or trade secrets. The imitation by the competitors can be prevented by socially complex knowledge, unique organizational history and ambiguous casual relationships between knowledge and the competitive advantage. Licensing is the third way outside use of a venture's knowledge may be limited. The use of limit pricing strategy may be used in order to discourage competitors to imitate. This strategy is useful if knowledge is expected to retain its value over lengthy period of time. (Oviatt, McDougal 1994)

Born-global theory suggests that there is a sub-segment of companies that are subject to rapid expansion from the inception and the expansion is not restricted to any region. The global market is targeted from the day of founding and is part of global strategy. Born globals leverage innovativeness, knowledge and capabilities despite scarcity of resources such as human, financial and tangible assets to obtain global market coverage early on. The born globals are defined by the Knight et al (2004) as business organizations that, from or near their founding, seek superior international business performance from the application of knowledge-based resources to the sale

of outputs in multiple countries. (Knight et al 2004) The holistic view of the framework is displayed in figure 4.

Figure 4. Conceptual framework of constructs and linkages in Born global framework
Source: (Knight et al 2004, 129)

. The international entrepreneurial orientation and international marketing orientation are the key elements of organizational culture level of the firm. The international entrepreneurial orientation reflects managerial mindset which is aimed to pursue innovation centric collection of strategies that are aimed to maximize global profits. Knight et al (2004) suggest that for born globals entrepreneurial mindset is crucial in order to develop high quality products that are technologically advanced and distinctive and are subject to international success. (Knight et al 2004) The author thinks it is important to stress that this model implies innovative mindset to be crucial which may also imply development on R&D capabilities, thus being a part of global expansion strategy form the inception of the firm.

International marketing orientation is second pillar of organizational level of born global theory that drives superior international performance. Born global managers are faced with unique and uncontrollable challenges due to multi-country context. International marketing orientation stands for knowledge of customers, product development and adaptation as well as manipulating key marketing elements to target foreign customers with differentiated and quality goods. (Knight et al 2004)

The strategy level components global technological competence, unique products development, quality focus and leveraging foreign distributor competences are significant drivers of global superior performance. Technological excellence and quality help firms to develop products that fit into the global market. Global technological competence, unique products development and quality focus which are related to activities such as innovation, R&D, knowledge development and firms capabilities synergistically ensure that born globals are well positioned in order to gain international success. These activities are essential for positioning and development product line offerings. The unique products can offer temporary monopolistic advantage which enhances internationalization. Bottom line is that innovation driven process of developing superior products is particularly important for born globals based on extensive research data. (Knight et al 2004)

Knight et al (2004) suggest that strong relationships with competent foreign distributors are significant element in achieving superior performance abroad. The results of their research study show that the born globals target 20 countries world-wide on median. It seems that leveraging strong foreign ties is a key element of strategy taking into account relatively young age of the companies and tendency to internationalize via exporting. Foreign distributors give significant competitive edge to the companies by selling products, gathering market intelligence, providing access to foreign networks of contacts, deepening relations in existing markets and reaching new segments of customers. (Knight et al 2004)

3.1.Export effect on profit

Number of empirical studies has indicated that the internationalization process as explained by Uppsala model has a positive impact on performance (Johanson, Vahlne 2009). It should be stressed that in referred studies the performance was defined with vide variety of metrics although wider implication might be considered relevant.

Katrak (1983) findings based on the study of Reserve Bank of India on India Multinational Enterprises (MNEs) are that under global profit maximization (GPM) a parent company will take account of the effects of the subsidiaries' exports on its (i.e. the parent's) net global profits: specifically, the parent's maximization calculus will require that the amounts exported by the subsidiary be higher the higher is the parent's ownership share in the subsidiary. GPM requires that the parent company takes account of the interdependences of profits among the various units of the MNE, rather than allowing each unit to try and maximize independently. (Katrak 1983)

Delios and Beamish (2001) found that internationalization process as explained by Uppsala model has positive effect on companies' profits. With regard to Uppsala model, current study analysed later stages of gradual expansion such as join-venture and FDI. The study was conducted amongst 3080 subsidiaries of 641 Japanese firms that all were engaged in manufacturing (Delios, Beamish 2001).

Westhead et al (1990) research of 621 companies largely in manufacturing, construction and in services industries in Great Britain results show similar tendency that export has positive effect on firms profits.

Findings of comprehensive research of 18 000 enterprises in Germany suggests that there is a positive effect of export on firms profitability. Interestingly only firms that generate 90% and more of their total sales abroad do not benefit from exporting in terms of an increased rate of profit (Fryges, Wagner 2010).

Bausch and Krist (2007) research confirmed that internationalization positively relates to firm's performance. The research used method of meta-analysis by integrating findings form 36 studies from following journals: *Strategic Management Journal*, *Academy of Management Journal*, *Journal of International Business Studies*, *Journal of Business Venturing*, *Management International Review* and *International Business Review*. (Bausch, Krist 2007)

Interestingly some scholars find that prior research stream have been inconclusive and contradictory and that there is also an evidence for some contradictory results. (Fryges, Wagner 2010) It should be stressed that majority of scholars and broader research evidence is rather inclined to consensus of export capability having positive effect on firm's profits.

Table 3. Summary table of export effects on company's performance

Industry	Country	Effect on performance	Source
Range of industries	India	Depends on ownership share of subsidiary	Katrak (1983)
Manufacturing	Japan	Positive	Delios and Beamish (2001)
Manufacturing, construction and service industries	Great Britain	Positive	Westhead et al (1990)
Range of industries	Germany	Positive until 90% external revenue to total sales threshold is reached	Fryges and Wagner (2010).
Range of industries	Multiple countries	Positive	Bausch and Krist (2007)

Source: made by the author

3.2.Measuring export capability

There wide range of variables is used in the research field in order to measure export capability (Cavusgil, Shaoming 1994). The goal of the review of the literature was to identify metrics that are widely used in the research field and select the metrics that are widely codified and measured. The latter ensures that the data can be obtained from well-established databases and

selected firm's annual reports. The research approach is thoroughly described in methodology chapter.

In the study based on Irish manufacturing firms Love et al (2009) have used export intensity the ratio of export sales to total sales were used as indicator of export performance.

Similarly as in prior study Diamantopoulos et al (2014) used export intensity as portion of total sales derived from exports in their study as one of many variables to describe export capability. The study was based on the data of 194 exporting Austrian companies.

In line with prior studies Axinn (1988) found that export sales turnover to total sales turnover was export performance metric was suitable to use in order to measure export performance. The rational is based on the two aspects as described by Axinn (1988). First of all the metric shows how deeply the company is involved in exporting and secondly how successful is the company in exporting operations. (Axinn 1988) Based on the current argument it can be interpreted that the export intensity is comprehensive metric to describe export capability performance.

Boso et al (2013) used export sales turnover to measure export performance in the study where conditions under which firm innovativeness is least or most beneficial to exporting firms. The study was conducted amongst Ghanaian, Bosnian and Herzegovinian firms.

There are multiple other authors that have used export sales turnover as measurement of export performance (Axinn 1988).

Table 4. Summary table of export capability metrics

Metric	Source
Export intensity	Love et al (2009)
Export intensity	Diamantopoulos et al (2014)
Export intensity	Axinn (1988)
Export turnover	Boso. et al (2013)
Export turnover	Axinn (1988)

Source: made by the author

4. R&D AND EXPORT CAPABILITIES BILATERAL EFFECTS

Knight et al (2004) has noted R&D effect on exporting activities. R&D in addition to introducing new goods and methods of production also supports the opening of new markets and reinvention of the firm's operations to serve those markets optimally. With regard to born globals there is conjecture formed on limited consensus that they undertake R&D projects that lead to entering new foreign markets, or they observe other early adopters of internationalization entering foreign markets and imitate such behaviours accordingly. (Knight et al 2004)

Similar finding was revealed by Bernard and Jensen (1999). They arrived at the conclusion that producing new products (executing R&D capabilities) by the firm lead to exporting.

Ito and Pucik (1993) research finding suggests that export sales are positively associated with R&D expenditures and average R&D intensity of an industry. More holistically speaking they found positive relationship between R&D and export. The research was conducted amongst Japanese firms in range of industries. (Ito, Pucik 1993)

Empirical findings of Filatotochev et al (2009) indicate that there is consistent positive effect of R&D on export performance. Based on the research conducted amongst Chinese firms the authors suggest that high levels of R&D spending enable firms to respond quickly to the technological demands of global customers. The findings contrast with earlier studies of Chinese industry, which have found either that R&D intensity is not significant, or that it impacts negatively on the export performance of Chinese firms. (Filatotochev et al 2009)

Findings with reverse cause and effect relation have been introduced by Girma et al (2008) stating that previous exporting experience enhances the innovative capability of Irish firms through increasing R&D activity. Conversely, authors did not find strong evidence for such direct effects of previous exporting on R&D for British firms (Girma et al 2008).

Harris and Li (2008) suggest that undertaking R&D activities and having greater absorptive capacity (for scientific knowledge, international co-operation, and organizational structure) significantly reduce entry barriers into export markets, thus enhancing exporting performance

based on study of UK firms. Interestingly they find that only greater absorptive capacity (associated with scientific knowledge) seems to further boost upon market entry export performance in such markets, whereas spending on R&D no longer has an impact on exporting behavior (Harris, Li 2008).

Lachenmaier and Wösmann (2006) findings show that the innovation (measured as function of R&D intensity) leads to an increase of rough seven percentage points in the export share based on the study of German manufacturing firms.

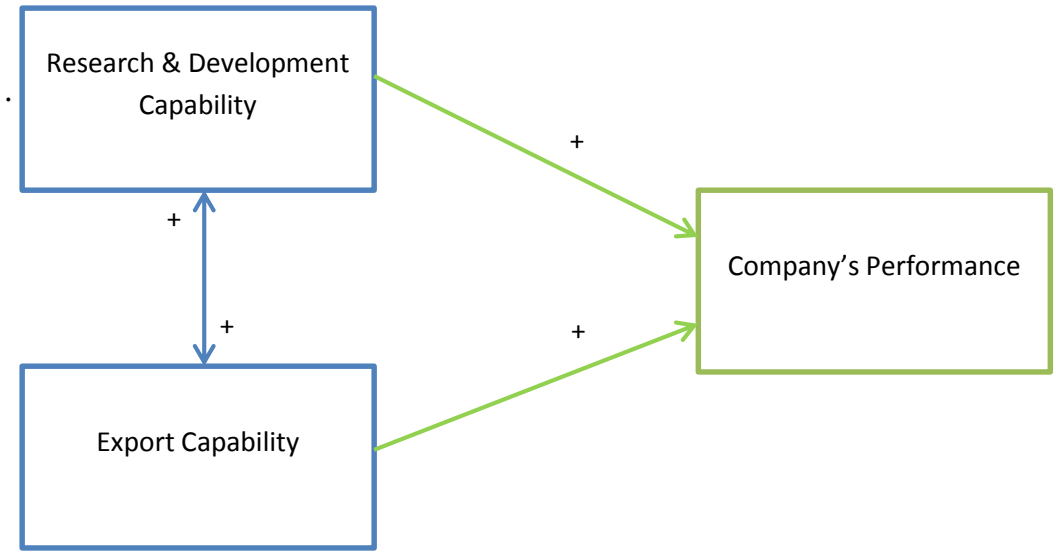

Figure 5. Research framework: variable relationships

Source: made by the author

5. METHODOLOGY

The goal of the study is to identify whether explorative dynamic capabilities such as R&D and export have effect on company's profits. Additional intention was to identify whether R&D and export compete for internal resources or the explorative capabilities enhance each other, thus have positive effect.

The empirical approach was chosen in order to attack current research question. The dependent variable describing performance of the company was chosen to be company's profits. Based on preliminary academic research of formal studies the number of parameters were chosen in order to describe capabilities that are in the scope of the research. The following table of independent variables describes the selection (refer to Table 5)

Based on selected variables the search for suitable databases was initiated. As there was no comprehensive database that had all the necessary data three different data sources were used in order to gather data. Based on data inquiries following databases were selected: *R&D Ranking of world top 2000 companies by European Commission, OpenSource, Annual Reports and SEC 10-K and 20-F fillings.*

Based on the first top 300 companies by R&D spending that were listed in *R&D Ranking of world top 2000 companies* the search for selected variables was initiated in all previously mentioned databases. The data for intangible assets and no of employees in R&D department was taken from 2012 financial year Annual Reports of the companies. For companies which equities are trading on US stock exchanges the SEC fillings 10-K and 20-F were requested (10-K for US domestic companies and 20-F for foreign companies that equities are trading in US markets). In case companies financial year ended not on 31.12.2012 the approach of maximum coverage of the 2012 year was taken. For instance if companies financial year ended before 30.06.2012 (inclusively) the 2012/2013 report was requested and if after 1.07.2012 (inclusively) the 2011/2012 report was requested. From initial 300 companies sample size it was narrowed down to

175 covering all requested variables except number of employees in R&D department. Second sample size with all variables included contained 52 companies.

Table 5. Variables selected for empirical study

Independent variables: R&D			
Metric	Unit	Database	Reference to previous studies
R&D expenditures	Million EUR	R&D Ranking of world top 2000	Hagedoorn and Cloodt (2003)
R&D intensity (R&D expenses to total sales ratio)	Ratio (%)	R&D Ranking of world top 2000	Helfat C. E. (1997)
ROI (5 year average)	Ratio (%)	OpenSource	Kerssens-van Drongelen and Cook (1997)
ROI (5 year average) to Industry ROI (5 year average) ratio	Ratio (%)	OpenSource	Kerssens-van Drongelen and Cook (1997), Daspit (2012)
Patents and developed technology, value of intangible assets	Million EUR	Annual Report, SEC 10-K, 20-F filling	Levitas and McFadyen (2009), Oriani and Sobero (2008)
No of employees in R&D department	count	Annual Report, SEC 10-K, 20-F filling	Bremser and Barsky (2004)
Independent variables: Export			
External revenue	Million EUR	OpenSource	Boso et al (2013)
Export intensity (external revenue to total sales ratio)	Ratio (%)	OpenSource	Axinn (1988)

Source: made by the author

Table 6. Selection of dependent variable for empirical study

Dependent variable: performance			
Metric	Unit	Database	Reference to previous studies
Profit	Million EUR	R&D Ranking of world top 2000	Richard et al (2009)

Source: made by the author

In the database companies were segmented by ICB-3D, thus figure 5 describes sample of 175 companies segmented by the industry.

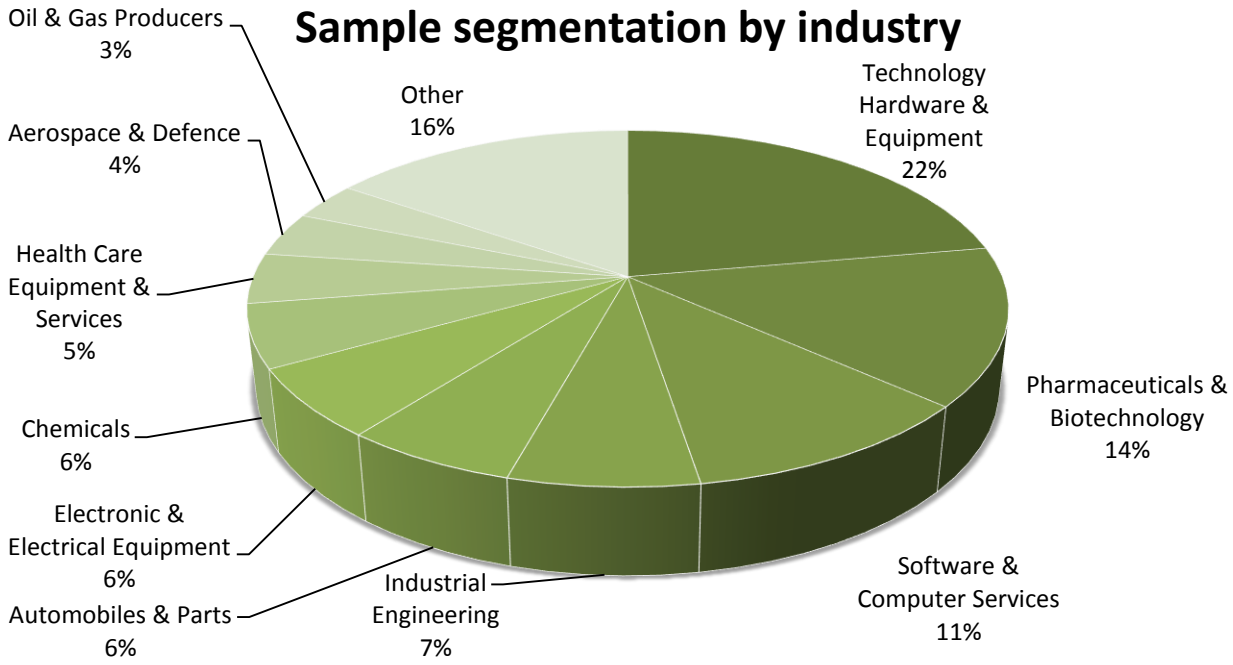

Figure 5. Segmentation of sample by industry

Source: author's data

The segmentation by country was also presented. The samples of 175 companies was segmented by country as following shown in figure 6.

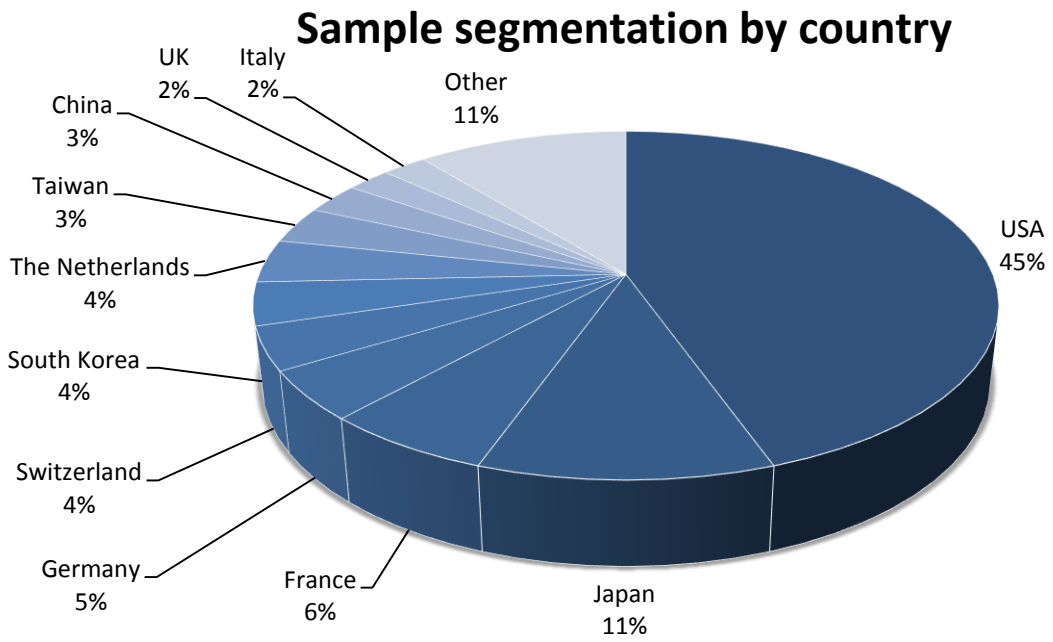

Figure 6. Segmentation of sample by country

Source: author's data

Figure 7 illustrates size of the companies in the sample by revenue brackets.

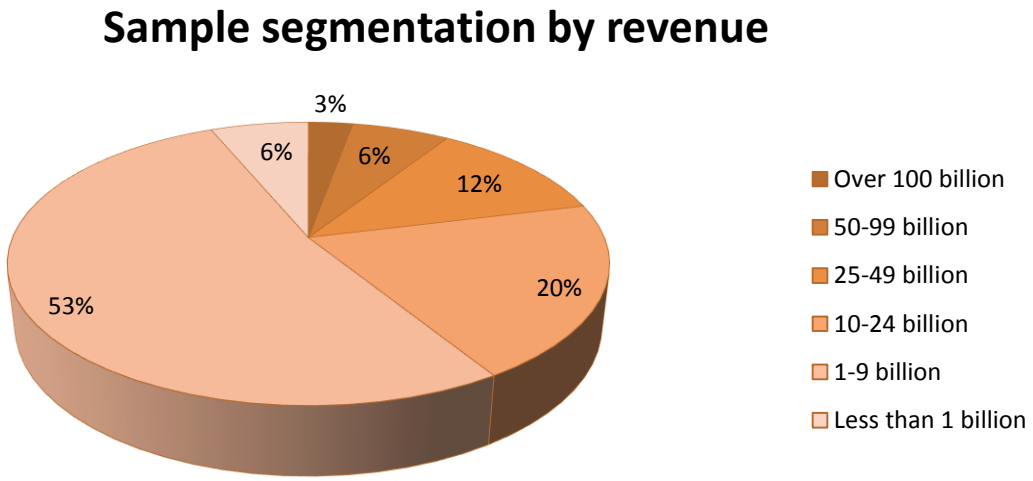

Figure 7. Segmentation of sample by total revenue in billions of euros
Source: author's data

As the figure 6 shows there were companies from multiple countries, which meant that annual report representation had also slight variation. The patents and developed technology asset valuation were defined differently in different financial statement notes. Here are some examples of disclosure of patents value in intangible asset financial statement notes: *intellectual property rights, products and product rights, patents, licenses and similar rights, patent rights, know-how and license agreements, developed technology, core technology etc.* The net asset value cost price less amortization was take for value of patents and developed technology as of 31.12.2012.

The correlation and regression analysis was performed based on the data. The four regression models were created. First regression model tends to describe relationship of independent variables of export capability to companies profitability. Second model comprises independent variables describing R&D capability (with exclusion of variable number of employees in R&D department) and explores effect on company's profits. The third regression model comprises independent variables of model 1 and model 2 with the goal to measure effect of export and R&D capability metrics on company's profits. Model 4 comprises all independent variables from previous models with additional independent variable (number of employees in R&D department) describing R&D capability added. The rationale behind separating model 3 and model 4 on the ground of one variable is due to the fact that data for 52 companies was found with regard to variable number of employees in R&D department.

The correlation analysis was performed for model 3 covering sample size of 175 companies and model 4 covering 52 companies. In order to analyse correlation matrix was generated.

Based on previously described analysis outputs (regression models 1,2,3 and 4, correlation matrix for model 3 and model 4) the extensive data analysis and interpretation was performed. Following chapter describes the results and interpretation of the results found by the study.

6. RESULTS AND DISCUSSION

6.1. Descriptive statistics

Amongst export variables the external revenue of the companies was substantial in 2012 (M= 18 673; SD= 30 752 m. EUR). For instance external revenues of the Volkswagen were substantially above other firms averages 154 943 m. EUR whilst Google external revenue was below average totalling 8 953 m. EUR.

The export portion of total sales was over half of total sales (M=0,60; SD=0,258). The current average characteristics of leading companies in the industries are below results identified in German study – 89%, the threshold where additional exporting does not improve profitability. (Fryges, Wagner, 2010, 417). The sample of 175 companies includes eight leading German companies such as Bayer, Basf, Continental, Daimler, Fresenius, SAP, Siemens and Volkswagen. The highest portion of sales derived from export was in Israeli Teva Pharmaseuticals and two Netherland companies ASLM Holding and Stmicroelectronics with the export's reaching 100% of total sales. The largest company with almost 0% of sales generated through exporting was US telecommunication company AT&T due to focus on domestic operations.

With regard to R&D characteristics the R&D expences (M=1 562; SD= 1 774 m. EUR) were on average 10% of total sales, so called R&D intensity metric (M=0,10; SD=0,084), in 2012. The top 3 companies based on R&D expenditures were Volkswagen, Samsung and Microsoft with expenditures totalling 9 515, 8 344 and 7 890 m. EUR respectively. One of the lowest expenditures was by Mitsubishi Motors ca. 305 m. EUR. The highest level of R&D intensity was in French company Ubisoft Entertainment with 36% of total sales allocation into the R&D. Oil and Gas Producers from different countries Royal Dutch Schell, China Petroleum & Chemicals and Gazprom had R&D expenditures in the range of 0,2-0,4% the lowest in the sample.

The high value of five year average ROI (M=0,09; SD=0,076) is due to substantial amount of industries represented in the sample where ROI is very high or above average (e. g. example Oil & Gas Producers, Automobile and Pharmaceuticals industries). The companies with the highest ROI were HTC and General Motors with 36% and 31% respectively. At the lowest band was Panasonic with average 5 year ROI of -10%.

The 5 year average ROI to industry average ROI (M=-0,211; SD=7,353) negative average value is slightly misleading due to underperformance of some industries. The average 5 year ROI of automobile industry was -0,43% due to the influence of previous recession. The metric is ought to indicate how many times over industry average the company is performing. Due to negative value of denominator with regard to some industries current average multiplier is uninterpretable and has to be dismissed. Although it can be stressed that the Canon Japanese technology company and Cummins US industrial engineering companies performed on average 5,9 and 8,8 above industry average respectively.

The companies had significant amount of patents and developed technology (M= 1 576; SD= 5 122 m. EUR) as of 2012. Interestingly all three companies with the highest patent and developed technology valuations were pharmaceutical companies – Pfizer, Merck US and Novartis – with patent and technology valuations 27 592, 19 141 and 14 544 m. EUR respectively. The high concentration of patents in pharmaceutical industry can be explained with peculiarity of the industry where companies are dependent on developing new patented products, thus charging higher premium until the patents are expired and production of generic products is pursued by the competitors. It is also in line with Love et al (2009) findings, where US pharmaceutical companies used “conveyor belt” strategy in order secure persistently high profits.

The substantial divisions of R&D were amongst 52 companies that were in the sample (M=10 162; SD= 9 206). Microsoft, Oracle and ZTE employed 36 000, 35 000 and 29 764 people in R&D departments respectively.

6.2.Export capability effect on company's performance

The results of the study reveal that there is substantial positive influence of export capability on company's performance (in case of current study profitability). Similar results were obtained by other academic studies (Westhead et al 1990, Delios, Beamish 2001, Fryges, Wagner 2010) The results of regression analysis are explored below (also refer to table 7).

Tested models suggest that external revenue has strong ($\beta_{ext.\ rev.}$=0,13) positive effect on company's profitability. Interestingly the external revenue to total sales ratio has negative impact ($\beta_{ext.\ rev.\ to\ total\ sales\ ratio}$=-3 070) with same magnitude ($\beta_{ext.\ rev}$*$M_{ext.\ rev}$=2 433; $\beta_{ext.\ rev.\ to\ total\ sales\ ratio}$*M $\beta_{ext.\ rev.\ to\ total\ sales\ ratio}$=- 1850) but slightly lesser than external sales. The findings suggest that if the company focuses on exporting capabilities it results in higher profit. But findings also suggest that the increase of external sales proportionally to total revenue have negative impact on profits, although the average net impact of export capability components on profits is positive.

Similar findings are noted in the correlation analysis (refer to the table 8). Findings suggest that export capabilities have positive effect on firm's profits. Most of the independent variables had positive correlation with profits. Strong correlation was identified between profits and external revenue ($r_{profit;ext.\ rev}$= 0,64). There was no correlation between external revenue to total sales ratio and profits ($r_{profit;ext.\ rev\ to\ total}$= 0) although in correlation with sample size 52 (refer to the table 9) the correlation was negative ($r_{profit;ext.\ rev\ to\ total}$= -0,22).

The effect of negative impact of external revenue to total sales ratio on profits could be explained with higher costs of advancing of export capabilities by the firm. The expansion to foreign markets requires higher expenditures especially if the expansion strategy comprises building new factories, facilities and other investments with high capital requirements as explained by later stages of Uppsala internationalization model (Johanson, Vahlne 1977).

Findings suggest that there is possible equilibrium of advancing exporting capabilities to maximize the profits. The results are also in line with Fryges and Wagner (2010) findings. Their findings show that export has positive effect on profit up until 90% of the revenue being generated by the export. When the threshold of 90% is breached the remaining exporting revenue has neutral effect on company's profits. (Fryges, Wagner 2010)

Export to sales ratio shows that almost two thirds ($M_{ext.\ rev.\ to\ total\ sales\ ratio}$=0,60) of revenues are coming from export operations. In case the company decides to further increase external

revenues without increasing domestic sales (by shrinking domestic market exposure or keeping it on the same level), the diminishing profits will be noted ($\beta_{ext.\ rev.}$=0,13; $\beta_{ext.\ rev.\ to\ total\ sales\ ratio}$=-3 070). Further pursuing of current strategy will result in equilibrium point or break-even point where the profits from export operations are zero beyond which company is operating with negative profitability. The equilibrium point was calculated on the basis of model coefficients and averages (β * M) and it was found to be 61% based on model 3 (R^2=0,62) and 79% based on model 1 (R^2=0,42) (Rungi, Ida unpublished) When compared with similar study, German companies suggest positive results between 0-89% of export intensity, reaching its maximum at 49% level (Fryges, Wagner 2010, 418). The results suggest that leading companies operate on average below ($M_{ext.\ rev.\ to\ total\ sales\ ratio}$=0,60) equilibrium point, thus generating profit with their export operation and having safety margin on average 19%-28%. (Rungi, Ida unpublished)

The results suggest that management faces the dilemma of capturing the overseas market or increasing short-term profits. As seen from the results leading companies are eager to balance on average and tend not to fall into extremes of the trade-off.

Export extreme dependency can be considered as disadvantage. Uppsala model recommends receiving first strong stand in homeland before going abroad (Johanson, Vahlne 1977). With time company may reduce homeland proportion from total sale, but it must stay within certain limits. Export operations are strategic advantage, but they imply different type of extra costs, such as transportation, local adaption, familiarizing market and usually higher salaries (Fryges, Wagner 2010, 399).

Export intensity is dependent on internal resource-based factors (e.g. firm size, management) and external industrial organization factors (e.g. environmental turbulence, cultural proximity, market competitiveness) (Sousa 2004, Sousa et al 2008). High export intensity is related with high industry instability, high R&D intensity, low concentration (i.e. the sample of the same top 2000 companies gives similar indication), high labour productivity (Fryges, Wagner 2010, 399), and negative export-orientation of industry, where R&D and capital intensities are not as important as others (Reis, Forte 2014, 18).

The difference in equilibrium points can be explained due to the smaller companies in German study (Fryges, Wagner 2010, 406). Small firms may have even higher export intensity, especially while they have been involved with export and presence abroad for a while (Ahmed and

Rock 2012). SMEs may have completely different enablers such as trust between board and owner, existence of unwritten norms (Calabro, Mussolino 2013).

Usually export intensity is higher in those companies who have just started exporting, those incumbent who increase export do not receive similar level productivity boost (Antolín et al 2013). That could be another reason why there is a cap on export operations with regard to profitability and why there is equilibrium point. (Rungi, Ida unpublished)

Table 7. Impact of export and R&D capabilities on company's performance (profit)

Component	*M*	*SD*	*Model 1*		*Model 2*		*Model 3*		*M*	*SD*	*Model 4*	
Export capabilities												
External revenue 2012 (m. EUR)	*18 673*	*30 752*	0,130	***			0,130	***	*21 200*	*33 476*	0,105	***
External revenue to total sales ratio 2012	*0,603*	*0,258*	- 3 070	*			- 3 924	**	*0,668*	*0,230*	- 3 256	
R&D capabilities												
R&D expences 2012 (m. EUR)	*1 562*	*1 774*			1,365	***	0,485	*	*2 026*	*2 237*	- 0,032	
R&D intensity 2012	*0,103*	*0,084*			- 22 945	***	- 2 519		*0,130*	*0,088*	- 2 947	
Return on investment (5 year average)	*0,090*	*0,076*			12 555	*	13 393	***	*0,098*	*0,085*	18 111	***
5 year average ROI to 5 year industry average ROI ratio	- *0,211*	*7,353*			312,8	***	330,5	***	- *0,050*	*6,299*	154,1	*
Patents and developed technology 2012 (m. EUR)	*1 576*	*5 122*			0,126		0,100		*2 678*	*8 073*	0,060	
Employees in R&D department 2012									*10 162*	*9 206*	0,213	***
Intercept			2679	**	2234	**	1412				519,7	
F			62,69	***	18,38	***	39,92	***			21,02	***
R square			0,422		0,352		0,626				0,796	
Sample size			175		175		175				52	

(Significants of parameteres: ***p<0,001; **p<0,01; *p<0,05; regression analysis performed)

Source: made by the author

6.3.R&D capability effect on company's performance

The results of tested models suggest that R&D capability has positive effect on firm's profits The results are in line with other academic studies (Georski, Machin 1992, Roberts 1999, Cooper 2000a, Leiponen 2000, Hanel, St-Piere 2002, Cefis, Ciccarelli 2005, Mata, Woerter 2013) Four out of six parameters were positive across the tested models and two had negative impact (refer to table 7). The results of correlation analysis are shown in the table 8.

Firms' spending on R&D has positive impact on profits ($\beta_{R\&D\ expend.}$=1,365), although R&D intensity has negative impact ($\beta_{R\&D\ int.}$=-22 945). The more firm spends on R&D the higher the profits are noted and at the same time if firm's expenditures on R&D increase related to revenues (ratio) the lower profits are noted. Theses counterintuitive findings can be caused by industry best practice (Cooper 2000b) aspect and mathematical aspect of the equation. Industry best practice would imply that the certain level of the R&D expenditures might be considered by market participants as optimal in order to stay competitive and this value most probably is benchmarked against competitors. Any additional increase from industry wide practice would dilute the profits and on contrary lowering the R&D expenditures would compromise the future competitiveness (Toshiniro et al 2013). The second, mathematical aspect is concerned with profit being function of revenues and expenditures. In case the firm decides to continuously increase expenditures not taking into account expansion of the revenue side at one point the expenses will be equal to revenue and eventually will be operating without profit or in case expenses exceeding the revenue firm will be operating with negative profit. The findings suggest that there is possible equilibrium in expanding R&D capabilities by spending on R&D to maximize the profits.

The findings are backed by correlation analysis (refer to the table 8). Weak negative correlation was identified between R&D intensity and profits possibly caused by the same influencers as described in regression analysis ($r_{profit;R\&D\ int.}$= -0,22). The proportional increase of R&D spending to revenue increases the costs which results in lower profits. At the same time spending on R&D was positively correlated with profits ($r_{profit;R\&D\ expend.}$= 0,36). Helfat (1997) also found that R&D expenditures tend to rise linearly with sales revenues at the business unit and the firm level. The results suggest that there is equilibrium point for R&D expenses in terms of spending and spending proportionally to total sales where the profits are maximized.

Rational towards equilibrium of R&D intensity is similar as in previous chapter with regard to export intensity. If the company intends to shift its cost structure by increasing R&D intensity it will eventually hit the equilibrium or break even point where the profits generated due to investing in R&D (increased R&D expenditures) are offset by structural shift in cost-structure (increase in R&D intensity). The further increase of R&D intensity would result in The equilibrium point was calculated similarly on the basis of model coefficients and averages ($\beta * M$) and it was found to be 9,3% based on model 2 (R^2=0,35) and 30% based on model 3 (R^2=0,62) although the R&D intensity was statistically insignificant ($p_{R\&D\ int.}$=0,53) in model 3. Therefore results of the model 2 are considered more reliable. (Rungi, Ida unpublished)

The results indicate that the companies perform beyond equilibrium point (M=0,10) (generating loss with expence and intensity side of the equation) due to intense competition (Toshiniro et al 2013). The intense competition pushes R&D operations of the companies to the beyond short-term profitability and incentivizes companies to expand market share to relieve the burden R&D structural costs (R&D intensity), thus giving possibility in increasing them. (Rungi, Ida unpublished)

The 5 year average return on investment (β_{ROI}=12 555) as well as 5 year average return on investment ratio to 5 year industry average ($\beta_{ROI/Ind.\ ROI}$=312,8) has positive effect on profits. The findings suggest that if the quality regarding future cash flow of R&D capability output is higher the higher profits are noted. In case the performance of firms R&D capabilities benchmarked to industry average are higher the better firm's performance is observed. If the profitability of R&D projects is high thus the quality of projects and processes of eliminating less potential projects is in place as explicitly stated in Cooper (2000b). The findings suggest that if firm's R&D capabilities output is better in terms of generating future cash flow than the competitor's the higher profits are noted.

The impact of patents and developed technology on firm's profits is positive ($\beta_{patents\ and\ develop.\ tech}$=0,126) although insignificant based on proposed model in table 7. The correlation analysis found (refer to the table 8) mildly positive correlation between company's profits and patents value ($r_{profit;patents\ and\ develop.\ tech.}$= 0,15). In case the patents and developed technology increases in terms of valuation it has positive effect on profits. The findings indicate that patents and technology value has to increase to have positive effect on firms performance, although there is some degree of uncertainty of immediate effect. The findings by Hanel and St-Piere (2002) and Hundley G. (1999) stress that the lagged effect of R&D capabilities effect on

company's profits can be noted. Ongoing new developments of products by competition increases pressure on firm to increase output of R&D in terms of patents and developed technology.

Based on model 4 (refer to the table 7) results the impact of amount employees in R&D department has positive effect ($\beta_{R\&D\ employ.}$=0,213) on firm's profits. The more personnel are in the R&D department the better performance of R&D capabilities is noted and the better R&D capabilities result in higher profits.

6.4. Bilateral effects of R&D and export capabilities

One of the key issues was to identify whether R&D and export capabilities both explorative capabilities are competing for resources and therefore have negative correlation. The results suggest (refer to table 8) that there was no evidence obtained to prove that the R&D and export capabilities have negative correlation. The study showed that there is mild positive influence between two explorative capabilities R&D and export. The results confirm similar findings of previous academic research (Ito, Pucik 1993, Filatotochev et al 2009, Bernard, Jensen 1999, Knight et al 2004, Lachenmaier, Wösmann 2006, Girma et al 2008, Harris, Li 2008)

The results suggest that the capabilities might be structurally separated as found by Gupta et al (2006) or that senior management has implemented such organizational elements that the explorative capabilities R&D and export co-evolve (Tushman, O'Reilly 1996) or at least the capabilities do not hinder the performance of each other.

Most of the variables had no correlation or weak positive correlation between R&D and export. Moderate correlation was identified between R&D expenditures and external sales ($r_{ext.\ rev;R\&D\ expenditures}$=0,43) which indicate that the more revenues (external revenues) firm generates the higher the expenditures on R&D are noted. The more cash is generated through export sales the more it is possible to allocate into the R&D expenditures. The effect is most probably *vice versa*, as found by Harris and Li (2008) the more R&D is undertaken the lower are the barriers to entry and more effectively export operations are pursued. Lachenmaier and Wösmann (2006) results state explicitly that innovation might effect positively export up to 7%. Negative correlation in approximately the same magnitude ($r_{ext.\ rev;R\&D\ intensity}$=-0,35) was identified between R&D intensity and external revenue. The results suggest that in case firm has high

turnover there is tendency to allocate smaller percentage of that turnover into R&D and firms with smaller turnover tend to invest in R&D higher percentage of turnover which leads to conclusion that there is a fixed cost aspect to R&D expenditures that firms maintain despite the amount of total revenues. It is possible that there are industry wide practices of how substantial R&D investments should be for companies to stay competitive in R&D intensive environment and firms maintain expenditures on R&D at levels generally used in the industry practice despite revenue side of the equation.

Insignificant correlation ($r_{\text{ext. rev to total sales;R\&D intensity}}$=0,23) was identified between external revenue and R&D intensity was identified. This is in line with the Ito and Pucik (1993) results where no significant association was observed between a firm's export ratio and the industry R&D intensity.

Additional correlation analysis was performed with one additional parameter employees in R&D department with decreased sample size of 52 samples (table 9). Employees in R&D department showed positive and moderately strong correlation with profits. Bigger R&D department can positively influence profits which was also backed by regression analysis. Employees in R&D department had weak positive correlation with external revenue and more than twice weaker negative correlation with external revenue to total sales ratio.

Table 8. Correlation analysis for sample of 175 firms

Variables	Profits 2012 (m. EUR)	External revenue 2012 (m. EUR)	External revenue to total sales ratio 2012	Return on investment (5 year average)	5 year average ROI to 5 year industry average ROI ratio	Patents and developed technology 2012 (m. EUR)	R&D expences 2012 (m. EUR)	R&D intensity 2012
Profits 2012 (m. EUR)	1,00							
External revenue 2012 (m. EUR)	0,64	1,00						
External revenue to total sales ratio 2012	-0,00	0,19	1,00					
Return on investment (5 year average)	0,17	0,02	-0,01	1,00				
5 year average ROI to 5 year industry average ROI ratio	0,25	-0,18	0,02	-0,07	1,00			
Patents and developed technology 2012 (m. EUR)	0,15	0,10	0,16	-0,07	0,00	1,00		
R&D expences 2012 (m. EUR)	0,36	0,43	0,17	0,16	-0,20	0,29	1,00	
R&D intensity 2012	-0,22	-0,35	0,23	0,06	0,11	0,21	0,05	1,00

Source: made by the author

Table 9. Correlation analysis for sample of 52 firms

Variables	Profits 2012 (m. EUR)	External revenue 2012 (m. EUR)	External revenue to total sales ratio 2012	Return on investment (5 year average)	5 year average ROI to 5 year industry average ROI ratio	Patents and developed technology 2012 (m. EUR)	R&D expences 2012 (m. EUR)	R&D intensity 2012	Employees in R&D department 2012
Profits 2012 (m. EUR)	1,00								
External revenue 2012 (m. EUR)	0,71	1,00							
External revenue to total sales ratio 2012	-0,22	-0,01	1,00						
Return on investment (5 year average)	0,38	0,04	-0,14	1,00					
5 year average ROI to 5 year industry average ROI ratio	0,04	-0,23	-0,02	0,04	1,00				
Patents and developed technology 2012 (m. EUR)	0,03	0,01	0,16	-0,14	0,00	1,00			
R&D expences 2012 (m. EUR)	0,53	0,41	0,05	0,26	-0,08	0,18	1,00		
R&D intensity 2012	-0,36	-0,48	0,28	-0,02	0,21	0,36	0,05	1,00	
Employees in R&D department 2012	0,58	0,25	-0,11	0,20	0,01	0,07	0,64	-0,09	1,00

Source: made by the author

CONCLUSION

Moderate amount of academic literature have covered topic of dynamic capabilities in the field of strategic management. The concepts of ambidexterity and company's performance in light of dynamic capabilities have also been in the focus of prior research agenda, although research covering leading companies in the industries have yet to be established and ambidexterity concept within same type of dynamic capabilities have not gained attention of broader research spectrum.

The aim of the thesis was to identify the effect of explorative capabilities research and development and export on company's performance. The sub-goal was to identify bilateral effects of the same type of explorative capabilities research and development and export.

Thesis comprises six chapters with the further described structure. The first chapter focused on theoretical fundamentals of dynamic capabilities, which are resource-based view, the definitions of dynamic capabilities, followed by thorough description of dynamic capabilities approach. The second chapter was devoted to research and development capability. It also comprises research and development capability effect on company's performance and different approaches to measure current capability. Third chapter discussed export capability, the effects on company's performance and the ways of measuring current capability. In the scope of the fourth chapter were bilateral effects of research and development and export capability. The fifth chapter covered methodology of undertaken research, description of sample size and explanation of the approach of selecting dependent and independent variables. The sixth and conclusive chapter summarizes and interprets research results and linking them to prior academic research.

The methodology of current thesis was quantitative. At the foundation of the empirical study was comprehensive data of top 2000 companies based on research and development spending and several other complimentary data bases. The sample size of 175 companies were selected from the data base covering wide range of the industries, range of countries, although almost half of the companies were from US, and most of the companies' revenues exceeding

one billion euros. The correlation and regression analysis were performed based on the obtained data.

The results of the study show that explorative capabilities R&D and export have positive effect on company's profits. The results are in line with previous studies that have shown similar results, although previous studies were focused on particular country or industry sectors. Therefore current study confirms previous results on global scale.

The results showed interesting insight into export capability effect on company's profits. When company's external sales reach certain threshold the additional amount of cash generated through overseas sales do not have positive effect on company's profits. Similar results were also noted by prior academic studies. These results can be explained with Uppsala internationalization model. The model stresses that later stages of exporting may require substantial capital expenditures and may increase costs thus fading away generated potential profits. There for it might be concluded that there is certain equilibria in exporting performance beyond of which export performance does not generate additional profits.

Second interesting insight was related to R&D expenditures effect on company's profits. The results showed that there is possibly industry wide best practice that is taken into account by market participants. The competitors most probably benchmark the level of R&D expenditures and tend not to increase them substantially over industry practice by being concert with short-term profitability and also tend not to lower it substantially by being concerned with long-term competitiveness.

The second batch of the results of the study shows that there is mild-positive bilateral effect of R&D and export capabilities. The results show that R&D and export capabilities are either separated organizationally or internal processes are organized in the way that the performance of capability translates into enhanced performance of other capability, thus co-evolving. These findings are in line with previous studies that examined elements of underlying capabilities.

The further research agenda might consider looking thoroughly into the equilibrium aspects of the R&D expenditures and export levels. The initial results of the study identified the equilibrium points of R&D intensity at the level of 9% and export ratio to total sales at the 61%-79% levels. The results indicate that leading companies perform beyond equilibrium with respect to R&D intensity and with significant potential to increase their structural export share of the revenue. The research might consider looking into specific levels of R&D expenditures

that are considered best practice by industry and by geographical segments. Same type of methodology might be applied in order to identify specific levels of export levels that tend to optimize global profits of the company.

KOKKUVÕTE

KAHE DÜNAAMILISE VÕIMEKUSE MÕJU ETTEVÕTTE TULEMUSLIKKUSELE

Andres Ida

Strateegilise juhtimise teooria valdkonnas on dünaamilisi võimekusi uuritud olulisel määral (Teece et al 1997, Teece 2007, Winter 2003, Eisenhardt, Martin 2000, Helfat, Peteraf 2003). Dünaamiline võimekus on organisatsiooni võimekus, mis loob, kohandab ning muudab organisatsiooni protsesse (Teece et al 1997). Dünaamilisteks võimekusteks peetakse näiteks teadus- ja arendustegevust, eksporti, turundust, strateegiat, logistikat, koostöövõimet ja võrgustiku arendamist, ühinemiste ja ülevõtmiste juhtimist ning avatud innovatsiooni (Eisenhardt, Martin 2000, Knudsen, Madsen 2002, Kolk, Rungi 2012). Võimekusi on võimalik jaotada eksploratiivseteks ja ekspluatatiivseteks (March 1991). Eksploratiivsed võimekused on eelmise näite varal teadus- ja arendustegevus, eksport ja avatud innovatsioon (Kolk, Rungi 2012).

Samas ettevõttes võivad tekkida pinged erinevat tüüpi võimekuste vahel (Tushman, O'Reilly 1996, Gupta et al 2006). Probleemi lahendamiseks on välja pakutud võimekuste struktuurne eraldamine organisatsioonis (Gupta et al 2006) ning nende integreerimine kõrgema juhtkonna poolt (Tushman, O'Reilly 1996). Kuigi eksploratiivseid ja ekspluatatiivseid võimekusi on osaliselt uuritud, on vähem tähelepanu pööratud sama tüüpi dünaamiliste võimekuste omavahelisele mõjule.

Dünaamiliste võimekuste mõju ettevõtte tulemuslikkusele on käsitletud varasemas kirjanduses, kuid teadustöö, mis hõlmaks juhtivaid maailma ettevõtteid, ei ole leidnud laiapõhjalist kajastatust.

Käesoleva magistritöö eesmärk on identifitseerida eksploratiivsete võimekuste – teadus- ja arendustegevuse ning ekspordi – mõju ettevõtte tulemuslikkusele. Täiendav eesmärk on identifitseerida sama tüüpi eksploratiivsete võimekuste teadus- ja arendustegevuse ning ekspordi – mõlemasuunalist omavahelist mõju.

Magistritöö koosneb kuuest peatükist, millest esimene annab ülevaate dünaamiliste võimekuste teooriast ning selle kujunemisest. Peatükis peatutakse ressursipõhisel teoorial, dünaamilise võimekuse definitsioonil ja dünaamilisi võimekusi käsitleval kirjandusel. Teine peatükk käsitleb teadus- ja arendustegevust, selle mõju ettevõtte tulemuslikkusele ning antud võimekuse mõõtmise erinevaid võimalusi. Kolmandas peatükis iseloomustatakse ekspordi võimekust, selle mõju ettevõtte tulemuslikkusele ning antud võimekuse mõõtmise võimalusi. Neljandas peatükis on uuritud teadus- ja arendustegevuse ning ekspordi mõlemasuunalist omavahelist mõju varasemast kirjandusest lähtuvalt. Töö viies osa hõlmab metodoloogiat, ülevaadet valimist ning muutujate valiku põhimõtet. Magistritöö kuuendas peatükis keskendutakse töö raames saadud tulemustele, autoripoolsele analüüsile ning nende seotusele eelnevate teadustöödega.

Magistritöös kasutatakse kvantitatiivset uurimismeetodit. Empiiriline uuring põhineb 2000 maailma suurimal ettevõttel teadus- ja arendustegevuse kulutuste põhjal, kus on esindatud erinevate valdkondade maailma juhtivad ettevõtted. Valim koosneb 175 ettevõttest, mille hulgas on Volkswagen, Samsung, Microsoft, Intel, Novartis, Johnson & Johnson, Pfizer, General Motors, Google, Siemens, IBM, Sony ja General Electric.

Magistritöö tulemusena leiti, et teadus- ja arendustegevus ning eksport mõjutavad ettevõtte tulemuslikkust positiivselt. Tulemused on kooskõlas varasemate teadustöödega, mis on keskendunud konkreetsele maailma piirkonnale või tööstusharule. Seega antud tulemused kinnitavad varasemate teadustööde tulemusi ilma geograafilise piiranguta ehk maailma tasemel.

Ettevõtte ekspordi võimekuse osas jõuti huvitava tulemuseni. Analüüsi tulemusena leiti, et kui ettevõtte ekspordi käive ületab teatava künnise, siis ekspordi täiendav suurendamine ei too positiivset mõju ettevõtte kasumile. Sarnastele tulemustele on jõutud ka varasemates teadustöödes. Tulemusi on võimalik selgitada Uppsala astmelise rahvusvahelistumise mudeliga (Johanson, Vahlne 1977), mis iseloomustab hilisemaid rahvusvahelistumise etappe kui kapitalimahukaid, mis suurendavad kulutusi, vähendades seega potentsiaalseid kasumeid. Võib

järeldada, et on olemas teatud tasakaalupunkt, millest järgnev ekspordi käive ei too ettevõttele täiendavat kasumit.

Teine huvitav tulemus hõlmab teadus- ja arendustegevuse mõju ettevõtte kasumile. Analüüsi tulemustena leiti, et tööstusharudes on välja kujunenud teatud tase teadus- ja arendustegevuse kulutuste osas, mida turul osalejad järgivad. Võib järeldada, et ettevõtted kasutavad seda taset võrdlusena ning üldjuhul üritavad kulutusi arvestatavalt mitte üle selle tõsta, kuna vastasel juhul põhjustaks see lühiajalise kasumlikkuse vähenemist, ning sarnaselt püütakse mitte vähendada kulutusi arvestatavalt, et tagada pikaajaline konkurentsivõimekus.

Väljundina täiendavale eesmärgile leiti magistritöö tulemusena, et teadus- ja arendustegevuse ning ekspordi võimekuste vahel on mõlemasuunaline positiivne, kuid ebaoluline mõju. Võib järeldada, et võimekused on struktuurselt eraldatud ettevõtetes või protsessid on ettevõttes korraldatud nõnda, et ühe võimekuse tõhusam talitlus parandab teise toimimist ebaolulisel määral. Seega tulemused on vastavuses varasema kirjanduse tulemustega.

Täiendava uurimisvaldkonnana pakub töö autor välja vajaduse põhjalikumalt uurida tasakaalupunkte teadus- ja arendustegevuse ning ekspordi võimekustevaldkonnas. Magistritöö esialgse tulemusena leiti tasakaalupunktid teadus- ja arendustegevuse intensiivsuse puhul 9% tasemel ja ekspordi kogu käibesse suhte puhul 61%-79%. Analüüsi tulemusel selgus, et ettevõtted tegutsevad arendus- ja teadustegevuse puhul mööndes tasakaalupunktist ning ekspordi võimekuse puhul suure potentsiaaliga suurendada struktuuriliselt ekspordi osa kogu käibesse, ilma et kaasneks negatiivne mõju kasumile. Järgneva uurimisvaldkonnana on võimalik keskenduda teadus- ja arendustegevuse kulutuste optimaalsele tasemele erinevatel geograafilistel turgudel ning tööstusharude lõikes. Sarnast metodoloogiat on võimalik rakendada ka ekspordi taseme uurimisel, mis suurendaks ettevõtte globaalseid tulusid.

REFERENCES

Ahmed, S. A., Rock, J. (2012). Exploring the relationship between export intensity and exporter characteristics, resources, and capabilities: evidence from Chile – *Latin American Business Review*, Vol. 13, no 1, pp. 29-57

Antolín, M. M., Máñez, J. A., Rochina Barrachina, M., E., Sanchis Llopis, J. A. (2013). Export intensity and the productivity gains of exporting – *Applied Economics Letters*, Vol. 20, no 8, pp. 804-808

Astebro, T. (2003). The return to independent invention: evidence of unrealistic optimism, risk seeking or skewedness loving? – *The Economic Journal*, Vol. 113, pp. 226-239.

Augier, M., Teece, D. J. (2009). Dynamic capabilities and multinational enterprise: penrosean insights and omissions – *Management International Review*, Vol. 47, no. 2, pp. 991-995.

Axinn, C. N. (1988). Export performance: do managerial perceptions make a difference? – *International Marketing Review*, Vol. 5, no. 4, pp. 61-71.

Barney, J. B. (1991). Firm resources and sustained competitive advantage – *Journal of Management*, Vol. 17, no. 1, pp. 99–120.

Barney, J. B., Ketcher Jr., D. J., Wright, M. (2011). The future of resource-based theory: revitalization or decline? – *Journal of Management*, Vol. 37, no. 5, pp. 1299–1315.

Bausch, A., Krist, M. (2007). The effect of context-related moderators on the internationalization - performance relationship: evidence from meta-analysis – *Management International Review*, Vol. 47, no. 3, pp. 319-347.

Bernard, A. B., Jensen, J. B. (1999). Exceptional exporter performance: cause, effect, or both? – *Journal of International Economics*, Vol. 47, pp. 1-25.

Birkinshaw, J., Gupta, K. (2013). Clarifying the distinctive contribution of ambidexterity to the fild of organizational studies – *The Academy of Management Perspectives*, Vol. 27, no. 4, pp. 287-298.

Boso, N., Story, V. M., Cadogan, J. W., Micevski, M., Kadic-Maglajlic, S. (2013). Firm innovativeness and export performance: environmental, networking, and structural contingencies. – *Journal of International Marketing*, Vol. 21, no. 4, pp. 62-87.

Bou, J. C., Satorra, A., (2007). The persistence of abnormal returns at industry and firm levels: Evidence from Spain – *Strategic Management Journal*, Vol. 28, pp. 707–722.

Bremser, W. G., Barsky, N. P. (2004). Utilizing the balance scorecard for R&D performance measurement – *R&D Management*, Vol. 34, no. 3, pp. 229-238.

Brown, M. G., Svenson, R. A. (1998). Measuring R&D productivity – *Research Technology Management*, Vol. 41, no. 6, pp. 30-35.

Calabro, A., Mussolino, D. (2013). How do boards of directors contribute to family SME export intensity? The role of formal and informal governance mechanisms – *Journal of Management & Governance* ,Vol. 17, no. 2, pp. 363–403

Cavusgil, S. T., Zou, S. (1994). Marketing strategy - performance relationship: an investigation of the empirical link in export market ventures – *Journal of Marketing*, Vol. 47, pp. 1-21.

Cefis, E., Ciccarelli, M. (2005). Profit differentials and innovation – *Economics of Innovation and New Technology*, Vol. 14, pp. 43–61.

Collins, D. J. (1994). Research note: how valuable are organizational capabilities? – *Strategic Management Journal*, Vol. 15, pp. 143-152.

Coombs, J. E., Bierly, P. E. (2006). Measuring technological capability and performance – *R&D Management*, Vol. 36, no. 4, pp. 421-438.

Cooper, R. G. (2000a). Doing it right: winning with new products – *Ivey Business Journal*, July/August.

Cooper, R. G. (2000b). Product leadership: creating and launching superior new products. Cambridge: Perseus Publishing.

Daspit, J. (2012). Absorptive capacity: an empirical examination of the phenomenon and relationships with firm capabilities. University of North Texas. 232 p. (Dissertation for the Degree of Doctor of Philosophy)

David, P., Hitt, M. A., Gimeno, J. (2001). The influence of activism by institutional investors on R&D – *Academy of Management Journal*, Vol 44, no. 1, pp. 144-157.

Delios, A., Beamish, P. W. (2001). Survival and profitability: the roles of experience and intangible assets in foreign subsidiary performance – *Academy of Management Journal*, Vol. 44, no. 5, pp. 205-222.

Diamantopoulos, A., Ring, A., Schlegelmilch, B. B., Doberer, E. (2014). Drivers of export segmentation effectiveness and their impact on export performance – *Journal of International Marketing*, Vol. 22, no. 1, pp. 39-61.

Eisenhardt, K. M., Martin, J. A. (2000). Dynamic capabilities: what are they – *Strategic Management Journal*, Vol. 21, no. 10/11, pp. 1105-1121.

Filatotchev, I., Liu, X., Buck, T., Wright, M. (2009). The export orientation and export performance of high-technology SMEs in emerging markets: the effects of knowledge transfer by returnee entrepreneurs – *Journal of International Business Studies*, Vol. 40, no. 6, pp. 1005-1021.

Fryges, H., Wagner, J. (2010). Exports and profitability: first evidence for German manufacturing firms – *The World Economy*, Vol. 33, no. 3, pp. 399-423.

Geroski, P., Machin, S. (1992). Do innovating firms outperform non-innovators? – *Business Strategy Review*, Vol. 3, no. 2, pp. 79–90.

Girma, S., Görg, H., Hanley, A. (2008). R&D and exporting: a comparison of British and Irish firms – *Review of World Economics*, Vol. 144, no. 4, pp. 750-773.

Griffin, A., Page, A. L. (1993). An interim report on measuring product development success and failure – *Journal of Product Innovation Management*, Vol. 10, pp. 291-308.

Gupta, A. K., Smith, K. G., Shalley C. E. (2006). The interplay between exploration and exploitation – *The Academy of Management Journal*, Vol. 49, no. 4, pp. 693-706.

Gupta, A. K., Smith, K. G., Shalley, C. E. (2006). The interplay between exploration and exploitation – *Academy of Management Journal*, Vol. 49, no. 4, pp. 693–706.

Hagedoorn, J., Cloodt, M. (2003). Measuring innovative performance: is there an advantage in using multiple indicators? – *Research Policy*, Vol. 32, pp. 1365-1379.

Hall, R. (1993). A framework linking intangible resources and capabilities to sustainable competitive advantage – *Strategic Management Journal*, Vol. 14, no. 8, pp. 607–618.

Hanel, P., St-Pierre, A., (2002). Effects of R&D spillovers on the profitability of firms – *Review of Industrial Organization*, Vol. 20, pp. 305–322.

Harris, R., Li, Q. C. (2008). Exporting, R&D, and absorptive capacity in UK establishments – *Oxford Economic Papers*, Vol. 61, pp. 74-103.

Helfat, C. E, Peteraf, M. A. (2003). The dynamic resource-based view: capability lifecycles – *Strategic Management Journal*, Vol. 24, no. 10, pp. 997-1010.

Helfat, C. E. (1997). Know-how and asset complementarity and dynamic capability accumulation: the case of R&D – *Strategic Management Journal*, Vol. 15, no. 5, pp. 339-360.

Henderson, R., Cockburn, I. (1996). Scale, scope, and spillovers: the determinants of research productivity in drug discovery – *The RAND Journal of Economics*, Vol. 27, No. 1, pp. 32-59.

Hill, C. W. L., Snell, S. A. (1988). External control, corporate strategy, and firm performance in research-intensive industries – *Strategic Management Journal*, Vol. 9, no. 6, pp. 577-590.

Hoopes, D. G., Madsen, T. L., Walker, G., (2003). Guest editors' introduction to the special issue: Why is there a resource-based view? Toward a theory of competitive heterogeneity. – *Strategic Management Journal*, Vol. 24, no. 10, pp. 889-902.

Hudley, G., Jacobson, C. K., Park, S. H. (1996). Effects of profitability and liquidity on R&D intensity: Japanese and U.S. companies compared – *Academy of Management Journal*, Vol. 39, no. 6, pp. 1659-1674.

Ito, K., Pucik, V. (1993). R&D spending, domestic competition, and export performance of Japanese manufacturing firms – *Strategic Management Journal*, Vol. 14, pp. 61-75.

Johanson, J., Vahlne, J. E. (1977). The internationalization process of the firm - a model of knowledge development and increasing foreign market commitments – *Journal of International Business Studies*, Vol. 8, no. 1, pp. 23-32.

Johanson, J., Vahlne, J. E. (2009). The Uppsala internationalization process model revisited: from liability of foreignness to liability of outsidership – *Journal of International Business Studies*, Vol. 40, no. 9, pp. 1411-1431.

Katrak, H (1983). Global profit maximization and the export performance of foreign subsidiaries in India – *Oxford Bulletin of Economics & Statistics*, Vol. 45, pp. 205-222.

Keeley, L., Pikkel, R., Quinn, B., Walters, H. (2013). Ten types of innovation: the discipline of building breakthroughs. New York: John Wiley & Sons.

Kerssens-van Drongelen, I. C., Cook, A. (1997). Design principles for the development of measurement systems for research and development process – *R&D Management*, Vol. 27, pp. 345-357.

Knight, G. A., Cavusgil, S. T. (2004). Innovation, organizational capabilities, and the born-global Firm – *Journal of International Business Studies*, Vol. 35, pp. 124-141.

Knudsen, T., Madsen, T. K. (2002). Export strategy: a dynamic capabilities perspective – Scandinavian Journal of Management, Vol. 18, pp. 475-502.

Kolk, A., Rungi, M. (2012). Total exploitation orientation in capability development: the cross-case of Google, Ericsson, Microsoft and Nokia – *Research in Economics and Business: Central and Eastern Europe*, Vol. 4, no. 2, pp. 5-25.

Kor, Y. Y. (2006). Direct and interaction effects of top management team and board compositions on R&D investment strategy – *Strategic Management Journal*, Vol. 27, pp. 1081-1099.

Lachenmaier, S., Wösmann, L (2006). Does innovation cause exports? Evidence from exogenous innovation impulses and obstacles using German micro data – *Oxford Economic Papers*, Vol. 58, no. 2, pp. 74-103.

Leiponen, A. (2000). Competencies, innovation and profitability of firms – *Economics of Innovation and New Technology*, Vol. 9, pp. 1–24.

Levitas, E., McFadyen, M. A. (2009). Managing liquidity in research-intensive firms: signalling and cash flow effects of patents and alliance activities – *Strategic Management Journal*, Vol. 30, pp. 659-678.

Love, J. H., Roper, S., Du. J. (2009). Innovation, ownership and profitability – *International Journal of Industrial Organization*, Vol. 27, pp. 424-434.

March, J. G. (1991). Exploration and exploitation in organizational learning – *Organizational Science*, Vol. 2, no. 1, pp. 71-78.

Mauri, A., Michaels, M., (1998). Firm and industry effects within strategic management: an empirical examination – *Strategic Management Journal,* Vol. 19, no. 3, pp. 211–219.

Nelson, R. R. (1991). Why do firms differ, and how does it matter? – *Strategic Management Journal*, Vol. 12, pp 61-74.

Oriani, R., Soberero, M. (2008). Uncertainty and the market valuation of R&D within a real options logic – *Strategic Management Journal*, Vol. 29., no. 4, pp. 343-361.

Oviatt, B. M., McDougall, P. P. (2005). Toward a theory of international new ventures – *Journal of International Business Studies*, Vol. 36, no. 1, pp. 29-41.

Patel, P., Pavitt, K. (1994). Technological competences in the world's largest firms: characteristics, constraints and scope for managerial choice – University of Sussex, Brighton, UK.

Peteraf, M. A. (1993). The cornerstones of competitive advantage: a resource based view – *Strategic Management Journal,* Vol 14, no. 3, pp 179 – 191.

Prahalad, C. K., Hamel, G. (1990). The core competences of the corporation – *Harvard Business Review*, Vol. 68, pp. 79–91.

Priem, R. L., Butler, J. E. (2001). Is the resource-based "view" a useful perspective for strategic management research? – *Academy of Management Review*, Vol. 26, pp. 22-40

Ries, E. (2011). The lean startup – New York: Crown Publishing Group.

Reis J., Forte R. (2014). The impact of industry characteristics on firms' export intensity – FEP Working Papers, no. 524.

Richard, P. J., Devinney, T. M., Yip, G. S., Johnson, G. (2009). Measuring organizational performance: towards methodological best practice – *Journal of Management,* Vol. 35, No. 3, pp. 718-804.

Roberts, P. W. (1999). Product innovation, product-market competition and persistent profitability in the U.S. pharmaceutical industry – *Strategic Management Journal*, Vol. 20, pp. 655-670.

Roquebert, J., Phillips, R., Westfall, P. A. (1996). Markets versus management: what drives profitability? – *Strategic Management Journal*, Vol. 17, no. 8, pp. 653–664.

Ruefli, T. W., Wiggins, R. R., (2003). Industry, corporate and segment effects and business performance: a non-parametric approach – *Strategic Management Journal*, Vol. 24, no. 9, pp. 861–879.

Rumelt, R. P. (1991). How much does industry matter? – *Strategic Management Journal*, Vol. 12, no. 3, pp. 167–185.

Rungi, M., Ida, A. (unpublished). How much is too much – equilibrium points for good export and R&D intensity

Schumann, Jr. P. A., Ransley, D. L. (1995). Measuring R&D performance – *Research Technology Management*, Vol. 38, pp. 45.

Sousa, C. (2004). Export performance measurement: an evaluation of the empirical research in the literature – *Academy of Marketing Science Review*, Vol. 2004, no. 9, pp. 1-21.

Sousa, C., Martínez-Lopez, F., Coelho, F. (2008). The determinants of export performance: a review of the research in the literature between 1998 and 2005 – *International Journal of Management Reviews*, Vol. 10, no. 4, pp. 343-374.

Teece, D. J. (2007). Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance – *Strategic Management Journal*, Vol. 28, pp. 1319-1350.

Teece, D. J., Pisano, G, Shauen, A. (1997). Dynamic capabilities and strategic management – *Strategic Management Journal*, Vol. 18, no. 7, pp. 509-533.

Tomiura, E. (2007). Effects of R&D and networking on the export decision of Japanese firms – *Research Policy*, Vol. 36, pp. 758-767.

Toshiniro, M., Noriaki, M., Susumu, C. (2013). Competitiveness and R&D competition revisited – *Economic Modelling*, Vol. 31, pp. 541-547.

Tushman, M. L., O'Reilly, C. A. III (1996). Ambidextrous organizations: managing evolutionary and revolutionary change – *California Management Review*, Vol. 38, no. 4, 8–30.

Wernerfelt, B. (1984). A resource-based view of the firm – *Strategic Management Journal*, Vol. 5, no. 2, pp. 171–180.

Westhead, P., Wright, M., Ucbasaran, D. (2001). The internationalization of new and small firms: a resource-based view – *Journal of Business Venturing*, Vol. 16, pp. 333-358

Winter, S. G. (2003). Understanding dynamic capabilities – *Strategic Management Journal*, Vol. 24, pp. 991-995.

Woerter, M., Mata, J. (2013). Risky innovation: the impact of internal and external R&D strategies upon the distribution of returns – *Research Policy*, Vol. 42, pp. 495-501.