

**SME INTERNATIONALISATION: INVESTIGATING FACTORS AND THE EFFECT OF
ORGANIZATIONAL CAPABILITIES ON STRATEGY
IN THE GERMAN MEDTECH INDUSTRY**

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the requirements of the degree of Doctor of Philosophy in the
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ABSTRACT

The research is focusing on small and mid-sized enterprises (SMEs) in the German Medical Technology (MedTech) industry and investigates the antecedents and the effects of organizational capabilities on their strategy regarding international ventures. Although there is various research in the field of strategy, internationalisation and SMEs, the impact of existing research in the specific field of German Medtech SMEs is relatively poor while theoretical and empirical findings obtained in another particular institutional context are not yet applicable in other countries or industries. As a consequence, a systematic review of the literature has been conducted. An initial conceptual model was developed, in which significant findings regards country, industry and firm-specific aspects could be identified. The philosophical stand of the researcher and his ontological view as a post-positivist allows both, a qualitative and a quantitative approach. By applying a mixed method approach a focus group discussion provided in depth-knowledge in order to sharpen the initial model. Antecedents, as well as the most important factors related to strategy, were emphasized and further important aspects that focus on capabilities were revealed. With these results, constructs and relationships were modeled and quantitative data from a survey with more than 60 German MedTech SMEs were collected and assessed. This approach led to the finding that factors such as 'market potential', 'physical capital', 'medical regulations' and 'product competitive-ness' have the highest influence on the firm's strategic approach. 'Organizational learning' and 'coordination mechanism' have particularly an impact on strategy development, whereas relationship capabilities mediating effect on the strategy-competitive advantage relationship. Firm size and firm's experience in international ventures influence a firm's internationalisation. The results will serve as a strategic input for SME's in the German MedTech industry. This research provided a contribution to knowledge that is relevant from an academic as well as from an economic point of view. The findings should help academics, MedTech SMEs, and governmental institutions to understand the decisive factors for internationalisation and the importance to develop specific organizational capabilities in this context. This understanding contributes towards a sound development of German MedTech SMEs in their future internationalisation.

STUDENT DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of The University of Gloucestershire and is original except where indicated by specific reference in the text. No part of the thesis has been submitted as part of any other academic award. The thesis has not been presented to any other education institution in the United Kingdom or overseas.

Any views expressed in the thesis are those of the author and in no way represent those of the University.

Signed:

Date: 6th of December 2017

PUBLICATIONS

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LIST OF ABBREVIATIONS

BDI	Bundesverband der Deutschen Industrie e.V.
BVMed	Bundesverband der Medizintechnik e.V.
EN	European Norm System
EU	European Union
EUR	Euro (€)
FDA	Federal Drug Administration
GATT	General Agreement on Tariffs and Trade
GNP	Gross national product
ISO	International Standards Organization
MNE	Multinational Enterprise
MDD	Medical device directive
MedTech	Medical technology (companies)
OLI	Ownership, Location, and Internalization model
OR	Operating room
PAL	Pharmaceutical Affairs Law
SFDA	State Food and Drug Administration
SME	Small and Medium Enterprise
SPECTARIS	Deutscher Industrieverband für optische, medizinische und mechatronische Technologien
SEM	Structural Equation Modeling
SW	Software
VDMA	Verein Deutscher Maschinen- und Anlagenbauer
WTO	World Trade Organization

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CHAPTER 1: INTRODUCTION

1.1 Chapter introduction

The main purpose of this first chapter is to provide a comprehensive introduction to the research topic and the objectives of the present thesis. The chapter starts with an explanation of the research context, the internationalisation of SMEs in the German MedTech industry. Next, initial hypotheses are proposed, serving as a starting point and justification for the research and leading to the research aims. Furthermore, research questions and objectives are outlined. Finally, the chapter will end with a brief explanation of the thesis structure.

1.2 Research introduction

This research is focusing on small and mid-sized enterprises (SMEs) in the medical technology (Medtech) industry and investigates their strategic approach regarding international ventures. Although, there is various research in the field of strategy, internationalisation and SMEs, the impact of existing research in the specific context of Medtech companies is relatively poor. There are only a few empirical findings obtained in this specific context regarding the challenge of providing innovative and safe high-tech equipment and devices in highly regulated international markets. Results that have been obtained in a particular institutional context are not yet applicable in other countries or industries such as for example in the combination of German Medtech SMEs. Germany is the third largest medical technology provider in the world. German SMEs enjoy universal recognition as manufacturers of MedTech products. They play an important role in their domestic market as veritable niche leaders. They are strong in domestic and EU markets, but compared to other high-tech industries most of them are under-represented in the large overseas markets and in the growth markets (MacDougall, 2011). The world market totals up to a volume of more than EUR 200 billion per year, in which the US is the largest national market followed by Japan and China, Whereas German MedTech SMEs often focus on the nearby EU countries. But today healthcare market growth rates in Germany

and the EU are stagnating due to restrictions on taxation and social security contributions, whereas foreign markets develop dynamically (Kuhlmann, 2014). Consequently, SMEs in this industry face a fundamental challenge. High product development costs with respect to a distinctive innovation strategy force companies to increase turnover and recover investments via internationalisation, while this is constrained by financial and managerial resource limitations or challenging environmental factors such as regulations.

Globalization is described as a prominent phenomenon in the world economy since many years and there is not the question whether firms will accept this development but how they prepare for the consequences (Ohmae, 1990). There is a strong motivation for such SMEs to find a way to successfully internationalize their business – otherwise, they might disappear from the market sooner or later. This would have an economic impact both on the industrial development in Germany and on the healthcare system (Wintermantel, 2009).

1.3 Research questions and gaps in knowledge

In strategy development firms have different strategic options and internationalisation can be an important element to support a firm's overall strategy. In the context of strategy, the internationalisation process is complex and determined by many different factors that encourage or discourage international involvement. There is some disagreement within the literature in terms of the relative significance of internal versus external contingency factors. According to Murray, Gao and Kotabe (2010) researchers have conceptualized the environment as one of the key constructs of understanding organizational behaviour and strategic approach depending on the competitive setting of the business. In contrast, Barney (1991) highlights the impact of internal factors and Leonidou and Katsikeas (2010) hold the view that particularly internal organizational characteristics are crucial, particularly in an organizational and managerial context. Despite this Katsikeas, Samiee and Theodosiou (2006) complain that the literature offers little guidance for specific contextual factors that have significant positive influence on international ventures and consequently firm's international performance.

Notwithstanding that there is a discourse about which factors are more important, the findings suggest, that whilst there are some common processes and patterns among firms' internationalisation, the variations can be explained through contingency theory.

However, this neglects the specific industry context in which the firms operate as an important factor in their internationalisation process.

According to Vignali, Vrontis, and Vranesevic (2003), the necessity of the development of a strategy and the need for proper execution cannot be questioned. The consistency of the elements and activities that refer to the strategy is a prerequisite for a company achieving success on the market. The availability of a formal strategy plan is important, but also its direction and approach matters. In the complex environment of the 21st century, the management of firms operating in an international diversified context continues to pose great challenges. Narayanan, Zane, and Kemmerer (2010) identified several opportunities to extend the literature and have outlined key methodological implications. According to them, researchers have mainly discussed the contributions and challenges with respect to strategic management theory, whereas the perspective on strategic management practice is characterized by considerable potential for future development.

Also, strategy development, implementation and execution of German SMEs vary over time. Some decades ago with 11% only a minority of these SMEs agreed to have strategic planning. In the recent years, 54% of these companies came to a formal and written strategy paper, which they use as a guideline for their daily business decisions (Geyer and Uriep, 2012). In contrast, Martin (2005) highlights that according to a survey based on several 100 SMEs in Northern Germany only 17% of the SMEs could sum up the direction of their activities being linked to a specific strategy.

Notwithstanding that strategic planning isn't consequently linked to strategic action, different research studies show heterogeneous results regarding content and depth of the incorporated strategy elements and their linkage to strategy implementation and therefore address the need for further research.

According to Morgan, Kaleka, and Katsikeas (2004), organizational capabilities affect the development and execution of firm's internationalisation strategy and

therefore its performance. Through the lens of the resource-based view capabilities, a firm's management skills or its organizational processes for instance, are valuable and rare (Barney, 1991). Following knowledge-based theory a firm's capability to coordinate internal competencies enables the transformation of knowledge into value creating processes (Dosi and Marengo, 1994).

But there is a discourse on the impact of capabilities on strategy and firm's success. Atuahene-Gima and Murray (2004) highlight the influence of organizational capabilities in the context of the strategy development. In contrast Lages, Silva and Styles (2009) see little empirical evidence of a strategic impact of capabilities on strategy or their consequent impact on performance in the context of internationalisation. Hence Theodosiou and Katsikea (2013) consider firm's capabilities as a specific field of interest for future research.

Following the resource-based view, firm size plays an important role with respect to SMEs internationalisation process and Shaw and Darroch (2004) observe a notable gap in the literature particularly concerning the role of organizational capabilities for SMEs.

Hence the research investigates which specific factors influence the strategic approach to international ventures of in the MedTech industry. Furthermore, it intends to find out about the impact of strategy development on the internationalisation of such German SMEs and how do organizational capabilities affect German MedTech SMEs in the development and execution of their internationalisation strategy.

Research questions:

1. Which specific factors influence the strategic approach to international ventures of German small and medium-sized enterprises (SMEs) in the medical technology industry (MedTech)?
2. What is the impact of strategy development on the internationalisation of German MedTech SMEs?

3. How do organizational capabilities affect the internationalisation strategy execution of German SMEs in the MedTech industry?

The research questions are linked to findings based on research gaps, which have been addressed in section 1.3 and will be discussed further in the literature review (Chapter 3). An adequate research strategy anchoring on a sound methodological foundation is intended to meet the research objectives by gathering new insights and therefore contribute to knowledge. In the following table, this is pulled together and summarized according to the context of this research.

Research Question	Gaps in Knowledge	Research Strategy	Data Sources
1	<p>Which specific factors influence the strategic approach to international ventures of German small and medium sized enterprises (SMEs) in the medical technology industry (MedTech)?</p> <p>Recent literature e.g. Murray et al. (2010), Barney (1991), Lages (2009) and Leonidou et al. (2010) show different results regarding influencing factors and their impact on SME's internationalisation and strategy.</p> <p>There is a lack regarding the comparison of current empirical research results in the area of SMEs and internationalisation</p> <p>Barnes et al. (2007) highlight the necessity of investigation with respect to the combined empirical research results in this field with regards to their potential application in the context of e.g. German MedTech SMEs</p>	<p>Literature review</p> <p>and</p> <p>Qualitative research (focus group discussion)</p>	<p>Evaluation of theoretical and empirical work in the area of internationalisation, SMEs and the MedTech industry. Data sources are from books and journals</p> <p>Review of previous theoretical and empirical research Data sources are from books and journals. Discussion and evaluation of the results in a focus group discussion confirm findings and develops new aspects.</p>
2	<p>What is the impact of strategy development on the internationalisation of German</p> <p>Narayanan et al. (2010), Martin (2005) and Geyer and Uriep (2012) show the need of a full understanding of SMEs' strategic approach with respect to international ventures in the</p>	<p>Quantitative research (survey)</p>	<p>Review of theories and empirical work in the area of SMEs' strategy approach.</p> <p>Data sources are from books and</p>

	MedTech SMEs?	MedTech industry context		journals Review of research techniques. Production of primary data by answers from questionnaires in a survey
3	How do organizational capabilities affect the internationalisation strategy execution of German SMEs in the MedTech industry?	Recent literature e.g. Atuahene-Gima et al. (2004), Lages et al. (2009), Morgan et al.(2004) show different results regarding the impact of organizational capabilities. Theodosiou et al. (2013) and Shaw et al.(2004) address need for further research and address lack of understanding particularly in the chosen research context.	Quantitative research (survey)	Review of theories and empirical work in the area of firm´s capabilities. Data sources are from books and journals. Review of research techniques. Production of primary data by answers from questionnaires in a survey
1+2+3	As stated above	a conceptual model of international expansion in the German MedTech industry leads to understand the behaviour of such SMEs and evaluates important ingredients of success and identifies those that appear to be most prevalent	Literature review and Qualitative research and Quantitative research	Previous theoretical and empirical work, results from a focus group by content analysis and results of statistical tests from a quantitative survey

Table 1: Research questions, identified research gaps and applied research approach

1.4 Research aim and objectives

The aims of this research are to find out which specific factors influence the strategic approach and consequently the development of international ventures in German MedTech SMEs, how organizational capabilities are related to their strategic approach and what influence they have on strategy execution. Based on theoretical justification and on an empirical investigation, a conceptual model of international expansion in this industry leads to understanding the behaviour of such SMEs and

evaluates important ingredients of success and identifies those that appear to be most prevalent.

In particular, the initial research objectives are formulated as follows:

1. To explore which specific firm, product and industry factors influence the strategic approach to international ventures of German MedTech SMEs.
2. To evaluate strategy development regards the internationalisation of German MedTech SMEs.
3. To assess the effect of organizational capabilities on international ventures of German MedTech SMEs.

1.5 Initial hypotheses

The following hypotheses can be regarded as initially, or working hypotheses, in the sense that they are not based on primary research, but only on experience, secondary research conclusions and logical reasoning. Based on the following literature review, these hypotheses will subsequently be examined and developed and with the help of the subsequent primary research they will be refined, tested, modified and supplemented.

It is a fact that internationalisation theories are a well-covered field of research and the German industry including its SMEs, in general, are well known for their international engagement. But there are differences between the industry sectors with regards to their structure and to their international involvement. The export-oriented German mechanical engineering industry, Germany's largest industrial employer, has an export rate of nearly 70% in average based on the total turnover in the last years (Wiechers, 2016). The German MedTech industry seems to be in the same range. When looking at the international ventures outside the European Community the picture becomes more diverse. The MedTech companies focus more on domestic and EU markets, whereas 60% of the total turnover is represented by companies with more than 500 employees (Kuhlmann, 2014), which are not typically classified as SMEs. Hence the export rate of SMEs to overseas markets in that industry might be even lower.

The figure below shows the comparison between these two German industry sectors, which are both dominated by SMEs. The primary data is collected from the sources as indicated on the diagram and based on figures from the German federal statistical office.

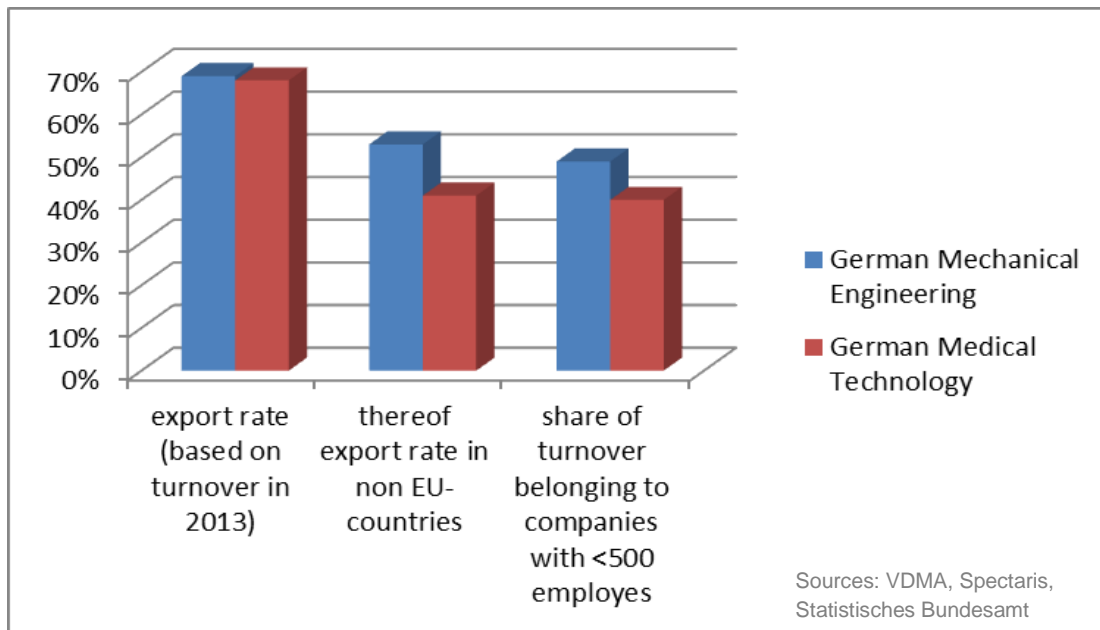


Figure 1: Comparison of export rates of different German industry sectors based on statistical secondary data from sources as shown in the diagram (own diagram).

It could be drawn as a conclusion that German MedTech SMEs are under-represented in international oversea markets in contrast to the leading role they play as veritable niche leaders in their home markets.

This has led the author to develop three initial hypotheses about the potential causal relationships behind this apparent paradox. Based on more than ten years' working experience in the MedTech industry and with the know-how as a practitioner, being responsible as an executive in different positions concerned with international business, the author has realised a set of characteristics that might have an effect on strategy building and execution with a direct impact on business performance in the given research context.

First, by bringing together the described discourse from the literature with the own experience out of several international ventures in different companies and time periods the author has understood that out of many existing factors which have

influence in the context of internationalizing firms' business some internal, external or product specific factors are more significant than others. Thus, initial hypothesis 1 follows:

H₁₁: There are industry and country-specific factors, which have a strong influence on the decision of internationalizing the business of German MedTech SMEs.

Second, the author has recognized during his engagement indifferent companies over several years, that strategic capabilities are developed inhomogeneous between German MedTech SMEs. Thus, initial hypothesis 2 follows:

H₁₂: The greater firm's efforts in strategic planning, the more international ventures will be supported.

Finally, the author noticed by own experience and by reflecting the activity of competitors and partners that some German MedTech SMEs are acting internationally with sustainable success whereas others under similar pre-conditions fail. Organizational capabilities such as coordination-mechanism, organizational learning, and relationship capabilities might create a significant advantage in a comparable business framework among different firms. Thus, initial hypothesis 3 follows:

H₁₃: The more an SME endeavours to transform knowledge into value creating processes based on a dynamic and interactive process, the higher the competitiveness and finally economic success will be.

1.6 Rationale for the choice of the research context

This research context was chosen for three reasons. First, the MedTech industry is an important industry sector of the German national economy. Furthermore, it is mainly based on SMEs which drive innovation and competition. Therefore it is important for the Healthcare-System that excellent healthcare services based on innovation and competition by SMEs in Germany can be provided also in the future.

Firm size also plays an important role particularly in the context of limited resources and knowledge. Organizational capabilities are crucial to develop singular

managerial experience and skills of foreign markets and business practices into organizational knowledge. Shaw and Darroch (2004) observe that particularly SMEs are severely affected by this fact in their internationalisation process. Mathews (2002) describes this lack of knowledge regarding SMEs as a barrier and further identifies relationship capabilities to play an important role for SMEs since they drive the development of market relationship and consequently firm's collaboration network.

Secondly, Germany is chosen as the location of interest for the present research. This decision has been made for several reasons. The author has been working for German MedTech companies for many years, so the focus on this German industry sector increases the possibility to get access to sources of information and insights, which cannot be accomplished in conventional ways with limited time and efforts. Furthermore, German MedTech SMEs play worldwide an important role so that findings obtained in the context of this research can be useful for MedTech companies in other countries or other companies in the high-tech industry as well.

Third, from the theoretical perspective of research, the context of SMEs' internationalisation in healthcare combines some very unique aspects:

This industry seems to be different from other sectors, as shown e.g. compared to the mechanical engineering industry, and although some internationalisation theories are based on surveys in the healthcare sector, not all aspects of the current development are theoretically covered. Recent research in the context of the MedTech industry emphasizes industry-specific factors. According to Chatterji (2009), economic success is e.g. more driven by regulatory knowledge than by technology or product-know how. Only a few MedTech SMEs have managed to internationalize their business against global MNEs and local competition in the overseas markets. Some presumptions have been formulated in form of initial hypotheses, but there is no comprehensive framework yet available. Hence, there is no full understanding of the current approach regarding internationalisation and their strategic orientation and a lack of specific predictions for the future development of this industry sector and related managerial implications with respect to strategy. But it is important for the Healthcare-System that excellent healthcare services based on innovation and competition by SMEs can be provided also in the future.

1.7 Target groups and relevance of the research

It is important to acknowledge the different target groups who are interested in the results of the present research and to specify what relevance the outcome has for these groups have in relation to the research objectives. In sum, the author identified three groups of interest: the Academic Community, the Industry, and the governmental institutions with respect to national promotion programs e.g. regards regulations.

Interests of the Academic Community

From a theoretical point of view, this piece of research is aimed to gather a deeper understanding regards the behaviour of SMEs in international ventures in a specific industry sector. This study develops a conceptual framework in the context of variables that influence this development and on related moderating effects on the result of this process. There is the opportunity to create a new body of data related to the factors and conditions of SMEs' international expansion in this industry. The findings will help and contribute to evaluate the impact of organizational capabilities.

Interests of the Industry

Despite their obvious importance and their economic implications for the German national economy, from the perspective of the industry, this research will provide a scientific approach to the practical question of why some firms are more successful than others. This research will provide new insights with respect to the factors practitioners must consider when attempting to internationalize their business within this industry.

Second, the knowledge of which factors have the strongest influence on strategy decisions will help the industry to derive managerial implications from the study which business support providers can use to meet international customer needs and assist firms operating within this sector.

Interests of the Governmental Institutions

Generally, most governments follow the aim to increase industrial growth and national economic wealth. The knowledge of which factors have the strongest influence on developing international markets for German SMEs will help to derive managerial implications from the study.

It is obvious that a profound understanding of the reasons and root causes can be used by business support providers and governmental sources to support and assist firms operating within this sector e.g by national programs or individual consult.

Consequently, governmental institutions are an important target group in the present research project.

The following figure shows the process from existing knowledge and through this research to the contribution that will be provided both for academic and managerial purposes.

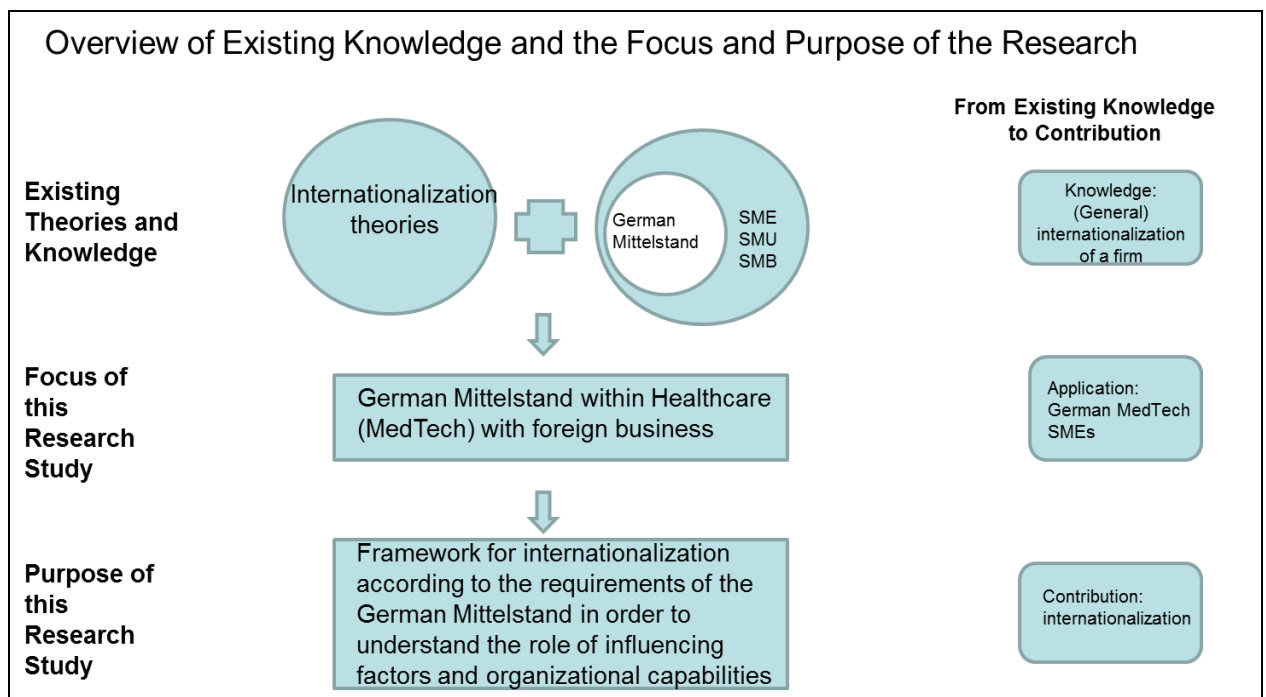


Figure 2: Process from existing knowledge to contribution through this research

1.8 Thesis structure

So far the research objectives, initial hypotheses, and the research questions, together with identified gaps in knowledge, have been provided. This information outlines the main academic and personal influences that formed the basis of this research as well as the justification for undertaking this research.

The structure and content of this thesis begin with **Chapter 2**, which provides information and basic figures about the chosen industry sector, markets, and technology. A basic understanding of the range of applications, the technological concepts and the understanding of the role of customers and the public healthcare systems is a prerequisite for understanding which advantages, but also which disadvantages or risks are related to the players in this business arena. The chapter is completed by outlining the current market situation for this technology in Europe and in the rest of the world as well as the legislative situation.

Chapter 3 outlines the key foundations, definitions and important terms related to the key concept of strategy regarding the internationalisation of a firm. The key concepts and models related to competitive advantage in the context of internationalisation and the role of organizational capabilities are described based on the research of different relevant authors. Potential factors and determinants in different fields, which will influence the decision on internationalisation of SMEs are derived by reviewing previous empirical work and are discussed towards their applicability in the specific research context.

Chapter 4 considers philosophical approaches, methodological choices and the most appropriate research design. The post-positivistic research philosophy as well as the triangulation of methods, combining qualitative and quantitative methodology, is justified.

Chapter 5 is concerned with qualitative methods and presents the focus group discussion as a qualitative approach to the research. It is starting with the theoretical reasoning, followed by the preparation and execution of the qualitative research. It ends with the presentation and discussion of relevant findings and its impact on the initial framework.

Chapter 6 is about the quantitative research. Here is described which quantitative method is applied, the iterative process of the questionnaire development and design is narrated, as well as the administration of the survey itself. Finally, statistical

tests and the analysis of the model are explained and the results are discussed. In **Chapter 7** the findings are discussed and the hypotheses are revisited. Implications of the research, its limitations, and recommendations for further research are addressed.

As mentioned before, the author's has many years of experience in this specific industry context. This is an advantage with respect to the access to background information, its evaluation and networking activities within this community. Also, the aspect of trustworthiness based on the own reputation regarding the targeted focus group participants can be highlighted. But it can also be a potential weakness with respect to bias and neutrality. Hence, it will be crucial to understand and apply the relevant research ethical topics. A description and discussion of how they will be respected in the specific research context will be provided in section 4.10, as well as specific measures, which are detailed in the quality section of each method chapter

1.9 Chapter summary

This chapter has provided an introduction to the research topic and a description of the research aims and objectives. Together with the rationale and justification of the research objectives, this chapter has laid out the foundation for the entire thesis. Research questions reflect the identified research gaps linked to the literature review in chapter 3. The chapter concluded with an analysis of target groups and the relevance of the research. Finally, it ends with the description of the thesis structure.

	Developing an initial framework	Further development	Completion of the framework	Modification of the framework
constructs	Industry & country-specific factors, Strategy, Organizational capabilities			
hypothesis	Hi1, Hi2, Hi3			
variable	Not defined yet			
Identified key mechanism	Specific factors have influence on internationalisation which differs with respect to industry sectors and firm size			
Source or key authors	Practitioner's experience			

Table 2: Development of an initial framework

CHAPTER 2: BACKGROUND

2.1 Chapter introduction

This chapter provides information and basic figures about German SMEs, the chosen industry sector, the role of markets and technology.

A basic understanding of the range of applications, the technological concepts and the understanding of the role of customers and the public healthcare systems is a prerequisite for understanding which advantages, but also which disadvantages or risks are related to the players in this business arena. The chapter is completed by outlining the current market situation for this technology in Europe and in the rest of the world as well as the regulatory situation.

2.2 The role of SMEs in Germany

Much of the prior research has focused either on small firms (export behaviour literature) or large multinational firms (international business and strategy). But also medium-sized organizations have been visited more frequently as a research object during the past years. Although there is no agreement among scholars that firm size is an important factor in the internationalisation process, the emerging research has debated the concept and definition of what constitutes a medium-sized firm in terms of the number of employees, revenue and in organizational, strategy and cultural terms.

However, there are problems regarding variation in the definitions of firm size, since some measures are revenue based and others depend upon employment data.

Some researchers in the field of internationalisation have adopted the number of employees as a measure of firm size. This definition is commonly used in Europe since it is based on an EU commission's size grouping, which also used in many national statistics, that spans a ranking from micro to large (Statistisches Bundesamt, 2011):

Micro (0-9 employees), small (10-99 employees), medium-sized (100-499) and large-scale (500+ employees).

However, the definition of SMEs in the existing research is often not consistent regards the number of employees and its classification. Some scholars refer to a size grouping which reflects better their local or national characteristics. According to Bruni (1987), SMEs have typically a workforce of 200-499 employees. Atherton and Scott (2002) applied in their study a range of 100-600 employees to categorize medium-sized firms in the UK.

Another method to categorize SMEs by quantitative figures is a combination of headcount with the annual turnover or the book value in the balance sheet. There are currently two relevant definitions based on quantitative figures, which are often used in publications and in economic policy. The definition of the EU Commission defines those companies with less than 250 employees and less than 50 million Euros in annual sales or a balance sheet total of 43 million Euros as SMEs.

The 'Institut für Mittelstandsforschung – Bonn' (IFM) defines companies with up to nine employees and less than 1 million Euros annual turnover as small companies, and companies with between 10 and 499 employees and an annual turnover of up to 50 million Euros as medium-sized enterprises.

Consequently, the term 'Mittelstand' reflects the so-called middle class and is according to the IFM (2012) made up of all companies with less than 500 employees and less than 50 million Euros annual turnover. This definition applies to the SME policy of the German federal government.

Some researchers argue that there is a need to incorporate a qualitative dimension to the definition of medium-sized firms, knowing that this is difficult to operationalize in practice. One point of consensus among researchers is that medium-sized firms tend to be grouped together with small businesses, although this grouping does not fully take into account the differences that exist between an enterprise with a few dozen employees operating at a local level, and an enterprise with some hundreds of employees which compete in international markets (Corbetta, 2002).

Nevertheless, this distinction between small and medium-sized firms might be particularly relevant to doctoral research because some scholars see

internationalisation processes and patterns to be sensitive to firm size. Some researcher referring to the resourced-based view see considerable differences between firms with ten employees and those with 150 employees in terms of access to internal resources, management, and financing.

But the present research does not only distinguish between small and medium-sized firms in order to explore the similarities and differences. According to Atherton and Scott (2002) a potential further distinction within the medium-sized firm category, namely between 'small' medium-sized firms (100 employees) and 'large' medium-sized firms (500 employees), is useful with respect to the level of formalization of international strategies and organizational structures. This topic will be considered further in the chapter literature review. Particularly German research articles focus on the so-called "Mittelstand" while considering in the background its qualitative characteristics, which is often described in terms of related property, liability and leadership aspects or the company's independence based on the comprehensive responsibility and authority of the owner. But also decision-making processes, mindset and culture have often a positive connotation in the context of SMEs.

In this research the term 'SME' is reflecting the German 'Mittelstand' or middle class and is understood according to the national German government classification, because the scope of the research are German MedTech SMEs and nearly 80% of the firms have less than 500 employees. Nevertheless, the figures are meant to be used more as a corridor for guiding than as a measuring instrument for precise distinguishing. There are companies with 600 employees and more who describe themselves as a typical SME, maybe also with respect to the mentioned positive qualitative attitudes. The figure below shows the size grouping of German MedTech companies. The primary data is collected from the sources as indicated on the diagram and based on figures from the German federal statistical office.

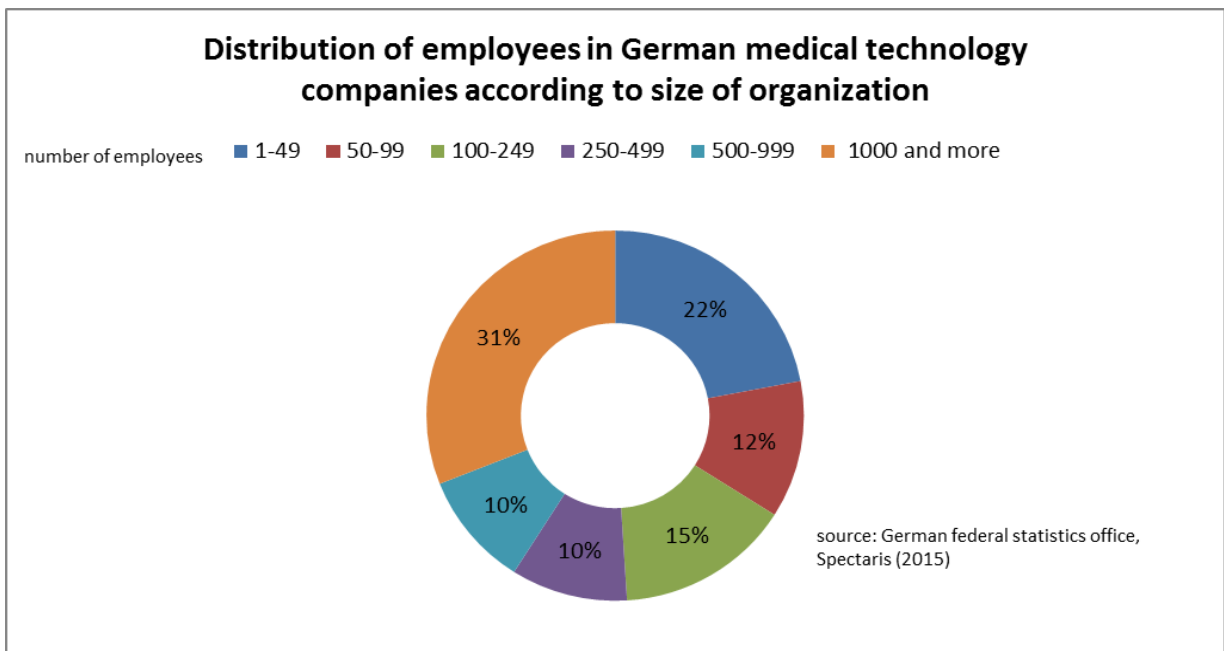


Figure 3: German MedTech SMEs – size grouping (own diagram)

The German industry and consequently SMEs, which play an important role in this context, have changed over the past decades. As a result of this change, significant adoptions have occurred over the time. For example, the German coal mining industry nearly disappeared and China became one of the most important players in the iron and steel industry (Woetzel, 2001). But also technical consumer products, i.e. devices for telecommunication or other consumer electronic products are – through the whole supply chain up to the end product – today mainly produced in the Far East.

This trend has also had an impact on the German industry, where many jobs in Germany disappeared or changed due to this relocation. This industrial change during the 1980s lead to the thesis that a new model of industrial organisation - referred to as 'flexible specialisation' – has been emerged in advanced societies. Under flexible specialisation, production is based on flexible networks of small but technologically sophisticated firms employing highly skilled people. The characteristics of such regions, which can be found e.g. in Northern Italy or in Germany is their high quality and great variety of products (Ackroyd, Batt, Thompson and Tolbert, 2005).

These SMEs play an important role in supplying machines and components for the mass production industries, which are located domestically or more and more overseas. Many of these SMEs managed this global transition by facilitating their export competences. Most German SMEs have international business and 69% of the companies have export business, but only 15% use representatives and less than 5% cooperate or have own subsidiaries in foreign countries (Geyer and Uriep, 2012). In some industry segments such as for mining equipment or process technology the export rate scores up to 80 -90 % (Wiechers, 2016).

Often German SMEs could guard a leading role in these industries and therefore their impact regarding the GNP or the employment rate is significant (IFM, 2012) and they are consequently called the backbone of the German industry. Today, Germany is one of the leading export nations (Statistisches Bundesamt, 2011) along with the SMEs that are predominantly positioned in the highly specialized segment of mechanical engineering with their highly customized precision machinery. Being a central factor of the social market economy in Germany, SMEs are backing the current economic development, and it is assumed that this trend continues to evolve (Geyer and Uriep, 2012).

Consequently, management skills with regards to the assessment of attractive markets, the evaluation of future business potential and the achievement of competitive advantage will become even more crucial for SMEs regards an ongoing intensified international engagement in the future. But there are coming up substantial challenges in the economic development. Local competition and MNEs become more important also for high-tech SMEs. Thus, it is assumed that the German industry will have to focus even more on innovation and specialism (BDI, 2012). But demographic changes, an aging population and consequently a struggle for qualified employees in the future will have an impact, particularly on specialized high-tech SMEs, which represent the majority of enterprises in the German MedTech industry.

2.3 Healthcare market

The health care industry incorporates several sectors that are dedicated to providing health care services and products.

According to industry and market classifications, health-care includes many categories of medical equipment, instruments and services as well as biotechnology, diagnostic laboratories and substances, and drug manufacturing and delivery. For example, pharmaceuticals and other medical devices are the leading high technology exports of Europe and the United States. At the interface between Pharma and MedTech the so-called combination and connected devices can play an important role in the future growth markets in health care particularly in the context of personalized medicine (Wintermantel, 2009).

Medical equipment is used in nearly all medical applications and medical technology products can be found in all stages of human life to support the health of human beings.



Figure 4: Industry background – medical device applications (own drawing)

Although MNEs such as GE, Siemens or Philips have a leading role with respect to turnover and broadness of their product portfolio, many of such products are also provided by German MedTech SMEs, which play an important role as specialized niche leaders. The medium-sized company oriented structure with niche products for specialist application is highlighted as a unique characteristic of the German medical

technology industry (MacDougall, 2011). Some of the medical devices are familiar due to their use in daily life; many of them are highly specialized and therefore used by professionals in the clinical life and laboratories.

Medical devices can help patients in every stage of their lives. Even before the childbirth imaging systems such as x-ray systems and early diagnostic systems based on ultrasonic monitoring systems assist during the prenatal phase. In case of complications, neonatological devices such as incubators can take care. Prostheses and implants provide technical aids for the disabled and for rehabilitation purposes. Telemedicine and model-based Therapy (E-Health) make use of telecommunications to bridge location and time distances between doctors and patients and is enabled e.g. by electronic patient records, tele-monitoring, and expert systems. Operational and interventional devices and systems include devices and procedures for operational interventions on the human body in the OR. Various devices including surgical instruments, patient monitoring, robotics and navigation in surgery, endoscopic equipment, anesthesia work places and many more. Patient's convalescence is enabled with devices such as infusion pumps or breathing systems applied in the intensive care. In-Vitro diagnostics, consisting of instruments and apparatus which are used together with reagents for the laboratory on-site examination of samples that originate from the human body, provides information specific to physiological or pathological states, congenital defects, recipient tolerance levels, and therapeutic condition monitoring. In case of an accident emergency care is able to support life-sustaining functions by mobile devices. In other applications such as in chronic care or elderly care special devices such as pacemaker, hemodialysis systems or ophthalmological devices support life in an aging society (Wintermantel, 2009).

Not at least with the help of highly innovative medical devices the possibilities in diagnosis, therapy and care have been developed significantly in the last decades, which consequently enable a positive development of public health in many countries all over the world.

As a result of significant demographic and technological developments, the world market for medical technologies has developed in the last decade from approximately EUR 200 billion per year to nearly EUR 400 billion. As such, Germany is the third largest medical technology provider of products and medical services in

the world (Kuhlmann, 2014). German companies servicing this market represent a turnover in total of 21,4 billion EUR in the year 2010 (Statistisches Bundesamt, 2011) - a figure that is increasing all the time driven by the development of international Healthcare markets.

German medical technology export shares in target regions concentrate on the EU with 40% in the year 2014 (increase versus previous year +6%), Besides the EU countries, where the MDD is the common base of regulations, German MedTech SMEs also focus on the nearby EU countries. North America with a share of 20% (+13%) and Asia with a share of 17% (+26%) are some of worldwide strong growing markets (Kuhlmann, 2014). With respect to market size, the US is the largest national market followed by Japan and China (Wiechers, 2016). The figure below illustrates the described context from the sources as indicated in the diagram and primary data provided by German federal statistics bureau.

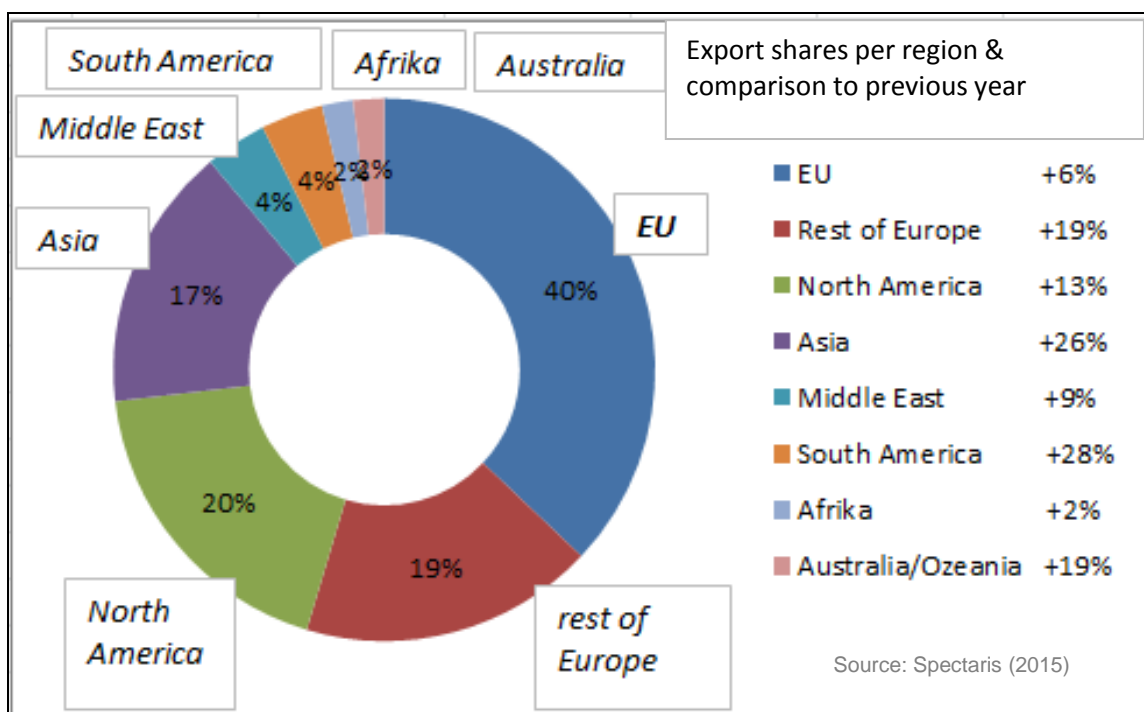


Figure 5: Industry background – target markets 2014 (own diagram)

Ninety-seven percent of all medical technology firms in Germany employ less than 500 employees. These SMEs, with less than 500 employees, account for roughly 40 % of the total turnover. This means that more than 1,200 companies with approx. 130,000 employees, which are active in this medical technology sector, play an import role in Germany (Kuhlmann, 2014).

In terms of new patent registrations, German manufacturers are positioned second after the USA, making Germany Europe’s strongest region for innovation in this industry.

The medical technology producers in Germany achieve approximately one-third of their turnover with products that are less than three years old. More than two-thirds of the generated revenue in this industry belongs to SMEs (MacDougall, 2011).



Figure 6: Industry background – German MedTech industry at a glance (own drawing)

The described technological products, the related companies operating in the healthcare market, together with public authorities in a highly regulated area are some of the ingredients that can be found in the field of management research within the German medical technology industry. It can be characterized as a high-tech sector with high levels of innovation and a strong export orientation. Around 15 percent of all employees in this industry work in R&D, highlighting the significant importance Germany attaches to R&D and innovation in the medical industry (MacDougall, 2011).

Innovation drives the development of new applications at the interface between MedTech companies and to the pharma industry. Stents, cardiac valves or facial

organs are innovative products in the regenerative medicine. This bio-science market is developing rapidly and totals up yet to several billion Euros. Due to its multi-disciplinary and challenging requirements towards innovation in a high-tech and highly regulated environment, German MedTech SMEs already play a leading role in this emerging market (Saifallian, 2017).

With the sequencing of the human genome at the beginning of this millennium and with the continual, rapid, ongoing development of new technologies for analysing the genome, the study of genes has been transformed. These technologies are used today in medicine for inherited and heritable diseases, tissue typing and transplantation, pharmacogenetics, or risk prediction for complex diseases like cancer (Venter, Adams, Myers, Li and Mural, 2001). Specifically for cancer as a genetic disease, the term “personalized medicine” has been brought up in order to offer patients based on their genomes the best individual treatment option available today. As a consequence, a large volume of data needs to be stored, analysed and simulated in a digital way in order to precisely diagnose and treat individuals. This digital transformation provides new business models and possibilities for existing MedTech companies as well as for innovative start-ups, although new regulatory guidelines are still needed that are adapting the volume, variety, veracity, velocity and value of data into personalized approaches (Mueller-Gerndt, Hildesheim and Maher, 2014).

Technological advancements and digital disruptions have transformed our life over the past decades and impacting today various industries, such as banking, automotive or energy. While these industries have already implemented a set of new business models and initiatives, the healthcare industry has started some years ago with this digital transformation.

The rise of drug combination devices, which combine pharmaceutical drugs and medical products, is one example of enablers regarding personalized medicine. MedTech SMEs start to develop focus and prepare their strategic roadmap for enabling digital solutions and artificial intelligence to directly engage patients for the future era of healthcare consumerism (Lai, 2017).

Innovative monitoring devices and software products connect patients to doctors or and provide help in critical situations by recording hemodynamic data anytime and anywhere. Private users can connect to health insurances and exchange vital

parameters and get recommendations regarding potential risks and improvements concerning their way of living (Mueller-Jung, 2014).

2.4 Regulations in the Medical Device Industry

However, compared to other industries (e.g. the consumer industry), the medical technology industry is depending on enormous local regulations and authorities. Examples, therefore, are the Food and Drug Administration (FDA) in the US the Pharmaceutical Affairs Law (PAL) in Japan or the State Food and Drug Administration (SFDA) in China. These regulations differ significantly from country to country along with the lack of harmonization in legal provisions for international standards of regulations (EN, ISO). Consequently, the investments for certifications - a prerequisite for entering the market - are significantly increasing (Kramer, Xu and Kesselheim, 2012).

The low level of worldwide harmonization of regulations in the medical business has an influence on many fields of activities across nearly all processes of a medical device manufacturer. This means that special requirements are needed compared to other industries e.g. in the product design phase in order to meet the product safety requirements. Different countries have different regulations according to the set-up the quality management system, the vigilance system or the classification of products that consequently has impact on the processes of approvals and certifications (Bijayata and Sørholm, 2012).

These different regulations cause various consequences. With respect to marketing strategies, this often means delays for meeting the time to market announcements due to additional regulatory efforts followed by additional market entrance costs. But also the permanent expenses to run the organization in compliance according to the different national standards have to be considered (Herok, 2009).

On top of that, the procedures in which the end customers are using the devices are varying from country to country and are strongly dominated by the different schools of education, which is often specifically reflected in regulations. But even it is not a normative requirement opinion leaders, who call for specific individual customized

features, workflows or methods limit firms' approach regarding product standardization (Wintermantel, 2008).

Regulations, which force to reveal technical details in documents and tests, can create tensions with different impacts on SMEs and MNEs in the context of technical know-how and risk. Knowledge prevention and related perceived risk can also play a role for innovation-driven SMEs when considering internationalisation strategy. To maintain the structures and to achieve worldwide necessary certificates and approvals, which are required to serve specific international markets, can therefore be a huge challenge and a limiting factor. Following the resource-based view, it is much more difficult for SMEs in the MedTech sector to expand and internationalize their business compared to many MNEs acting as global players in this market.

2.5 Chapter summary

This chapter provides information and basic figures about German SMEs, the chosen industry sector, the role of markets and technology. By understanding the wide range of applications and the underlying variety of technological concepts it can be recognized that specialised market niche leaders anchored in innovation and with highly customized and high quality-products can play an important role besides the global acting MNEs.

However, firms acting in international healthcare markets, need to understand the specific rules of this market when willing to consider the chances, but also the risks in these often strongly regulated markets. In this context, the role of customers and demand has also to be seen under the aspect of public healthcare budgets and social developments. Besides the impact of this industry-specific mechanism on business medical regulations have to be respected as an important factor. When considering international ventures, the legislative situation and its impact on cost, time to market, innovation and know-how preservation have to be considered in particular.

	Developing an initial framework	Further development	Completion of the framework	Modification of the framework
constructs	Industry & country-specific factors, Strategy, Organizational capabilities	International ventures Competitive advantage		
hypothesis	Hi1, Hi2, Hi3			
variables	Not defined yet	Innovation, resources medical regulations quality customization		
Identified key mechanism	Specific factors have influence on internationalisation which differ with respect to industry sectors and firm size	Internationalisation of MedTech SMEs is a consequence and may be a chance, but require specific antecedents		
Source or key authors	Practitioner's experience	Wintermantel(2009) Kuhlmann (2014) Kramer (2012)		

Table 3: Further development of the initial framework

CHAPTER 3: LITERATURE REVIEW

3.1 Chapter introduction

It is intended to provide within this chapter an understanding on how the subject is structured, which important variables are relevant to this topic and to provide an overview of the existing theories of internationalisation and SMEs. Hence, previous findings in this field of research and consequently different results are synthesized in order to develop a new perspective. Relationships between ideas and practices are identified with the aim to provide a framework and a rationale for the selection of key approaches and authors.

As explained in the previous chapter, this research aims to provide a contribution to knowledge. Without establishing the state of previous research, however, it is impossible to demonstrate how the present research advances the knowledge in the field. Thus, this literature review is also aimed at locating the present research into the context of current advancements in innovation acceptance literature.

3.2 Conducting the literature review

Conducting a literature review is a means of gaining insight into a particular field of study, including theories, main contributors, key variables, methods and history (Randolph, 2009). The literature review also helps to distinguish what research topics already have been visited and what has been addressed for future research. This is especially important in a field that produces a considerable amount of research papers, as in the field of strategy and internationalisation. According to Gall, Borg and Gall (1996), a literature review also helps to delimit the research problem, to identify recommendations for further research and to gain methodological insights.

As suggested by Tranfield, Denyer, and Smart (2003) for management research prior to the beginning of a review a scoping study was conducted to assess the sizes of the literature on the field and to delimit the subject area by finding studies of

different subject areas. The scoping study leads to deeper information about the quantity and scope of scholar articles regarding the key terms, which are included in the research title and provided an overview of the frequently used sources.

This literature review was conducted in different stages. After the scoping study, an Internet search based on specific combinations of search terms was performed in different databases. According to the research objectives, the review contained the terms such as SME, strategy, healthcare, medical technology or regulation. It was performed with the help of specific search terms and their combination in Boolean terms. In order to narrow down the number of results based on a single research term, different possible advanced search term combinations within the reviewed databases have been applied. Combinations such as e.g. SME AND medical technology or strategy AND regulations enabled further selections. In case the result was still too broad, complementary attributes have been adapted such as SME AND German industry, internationalisation AND Strategy, Medical Technology AND companies and regulation AND medical devices. Details are shown in table 1 in the appendix.

Due to the vast amount of empirical research in this field of research, several selection criteria have been defined for the inclusion or exclusion of empirical articles. The inclusion and exclusion criteria for scholar articles referred to the number of citations, the date of publication or the relevance according to the research objectives.

As a result, articles focussing on special cultural aspects such as leadership phenomena in India or special social aspects such as the role of labour unions in England were excluded. Details are shown in table2 in the appendix. Finally, 40 studies, articles and research papers passed this gate and were reviewed in a following qualitative synthesis. Details and abstracts are shown in the table 3a and 3b.

In the next step, a qualitative synthesis of the empirical articles that meet the criteria was developed by comparing and contrasting the results of the individual studies and generating categories and core concepts. Consequently, the final result of this chapter was a table, containing the common synthesized concepts and results from all articles reviewed in the process of this literature review.

According to Mc Dermott, Graham and Hamilton (2004) a “hand research” can also be applied combined with practitioner knowledge or subject-matter expertise in order to select valuable contributions from prior research.

Consequently, selected articles, sources, and databases have been evaluated by a peer review. Additional journals have been suggested as valuable sources. Based on a manual search of research articles within the last 10 years in the Journal of International Marketing and in the Journal of Academy of Management additional articles have been identified during this next step. The results were added to the review and details are shown in table 4 in the appendix.

Based on this outcome, constructs have been identified and concepts have been synthesized and after all an initial conceptual framework could be developed in several steps in parallel with the literature review. An additional literature-net based analysis was performed in order to screen specific areas. By sharpening the constructs and concepts regarding specific questions the framework was refined with the help of in-depth investigations.

3.3 Basic theories and internationalisation strategies

Internationalisation from the view of a company can be described as the process of becoming multinational. In the first phase of this process a company sells its products in the domestic market. In a second phase, the company begins selling its products abroad. The next step in the internationalisation process may be the establishment of an international sales network. Then the process of internationalisation has advanced so far that the individual company has manufacturing, sales, research and development in a number of countries and it becomes multinational (Levitt, 1986).

Recent literature describes this process often as globalization, due to the upcoming interconnectedness, which has been enabled by international trade agreements such as GATT. In the 1990s under the direction of the WTO, a multilateral trade system has been established, which was an important prerequisite to many former still encapsulated national markets.

The term globalization is frequently used in socio-economical discussions; however, the meaning is somehow blurred and often used as a synonym for the term internationalisation. From an academic point of view, it seems advisable to define the intended meaning of internationalisation according to the scope of this research. According to Petralla (1996), the concept of internationalisation begins with the expansion of national entrepreneurial activities. This comprises all functions of a firm and ranges from raw material over products and services to financial capital. In contrast, globalization is according to Dicken (1992) more than export or foreign investments and can be distinguished by its additional qualitative aspects. These can be characterized as a higher degree of functional integration with respect to the economic value chain, which goes along with specialisation as well as with social relations across national boundaries.

Some scholars argue that globalization can be seen as an intensified next step of internationalisation and that the globalization process covers the activities of internationalisation as well. However, the analysis of the existing literature is often attributed to internalization theories that are embedded in international business behaviour research. In order to keep the wording consistent and to avoid semantic confusion in this research the term internationalisation is used as a broader approach under which also characteristics that some researchers group under globalization are reflected, too.

Theories in this academic field of interest have developed over the time. Some of them have been revisited and expanded over the time, other are criticised since they do not fit anymore to the observations obtained in a rapidly changing world. It is the intention of this research to give a comprehensive overview also from the perspective of the development of the theories over the time. Hence, theoretical reasoning often starts with elder references and ends up with recent research.

Theoretical frameworks regard internationalisation often draws to one of the three main strands of the literature, namely the stage theory, contingency theory(ies) and the resource-based theory. Different internationalisation approaches, which are discussed in detail later, recognize the multiple influences on the internationalisation process and are linked to different fields of research such as export behaviour, international marketing, resource-based literature and international

entrepreneurship. They reflect different basic academic views, such as the economics based view, the behavioural view or the knowledge-based view.

Some explanatory models in the reviewed literature draw on generic economic theories, which they use to interpret particular phenomena with the help of a general mechanism. Certain aspects of internationalisation can be explained by following the transaction cost theory. It states, that firms exist to minimize the cost of making transactions through either hierarchy governance structures, i.e. within the boundaries of the firm, or through market governance structures, i.e. in the open market (Williamson, 1981). This theory is a starting point for other approaches.

First, the internalisation/transaction cost approach argues that licensing can reach customers abroad. But in the perspective, the multinational firm would usually prefer to 'internalise' transactions via direct equity investment rather than license its capability. The internalisation perspective is closely related to the transaction costs, which decide on whether to enter a foreign market through internalisation within its own boundaries or through collaboration with an external partner. Both perspectives are concerned with the minimisation of transaction costs and the conditions underlying market failure.

Second, the resource-based theory draws on the assumptions that in order for a firm to sustain its competitive advantage its resources must be heterogeneous and immobile (Barney, 1991). The traditional marketing approach reflects the common marketing focus on firm's core competences combined with opportunities in the foreign environment. Hence, the firm must possess a 'compensating advantage' in order to overcome the 'cost of foreignness'.

Many of the selected studies and articles in the context of internationalisation refer to one of these approaches and often the constructs of the researched models apply to competition. Porter's five forces model (Porter, 1980) is a general approach, which identifies and analyses five competitive forces that shape every industry, and helps determine an industry's weaknesses and strengths. These forces are: Competition in the industry, potential of new entrants into the industry; power of suppliers, power of customers and threat of substitute products. It is frequently used to identify an industry's structure to determine corporate strategy.

Firms own value position regarding its elements of the business model has also to be considered in order develop a strategy and align firm´s capabilities and resources. Based on the generic orientation of strategy (Porter, 1986), firms have different strategic options and internationalisation can be an important element to support a firm´s overall strategy.

But also the so-called eclectic paradigm, also known as Dunning´s “Ownership, Location, and Internalization Model” (Dunning, 1988) is often named in this context. An eclectic paradigm can be understood as a theory that provides a framework for a company to follow when determining if it is beneficial to pursue direct foreign investments in order to explain the internationalisation mainly of MNEs its business (Dunning and Lundan, 2008). This holistic approach combines together ownership (O), location specific (L), and internalization (I) factors in an eclectic paradigm of international production, known also as OLI paradigm and is based on the assumption that for a direct investment in a foreign country to be beneficial, there must be a comparative advantage, an ownership advantage and an internalization advantage (Dunning, 1988). As a result, the main factors described above have been integrated into this approach in order to examine the totality of the relationships and interactions of the different components.

According to Dunning (2000), one of the main targets is to find out whether the existence of a comparative advantage leads to executing particular functions within a specific nation. These thoughts are used often in the context of resources with respect to costs and availability when comparing one location against another.

Ownership benefits can be topics around naming, copyright or patent rights including existing trademarks. Furthermore, the management of existing internal skills compared to those that can be used in a foreign market can also be considered as internalization advantages in Dunning´s OLI model.

According to Turcan and Carter (2003), this model supports the decision if it is best for an organization to produce the particular product itself or consider an outsourcing to a third party. In the context of internationalisation, it is sometimes more cost-effective for an organization to keep the execution of the work internal, and therefore, perform their activities out of a different market location. This is in comparison to outsourcing the production where the organization builds up business

ties with local producers. If those local producers can meet the organization's production needs at a lower cost, than the organization itself, the production is managed and performed by third parties.

With the help of Dunning's eclectic paradigm it can clearly be explained that under imperfect market conditions, firms have an incentive to internationalize certain activities. Ownership-specific advantages enable them to compete with local firms in foreign countries and the preference for direct investments over licensing and export results in location-specific advantages.

But this approach can be criticised with respect to its contributions in traditional small firm internationalisation research, as it has been developed on the internationalisation of MNEs. Thus, it takes the multinational stage for granted and assumes perfect rationality, leaving many questions unanswered regarding the development process by which companies become multinational.

Also, Johansen and Vahlne's (1977) Uppsala Stage Approach are often named theories in the context of internationalisation strategies. This explanatory framework suggests that each stage involves an increased commitment to international activities and that the process of internationalisation is the consequence of the acquisition of experiential knowledge, in particular, market-specific knowledge, and of uncertainty associated with the decision to internationalize. The model distinguishes four different steps of entering an international market. According to Holtbrügge (2005), they cannot be considered independently of a company's situation, market and the market knowledge. The Uppsala approach determines between no regular export activities (sporadic export), export via independent representative (export mode), establishment of a foreign sales subsidiary, foreign production/manufacturing.

From the knowledge-based view, the Uppsala stage process is based on organizational learning as a key element and focuses on 'experience' as the sole explanatory factor. Neither environmental factors, such as those relating to competition, nor any company characteristics other than 'experience' were considered in the model.

Turcan et al. (2003) evaluate this as a positive reduction. They argue that it leads to a powerful explanatory strength for explaining and describing the process for firms

that expanded abroad during a particular time period and at a certain stage in their internationalisation particularly at the example of Swedish MedTech SMEs.

Today, it can be still observed, that companies normally start their expansion in a psychic nearby market (Johanson and Vahlne, 2009). Market knowledge and control of resources is the existing base, which can be enhanced step by step. When the firm becomes more experienced and is prepared to acquire better resources, they expand to more distant markets.

But even if many firms still seemed to behave in accordance with the traditional pattern, Johanson and Mattson (1985) have indicated early, that the development of cooperative relationships with customers, suppliers or other business partners is another important factor. Their “network model of internationalisation” explains the influence of external actors or organisations on the internationalisation of a firm by comprising two dimensions, the degree of internationalisation with regards to the firm and with regards to the market.

Johanson and Vahlne (1990) enlarged their stage process model accordingly by adopting the network model and acknowledging multilateral influences on the international decision making of the firm.

In the following table four basic paradigms, which draw back to the 1970’s to 1980’s of the last century, summarize different approaches regarding the understanding of firm’s internationalisation.

	OLI Paradigm	Net-work approach	Stage approach	Porter’s 5 Forces model
mechanism	<i>An incentive to internationalize certain activities is based on comparative advantages regarding ownership, location and internalization and is therefore a source of heterogeneity</i>	<i>Embeddedness and connectivity as social assets</i>	<i>Experiential market specific knowledge as a source of stepwise international growth</i>	<i>To identify an industry's structure to determine corporate strategy such as internationalisation by evaluating attractiveness and risk and own value position</i>

Key Sources	Dunning	Johanson & Mattson	Johanson & Vahlne	Porter
Year	1988	1985	1977	1980

Table 4: Approach to internationalisation (based on Turcan and Carter, 2003 p.13).

The research on the internationalisation of a firm and the development of an appropriate framework still goes on. Some scholars observed so-called “born global” companies that, from inception, seek to derive significant competitive advantage from the use of resources and the sale of outputs in multiple countries.

Their goal is to go through different stages of internationalisation suggested by stage models very rapidly or even start with international ventures from the very beginning. Oviatt and McDougall (1994) explained such a phenomenon very early in their “International New Venture” approach, which draws from transaction cost, international production, and resource-based theories. This approach is in alignment with the behavioural-based view and closely related to the field of international entrepreneurship. That is defined as a combination of innovative, proactive, and risk-seeking behaviour across national borders and is intended to create value in organizations (Turcan et al., 2003).

Although export is only one characteristic of firm’s internationalisation, many companies start with or are limited to export business and it can be understood that various factors influence their strategic decision-making and execution. A review concerning research articles in the context of export business (Leonidou and Katsikeas, 2010) shows the various facets of this subject matter. The subject of overall export strategy was most often examined in conjunction with antecedents (e.g., environmental, firm, or product) and/or outcomes (e.g., export performance) of marketing strategy standardization or adaptation. But also export products in the context of standardization versus adaptation was a dominant topic, followed by branding strategy and new product development, export pricing/financing and export distribution/logistics have traditionally been an attractive subject for many export researchers.

All of the research in this context has something in common. Their research objects are not companies and their business with respect to domestic markets. The business transactions are supposed to go across national borders. The outflow of

goods of a country is called export trade. Foreign trade is trade between different countries, it is also called international trade. Sometimes, particularly if the foreign partners are perceived to be far away or the transaction requires a shipment over an ocean the term overseas is used as a synonym. This research is focussing on the internationalisation of German SMEs. Hence, international and export are meant to describe all non-domestic business ventures, foreign and overseas are understood in the context that the business partner is not located nearby, which can mean a geographical distance as well as a related cultural distance.

3.4 Critical reflection on internationalisation strategies

Internationalisation as strategy process within the international business research may be blurred by the multidiscipline nature of the field. Stage models of Internationalisation, SMEs' deficiencies regards strategy, structure and administrative processes or transaction costs or international entrepreneurship - it can be questioned whether these patterns and models still fit in general.

Circumstances have changed and internationalisation theories do not cover all aspects of the current development in the world (Holtbrügge, 2005). Transportation has become cheap and information technology enables close cooperation all over the world. The availability of knowledge in the times of the internet and real-time information at any place in the world are enablers for recent developments but also caused a change regards established business paradigms.

Therefore it is not surprising that meanwhile, the theoretical framework of internationalisation theories are going to be enhanced. SME specific aspects are more integrated for example by Mathew's (2002) LLL model, which describes the lack of knowledge of SME's but also the possibility and the importance of the development of leveraging their capabilities. Johanson and Vahlne's (2009) Liability of Outsidership approach focus on this collaboration aspects because networks and collaboration drive relationships and hence facilitate business networks, which are elementary for business success. Hence, the established internationalisation Uppsala Stage Theory has been revisited and knowledge creation has been added to the framework in order to recognize the fact that new knowledge is developed in relationships. And according to Dunning and Lundan (2008) also Dunning's (2000)

OLI approach has extended to strategic alliances. But this can not cover the whole range of phenomena regards SMEs´ internationalisation.

A challenge to stage models has come from the field of international entrepreneurship research. Recent literature has focused predominantly on ventures that have demonstrated early and rapid internationalisation. The “International New Venture Approach” draws from transaction cost, international production, and resource-based theories. Oviatt and McDougall (1994) defined international new ventures as business organizations that, from inception, seek to derive significant competitive advantage from the use of resources and the sale of outputs in multiple countries. One of the key questions aiming at the so-called “born global approach” addresses, how some small firms can succeed abroad rapidly without e.g. going through different stages suggested by stage models. Recent research indicates that the reasons for this more rapid internationalisation are depending on the degree and type of international competition. These new patterns tended to be particularly frequent in industries of highly internationalized or "global" competition.

Modern empirical findings show that SME internationalisation modes are not path dependent, emergent or incremental (Schulz, Borghoff and Kraus, 2009). Some SMEs focus on international markets as an early start-up, some concentrate on single international markets, some even re-concentrate their international activities back to the home base and others never engage in international ventures.

The ongoing digital transformation and the expected changes, which are going along with the development of personalized medicine have already been described. As massive investments in intelligent technology within a regulated environment are required, different convergence trends in the healthcare industry can be observed: MedTech companies are collaborating with IT giants. Pharma Life Sciences companies are developing new digital business models “beyond the pill” that are reimbursed by health care insurers and cooperate with fast and innovative MedTech SMEs. Contemporary SME research is still attempting to fill the gap between the framework based on existing internationalisation theories and the observed international activities of these firms by concentration on an independent theoretical concept of SME and internationalisation (Wincent, 2005).

3.5 Considering research context-specific factors

This research focusses on SMEs in the MedTech industry in Germany. Hence, the word “specific” is related towards the firm size, the industry sector and firm’s country of origin. The structure of following sections from the literature review will habitually start with findings from the literature, which are applied to a broader context such as companies and internationalisation or SMEs and capabilities in general.

The intention for this broader approach is to synthesize the different results and to develop a new perspective, and to identify relationships between ideas and practices.

Some information regarding industry background, SMEs or internationalisation has already been provided in the chapters and sections before. In the following sections the field of strategy, factors that stimulate or hinder internationalisation and the role of capabilities will be evaluated in order to investigate applicable constructs.

But also industry-specific factors have a strong impact. According to Hawawini, Subramanian and Verdin (2003, p.1) “only for a few dominant value creators (leaders) and destroyers (losers) do firm-specific assets seem to matter significantly more than industry factors. For most other firms, i.e., for those that are not notable leaders or losers in their industry, however, the industry effect turns out to be more important for performance than firm-specific factors.”

Thus, the significance of the more general findings or concepts from the literature is examined in a second step. Based on survey findings from previous research it is evaluated, whether they are also applicable for MedTech companies.

However, theoretical and empirical findings obtained in a particular institutional context are not equally applicable in other countries (Hoskisson, Hitt, Wan and Yiu, 1999) This means that e.g. findings and the existing constructs regarding SMEs’ internationalisation also have to be considered in a final step regards its country-specific context if applicable based on findings from specific surveys.

This step-approach, which moves the focus from more general aspects of firms internationalisation on SMEs in the MedTech industry and finally on country specific factors of MedTech SMEs in Germany, has the intention to make further

contributions on a more detailed level in order to select distinguished factors and variables, which represent the constructs in the specific research context in a best way. Finally, the section should be a rationale and a starting point for the theoretical completion of a framework based on the introduced constructs and relationships drawn from the literature.

3.6 Influencing factors

It is agreed that the process of strategic decision making and strategy execution is determined by many different factors. Some scholars group them into classes such as external environment, internal environment, and product-market structure.

The contingency theory recognizes the importance of external environmental factors of firm's strategy that affect organizational actions. Leonidou and Katsikeas (2010) focus on environmental and internal factors, particularly in an organizational and managerial context. In contrast, Atuahene-Gima and Murray (2004) are drawing on the contingency theory and see internal and external determinants of firm's strategy embedded mainly in social relationships.

According to Katsikeas, Samiee and Theodosiou (2006) the strategic fit of marketing strategy and its influence on performance outcome is influenced by three macro-environmental factors (regulatory environment, technological intensity, and velocity, customs and traditions) and three micro-environmental forces (customer characteristics, product life-cycle stage, competitive intensity).

There is some disagreement within the literature in terms of the relative significance of internal versus external contingency factors. The extant literature emphasizes the significance of external triggers, such as the market structure. According to Murray et al. (2010) researchers have conceptualized environment as one of the key constructs of understanding organizational behaviour and strategic approach depending on the competitive setting of the business.

Some scholars distinguish between endogenous or exogenous factors, others recognize positive triggers that encourage international involvement, or negative barriers that discourage or hinder internationalisation and that they can differ with respect to e.g. firm size.

Also, the perception of barriers differs between NMEs and SMEs. Scholars agree that foreign country related topics like risk and hazards have more influence on SMEs' decisions.

Particularly the safeguard of know-how characterizes a main difference whereas criteria like transaction cost seem to work on both SME and MNE when considering internationalisation. Psychological distance is often named as a further barrier in the context of SMEs.

According to Hofstede (1980) culture is defined as the collective programming of the mind that distinguishes one category of people from another. His framework of crosscultural communication describes the effects of a society's culture on the values of its members, and how the behavior is influenced by these values. The theory has been used in several fields as a paradigm for research, particularly in international management. Cultural diversity recognizes the behavior of people of different cultures. National or even regional characteristics occur as cultural differences and are relevant in international business, too. One reason for perceived psychological distance can be an experienced or assumed high cultural difference (Lewis, 2015). Provided that this distance is not based on the stereotyping of national psychology and characteristics, also practitioners highlight that the influence of culture on international business should not be neglected because it can cause operational conflicts. From an academic point of view, the assessment of the Hofstede's different dimensions of national cultures goes along with cultural values and continues to be a major resource in cross-cultural research fields such as individualism-collectivism, uncertainty avoidance, power distance (strength of social hierarchy) and task orientation versus person-orientation.

Zaman, Mahtab and Raza (2014) highlight the role of leadership and management in this context. While recruiting, retaining and motivating people it must be kept in mind that people come from diverse backgrounds, so managers must be very careful in honoring the values, cultures and sub-cultures of all the diverse backgrounds.

Leonidou, Palihawadan, and Theodosiou (2011) highlight that the adoption of specific national export-promotion programs positively can improve cultural understanding, strengthens the firm's export-related resources and capabilities by providing relevant know-how and supports potentially by capital investment incentives.

From another perspective, Julien and Ramangalahy (2003) identified in a broad literature review sixteen competitive factors that small firms use. Six of them relate to product strategy (adaptation, scope of product line, exclusivity, technological intensity, maturity, and size of orders); five to distribution strategy (similarity and number of models, intensity of contacts, and marketing coordination with intermediaries); three to price strategy (differentiation, lower export price, pricing according to local situation); and the last two factors relate to promotion strategy (scope of promotional efforts and participation in trade fairs).

These categories are respectively related to the markets and products, competition, business opportunities, operating conditions, and to export operations. Specific environmental factors such as competition by MNEs or upcoming domestic firms in a foreign market have particularly impact on their strategy.

When facing a high level of competition, firms need to to be market-responsive in monitoring competitors, developing their own competitive strategies, and anticipating and responding to competitors' actions in a highly competitive export environment, information about competitors becomes more valuable, and the need for high levels of market orientation is more critical (Murray et al., 2010).

Competition has been named as one of the five forces determinating strategy development in a specific industry. This is also applicable for this specific research context, since it has been addressed that local competitors and foreign competition across markets are a strong force, which has to be considered by SMEs in their strategic approach.

According to Cavusgil and Zou (1994), the specific (marketing) strategy in international ventures is influenced by product characteristics because its attributes can effect the positional competitive advantage. Product uniqueness, cultural specificity, unit values and offered services are named as key determinants. The competitiveness of the product often depends on the technology intensiveness and intensity of price competition.

Product competitiveness is crucial especially in international ventures, because it enables firms to develop and market the appropriate goods and services that are valued by customers in export markets. Some scholars understand this as market

orientation. It is agreed that there is a significant relationship between market orientation and firm performance in international ventures (Murray et al., 2010).

As a result of the review, SMEs seem to achieve better performance when adopting a differentiation and innovation strategy. This is in line with Lages et al. (2009), who focuses on constructs such as product uniqueness, innovation and quality. Product quality has been found to be strongly related to export success.

Furthermore, it was indicated that the degree of formal quality processes and education of employees concerned with the quality system are the characteristics that most discriminate between successful and unsuccessful exporters. Finally, he summarized that the export performance literature suggests these elements as critical product-related performance drivers.

Summarized, it is agreed that there are many different influencing factors, but it is unclear which are more important than others, particularly in the given research context.

As result of the qualitative synthesis and based on the findings from the reviewed articles, three different categories of influencing factors can be distinguished. It can be recognized that a perspective which respects product, firm, and environment-related factors could group most of the described factors, which have been revealed in the literature review. However, the definition which specific variables represent the different categories in this framework best has to be extracted in a next step,

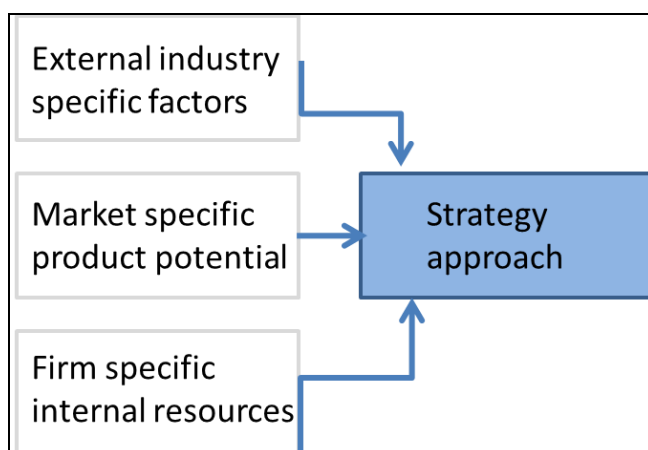


Figure 7: Grouping influencing factors on strategy approach by second-order constructs

In this step empirical research contributes to a deeper understanding of relevant factors in the specific context of MedTech SMEs.

Different medical devices are used in a single OR during an intervention, it is important that they can be connected together in order to the best support of the staff and the patient. This is not restricted to technical interfaces, this comprises also procedures and workflows in the OR. Patients data achieved in diagnosis by one device is expected to be used and continued later also in therapy by another device.

Hence, cooperating with other manufacturers, suppliers or customers is crucial. The possibility to cooperate from a market perspective can be seen as an antecedent.

Therefrom Mitchell, Shaver and Yeung (1992) highlights collaboration and relationship as key enablers particularly for SMEs to commercialize complex products in foreign markets. As described by (Lai, 2017) particularly for MedTech SMEs it will be even more important in the future to cooperate within the healthcare market.

According to Lages et al. (2009), to establish and to maintain such partnerships is based on specific organisational capabilities. Consequently, Zeng, Simpson and Dang (2017) see capabilities as crucial in order develop, manage and deploy to renew firm's resource bases in order to respond to the operational challenges. Their research suggests that dynamic capability development is a meta-capability to learn how to repeatedly renew firm's overall capability

In the literature collaboration between companies is described as usually but not always beneficial due to the risk of sudden break down due to mergers and acquisitions, which increases by sharing technology and road map strategies. But there are also important positive effects such as common definitions and interfaces leading to standardization and system integration, which fosters connectivity and sales possibilities.

Hence cooperations, networks and collaboration can be identified as a way to compensate the lack of knowledge and capabilities which often characterize the situation in SMEs' business. This is also applicable for the specific research context, since it has been addressed that more than two-thirds of the generated revenue in

Germany's MedTech industry belongs to small and medium-sized enterprises and that they often face limited resources while having to invest significantly in research and development.

New markets and respectively higher production volumes were named as triggers for international ventures, whereas management resources, lack of experience and financial resources were also identified as barriers based on several hundreds of answer in a primary study on SMEs conducted by the German chamber of commerce. (Geyer and Uriep, 2012).

This is in line with a survey in the MedTech industry focusing on SMEs in the UK, which generated interesting results regards motivation, barriers and success factors in the context of internationalisation (Barnes, Chakrabarti and Palihawadana, 2007). Oversupply in the domestic market, higher market size, guard own resources by entering more markets and greater profit were named as motivation, whereas finding the right partner, local competition and limited financial and management resources were named as barriers. As success factors were identified e.g. competitive products in a high-quality as well as an experienced management.

As a conclusion MedTech SMEs have to consider the attractiveness of a foreign market, the availability of attractive high-quality products for their internationalisation. The impact of medical regulations has already been identified in a previous section. The critical role of firm's resources can be confirmed and the importance of management experience, (Export) know-how and competition as influencing factors has been identified. These findings support and fit to the already described factors from the literature and are therefore added to a preliminary selection of representatives.

More evidence of country-specific behaviors can be found in a study which compares Japanese, British and German companies and their export strategy towards the US by means of 462 product families (Williamson, 1990). British companies were dominated by UK supply and demand considerations, Japanese companies invested heavily in distribution and support channels, whereas German companies have built their shares on technological advantage and direct sales.

Although the study is some years old, it has already been recognized that German MedTech enterprises still have a strong approach towards technological innovation.

The growth rates indicated that this is particularly successful in today's fast-growing markets such as in the US or the Far-Eastern countries which are willing and able to reward the benefits of technological innovation.

Hence innovation is again confirmed as an important influencing factor in this specific research context.

In the following table the in the literature review identified and in the section above described factors which have influence on firm's strategic approach in this research context are summarized.

Chapter	sources /key author	External industry-specific factors	Market-specific product potential	Internal firm-specific factors
1 Introduction	Chatterji (2009) Murray (2010) Leonidou (2011)	Medical regulations Competition		Management Skills &Experience
2. industry background	MacDougall (2011) Kramer (2012)	Medical regulations	Innovation	
3.1 literature review (internationalisation in general)	Johansson & Matson (1988) Johanson & Vahlne (1977) Porter (1980)	Cooperation Market Potential		Experience
3.1 literature review (SME's internationalisation)	Julien (2003) Murray (2010) Cavusgil (1994) Lages (2009) Geyer (2012)	Competition Market Potential	(Customization) &competitiveness Quality	Resources Resources Experience Management Skills
3.1 literature review (MedTech specific context)	Williamson (1990) Mitchell (1992) Barnes (2007)	Cooperation Cooperation Competition Market Potential	Innovation Quality Competitiveness Quality	Resources Experience Resources

Table 5: Itemization of representative influencing factors

Nevertheless, based on the literature review the itemized factors and related variables cannot be limited further, as well as not all of them can be prioritized in a country and industry-specific context. This will have an implication and needs to be considered in the further research design.

However, the decision on grouping the factors in product, external and internal related categories, is confirmed. So far additional valuable aspects have been detected, which will find attention in other constructs.

3.7 Strategy approach

The term 'strategy' covers a broad field of subject matters within the academic literature. Strategic management as one branch is recognizing that in the world of business certain strategies suit different situations and environments better than others (Whittington, 2001). It is the intention of this research to develop the own reasoning by considering different approaches over the last decades in order to combine strategic approaches from different perspectives without neglecting related criticism, which motivated further research. Thus, this section starts with the early strategic management literature, because their basic concepts and assumptions can still be found on management shop floors. The results of recent research with respect to academic and managerial impacts are considered at the end of the chapter, too.

Although there is no single definition, the literature describes often the existence of an overall long-term objective compared to a decision made in and for the advantage related to a single moment. Therefore, one of the main targets in the economy is to attain competitive advantage (Hinterhuber, 1992). Strategy as a topic in literature came up in the 19th century in the context of military strategy initiated by Clausewitz. In management research, strategy related to economics was developed at Harvard Business School in the 1950s. Strategy in management research is nowadays a well described and a commonly used term in management literature and practice (Easterby-Smith, Thorpe and Jackson, 2008).

According to the comprehensive approach which is chosen in the context of this review, strategy can be understood as a seamless merger of all activities of a company (Porter, 1986). Every organisation operates on a set of assumptions as to what is business, what the objectives are or what customers value and pay for. According to Drucker (1998) strategy converts this theory of the business into performance. The purpose is to enable the organisation to achieve its desired results.

Strategy is the pattern in a stream of decisions (Mintzberg, 1973), which means to execute specific actions based on a planning to achieve an objective. Strategy requires resource allocation decisions that are intended to fulfill an organization's objectives. The strategy of an organization is broken down into the different levels of hierarchy for organizational purposes, objectives and goals.

According to Whittington (2001), different perspectives of strategy can be found in research with a different focus over the last decades.

	Classical 1960s	Processual 1970s	Evolutionary 1980s	Systemic 1990s
strategy	formal	crafted	efficient	embedded
focus	Internal	internal	external	external
Key influence	Military Economics	psychology	Economics biology	sociology
Key authors	Chandler Ansoff Porter	Minzberg Pettigrew	Hannan&Freeman Williamson	Whittle

Table 6: Perspectives of Strategy (adopted from Whittington, 2001. P39)

Recent research introduces the concept of viewing strategy through separate lenses. Johnsons and Scholes (2002) distinguish different perspectives such as the traditional design view of strategy, the aspect that strategy can arise from experience and culture and the notion that strategy can be a product of emergent ideas.

Also, Wheelen and Hunger (2012) refer to the dynamic nature of strategic management and emphasize the monitoring and evaluating of external opportunities and threats in light of a corporation's strengths and weaknesses. Therefore strategic management comprises strategic planning, but incorporates also topics such as environmental scanning, and industry analysis.

In a review of academic articles from the past decade, Narayanan et al. (2011) investigated the different strands in theory development. Most of the contributions can be allocated in the field of organizational identity, organizational routines, strategy implementation, strategic change and organizational learning. According to this survey, the link to competitive advantage and the impact of competitive

dynamics is confirmed. But also the importance of coordination mechanisms is enumerated by strategy scholars.

Summarizing this development in strategic research, it can be recognized that certain 'strategy schools' suit different situations and environments better than others. It, however, appears that a systemic approach on strategy is indeed still persuasive. This means that in today's world of global business finding the 'school' that best suits an organisation's goals earns the greatest reward for all. But internal antecedents and capabilities have to be respected as well as cultural and societal needs, while still maintaining sufficient profit. This relationship between organization, structure and strategy has early been illustrated by Chandler (1962) under the term 'Structure follows Strategy'. Murray et al. contrast this relationship by highlighting that to develop a level of strategy fit that is consistent with organizational resources determines firm's success.

According to Porter (1980), there are different generic competitive strategies and cost leadership, differentiation or focus (niche) are often named as the basic paradigms. Along the internal value chain, each area contributes with its functional strategy, such as in production, HR or finance. Accordingly, they target for low unit cost, high employer branding or exchange rate hedging in order to support the overall strategy. Ansoff (1965) describes the patterns of market differentiation, market extension and diversification. A matrix spanning a strategic field from existing products to new product development and between existing markets to new market development is the base for developing strategic approaches. Other researches and management practitioners draw back on portfolio based approaches considering product market- related potentials illustrated as cash cows, stars etc.

The necessity of the development of a strategy and the tactics appropriate for the achievement of that strategy is widely agreed. The task on how to bridge strategy and tactics needs to be thought out during the process of strategic planning. Consequently, a subset of strategy is strategic planning. According to Vignali et al. (2003), this process is wise to view as somewhat separate and related to the strategic level of management. Looking through the lens of the resource-based view this construct of strategy development and strategy execution has brought special attention for SMEs. In the context of this research both are named under the umbrella of strategy approach.

Strategic planning is influenced within a company by a range of factors, e.g. its culture, leadership, size, ownership, perceived market share and industrial sector (Gabler, 2012).

There is no single definition to distinguish between strategic and operational planning, mainly when considering budgeting, although the strategic aspect is often described as meaningful and long ranging. It is agreed that the result is not limited to the formulation of basic organizational missions, purposes, and objectives; also policies and programs to achieve them and the methods needed to assure that strategies are implemented to achieve organizational goals are expected as an outcome. Firm obtains its advantage by building strategies that exploit its internal strengths and avoids its internal weakness while responding to environmental neutralizing external threads (Leonidou et al., 2011).

According to the literature there seem to be significant differences in the development of a strategy and decision-making processes between global players and SMEs (Martin, 2005). It has already been addressed that there is still a significant amount of SMEs that have not implemented a formal strategy planning and that this figure is decreasing in the recent years.

Furthermore, it has been noticed that those, who base their decision on formal processes and tend to more rationale and objective based decision modes come to different prioritizations regarding decision factors such as risk, transaction costs or know how prevention. But also entrepreneurial leadership and decisionmaking is often mentioned in the context of strategy and SMEs.

Entrepreneurial attitudes are often described as virtues are illustrated as visionary, assertive and flexible. The literature shows a heterogeneous picture, some companies follow this stereotype of an owner dominated SME, but it is also agreed that this is not the majority of the companies and often decision making is a mixture of different behavioral attitudes. Based on the experience of the author this is also true within different MedTech companies according to the development of their business strategies and their organizational approach.

The strategic decision management in SMEs follows different stages (Wheelen and Hunger, 2006). Based on a product an environmental scan regards risk and opportunities is followed by an organizational analysis related to strength and

weakness of internal factors. Based on this result a firm-specific strategy can be formulated.

As far as SMEs are willing to follow such an iterative process they will need to meet specific antecedents such as knowledge and resources. Different factors have influence depending on the specific circumstances that a company faces in its situation, position and market. As soon as a strategy has been formulated as an outcome of this process, routines and procedures have to be applied in the daily business.

This means that internal factors of an organization such as capabilities also affect firm's internationalisation strategy (Morgan et al., 2004). Following the knowledge-based theory firm's capability to manage internal competencies enables the transformation of knowledge into value creating processes (Dosi and Marengo, 1994) and particularly organizational capabilities influence strategy development (Atuahene-Gima and Murray, 2004).

Resources provide the basis for designing and implementing strategies that subsequently help to achieve sustainable competitive advantage and improve effectiveness and efficiency.

According to Katsikeas et al. (2006) strategy capabilities, meaning strategic fit of firm's strategy according to resources both in development and execution is seen as an antecedent for competitive advantage and economic success.

But there are also findings from empirical research, which focus on the specifics of German SMEs in this context. Some of them highlight SMEs orientation towards stability or risk avoiding. Others focus on the orientation regarding leadership and change as dominant attitudes of management and identified accordingly three different types of behavioral paradigms, named conservators, innovators and pragmatists (Scharrer, 2001). Other papers address the influence of the managerial team over the behavior and performance SMEs and provide a more complete understanding of how the characteristics of managerial teams shape decision-making processes and SMEs' strategic orientation.

Nevertheless, some scholars argue that behavior is not only determined by the managerial orientation, but also by the situation and the management structure of

the company, which is involved in the development of strategy and related decisions. This means that behavior is not uni-dimensional. Consequently, the behavior of firms cannot be reduced to simple patterns, such as that a risk-seeking oriented top-management will neglect all thoughtfulness and will tend to give order towards hazardous ventures. In the decision making-process the orientation is influenced by correctives such as rational considerations and internal debates.

This is confirmed by the findings from Martin (2005), who did a survey on several hundreds of SMEs in Germany not only to investigate behavioral aspects how they decide on their strategy but also what where the specific outcome in terms of their implemented business strategy. According to his findings, nearly two-third of these SMEs had international business. Only 10% of the SMEs in Germany named cost leadership as a dominant factor regarding their business strategy, 73% claimed to realize their competitive advantage by customized products and therefore following a differentiation strategy. Also very few of the SMEs would describe themselves as pioneers, most of them consider themselves as well established. The majority has its focus on continuously improve existing and successful products, but one third pays high attention to fostering innovation.

According to Martin (2005), the ratio regarding those SMEs that follow strictly a growth strategy (41%) and those that concentrate on existing markets (46%) is more heterogeneous. According to the survey margins and financial key performance indicators are considered as one measure between other targets (46%). But only one-third of the companies build on close cooperations with other partners.

Summarized, this means that most of these investigated SMEs consider having a strategy as important and build on customized products, innovation is recognized by a significant number of them as important. Cooperations with other partners have not been in the focus.

This seems not in alignment with the literature where cooperation has been identified as an import measure to compensate the potential lack of resources of SMEs. However, there is not mentioned what are the reasons for this. Although the German SMEs are well known for their export orientation the survey did not evaluate in detail whether those who followed the majority of firms were more successful than others.

In another research, based on a survey with 600 Australian SMEs in 2010, it became evident that SMEs' performance is likely to improve as they increase the degree to which they mirror large manufacturing firms with respect to formal strategy and structure. Particularly in the field of innovation it was revealed, that the more SMEs recognize that innovation culture and strategy are closely aligned throughout the innovation process the better they perform (Terziovski, 2010). On the other hand, it was reported that SMEs still face a lack in the utilization of formalized strategic planning and organizational structures as examples of differences based on firm size.

Bringing the findings of these different surveys in the context of strategy together, the role of influencing factors on strategy and firm's performance like developing customized and innovative products (Martin, 2005; Terziovski, 2010) could be confirmed. The importance of a formal strategic planning and its operational implementation, which both have to fit to internal resources and external environment, has been highlighted (Katsikeas et al., 2006). The impact of organizational capabilities in the context of strategy could be demonstrated (Atuahene-Gima et al., 2004; Narayanan, 2011).

Hence, a strategic approach is crucial for planning and achieving targets and for the exploitation of processes and consequently for creating value for the company and its stakeholders. Consequently, a construct named strategic approach is introduced, which reflects formal strategy development and its operational execution. This construct is influenced by various factors as described before and has its firm-specific characteristic with respect to meaning, strategic elements or tactical implementation.

Furthermore it has been highlighted that firm's strategic approach seems to be moderated by other variables (Dosi et Marengo, 1994; Atuahene-Gima, 2004) that are summarized under organizational capabilities and described next.

3.8 Organizational capabilities

Through the lens of the resource-based view, capabilities are valuable and rare. They can be viewed as bundles of tangible and intangible assets, including a firm's

management skills, its organizational processes and routines, and the information and knowledge it controls (Barney, Wright and Ketchen, 2001). Following the knowledge-based theory intangible assets such as knowledge and firm's capability to manage internal competencies enable the transformation of knowledge into value creating processes (Dosi and Marengo, 1994). It has already been mentioned that some scholars see a direct impact of capabilities on strategy and firm's success. Others see little empirical evidence of the impact of capabilities on strategy and address needs for future research.

Following the resource-based view, the firm size plays an important role. Welsh and White (1980) addressed already more than 30 years ago in their article "A small business is not a little big business", that SMEs have specific characteristics. This reflects that firm size matters particularly in the context of limited resources and knowledge.

Organizational capabilities are crucial to develop singular managerial experience and skills of foreign markets and business practices into organizational knowledge. Shaw and Darroch (2004) see particularly SMEs severely affected in their internationalisation process by the lack of capabilities and consider this fact as a notable gap in the literature.

Finally, this implicates that organizational capabilities have an influence on strategy in terms of how an adequate strategy in SMEs can be developed and how this strategy can be accordingly executed. Consequently in the context of internationalisation capabilities are related to the success of international ventures and therefore firm's business performance since finally the strategy of has to be transferred into firm's desired results.

Which specific organizational capabilities are from major importance with respect to this research context and therefore represent this construct best, will be developed next. It has already been highlighted that from the knowledge-based view the Uppsala stage process is based on organizational learning as a key element and focuses on 'experience' as the sole explanatory factor (Turcan et al., 2003). Neither environmental factors, such as competition, nor product-related factors, such as quality or price, are integrated into the model. This underpins the strength of this

paradigm and its foundation, which is based on organizational learning as crucial capability.

Learning capabilities are crucial for an organization to have an adequate level of information and knowledge available through in all organizational levels and functions. Lages et al. (2009) define organizational learning capabilities as the development of knowledge or insights that facilitate behavioral changes based on a shared vision. This enables firms to improve and innovate continuously their business models.

Once the requested information is available and knowledge is captured, further organizational capabilities are needed to span people together in order to enable distinctive activities which contribute to firm's success by deploying organizational routines and processes.

Dosi, Nelson and Winter (2007) highlight the need of appropriately adopting, integrating and reconfiguring internal skills, resources and competences. This coordination of work is made possible by a process of formal and informal communication between people conducting interdependent work. This is also achieved by one individual taking responsibility for the work of others and by specifying their work content in rules or routines which are understood and followed. According to Murray et al. (2010) the alignment to a common target facilitates collaboration and enables cooperation.

Therefore coordination mechanisms are seen as a valuable capability. Cooperation, alignment and appropriate communication can be seen as attributes of this capability. It is reflected in firm's managerial and organizational processes, and can be found on the factory floor, in the labs of research and development and as well as in executive suites.

The importance of building networks and maintaining cooperations and partnerships have already been highlighted. Thus, the importance of relationship capabilities is obvious. Lages et al. (2009) assess relationship capabilities as critical for superior performance. As predictors are addressed the degree of involvement, the way of information sharing and the preparedness for a long-term commitment. According to Rashid and RajInnovative (2006) relationship marketing has several dimensions such as trust, commitment or communication. It is important to

understand these dimensions, because through them relationships could be developed and made successful. Particularly communication is seen as a vital component in the establishment of relationships, that is often assumed or taken for granted and consequently overlooked as a component of relationship development. This is unfortunate, as all other components are experienced through the medium of communication.

According to Zeng, Simpson and Dang (2017) firms need to compete collectively with their network partners against the networks of other companies, because processes are interconnected and value creation is no longer restricted to firm-level activities. Consequently, they address that at this level, firms have to orchestrate co-specialized capabilities.

This is in line with the recent literature, that highlights networks and collaboration as an important factor for SMEs, since they drive the development of market relationship and consequently firm's business network.

Consequently, internal organizational capabilities such as organizational learning, coordination mechanism and relationship capabilities are from particular interest.

It has already been highlighted that they are supposed to have a moderating effect on both, the strategic and tactical level of firm's internationalisation and thus on the success of its international ventures.



Figure 8: Itemization of specific organizational capabilities

Finally, the construct of organizational capabilities is represented by the three specific capabilities related to learning, relationship and coordination mechanism. They are named second-order constructs and according to the reviewed literature they can be represented and described by different variables. Some researchers characterize organizational learning e.g. by firm's commitment to learning and

visibility of a shared vision (Lages et al., 2009). According to Leonidou et al. (2011) relationship capabilities comprise e.g. long-term relationships information sharing and importer involvement as well as communication quality. Murray et al. (2010) understand coordination mechanism in the meaning of being aligned to a common, work orientated goal, taking responsibility, and facilitating cooperation and teamwork.

Finally, the detailed variables representing the second-order constructs named as specific capabilities are developed in the methods chapter. How with the help of organizational capabilities a successful strategic approach results in competitive advantage and consequently in the achievement of international ventures will be described in the following section.

3.9 Competitive advantage and economic success

In the previous section, the impact of specific capabilities on international ventures has been described. Cavusgil and Zou (1994) define international ventures, as a single product or product line exported to a single export market.

It is widely agreed that (export marketing) strategy, related capabilities, and the achievement of competitive advantage have a significant impact on export performance (e.g., Cavusgil and Zou 1994; Morgan et al., 2004; Murray et.al, 2010). In these research studies in international marketing it is argued that relationship between marketing capabilities and export performance has a high importance, because firm performance over time is primarily determined by the firms' capabilities of acquiring and deploying resources to match their market environment. According to Murray et al. (2010), firm capabilities consist of complex coordinated patterns of skills and knowledge that are uniquely embedded in processes and that are performed well, relative to competitors with regard to marketing practices, relationships with foreign customers, and other export activities.

In the section strategy it has already been highlighted that there is the need of firm's internal capability to develop a sound competitive marketing mix strategy and commit to the allocation and organization of export-related resources. Different marketing capabilities are required for success in global markets as firms face highly specialized circumstances during various stages of the internationalisation process.

Summarized this means, that there is a relationship between the construct of competitive advantage and firm's performance and consequently its economical success.

According to Leonidou and Katsikeas (2010), who examined research articles over the past decades, export performance was the one of the most researched topics. This is not surprising due to the fact that this is an indicator of a firm's overall success resulting from marketing efforts and other business activities in foreign markets. Since export performance is influenced by various factors, different aspects such as export performance related to marketing strategy or various background variables such as firm size, quality, or relationships with foreign customers have been assessed.

Some scholars emphasized special key factors in the context of economical success and foreign business. Theodosiou and Katsikeas (2013) have a focus on previous research in terms of other key aspects like environmental, organizational, and managerial factors. Lages et al. (2009) focus in his research on quality and innovation as determinants of Export Performance. Leonidou and Katsikeas (2010) see the relationship of export performance and product quality as important but widely researched whereas the relationship between export performance and product innovation is seen as rarely investigated. However, technical innovation is also identified as a strategic key factor (Souitaris, 2001). This is relevant in this research context since – as mentioned before - MedTech companies in Germany achieve a significant share of their turnover with high-quality products that are less than three years old.

Barney (1991) highlights firm resources leading to sustainable competitive advantage by focusing on internal resources like physical capital, human capital, and organizational capital. Morgan et al. (2004) see superior export performance linked to competitive advantage in specific competences and capabilities such as organizational learning, relationship capabilities and quality capabilities.

Some of various background variables which are described in the literature as directly or indirectly associated with competitive advantage, such quality and innovation, have already been addressed as influencing factors and fit to the developed model so far. Others such as relationship aspects are more related to factors, which are grouped under capabilities.

Leonidou et al. (2011) highlight that the adoption of specific national export-promotion programs positively strengthens the firm's export-related resources and capabilities, which are instrumental in developing a profound export marketing strategy, and achieving competitive advantage, which in turn helps to achieve superior export performance. National export-promotion programs can be seen as drivers of organizational resources and capabilities with effects on strategy, competitive advantage, and performance. Besides information, knowledge and advice often contacts and potential financial support can be offered.

Narooz and Child (2017) stated substantial differences around the institutional support for SMEs and in their cultural norms towards network relationships by questioning twenty SMEs from developing as well as from developed economies. The survey demonstrates a lack at some SME decision makers' networking behavior in response to specific institutional conditions.

Although national export-promotion programs can provide such information and education, national characteristics may remain as perceived cultural differences and therefore have an influence on behavior and therefore perceived cultural distance.

Today many companies are involved in international ventures. However, according to Felicio, Meidutė and Kyvik (2016), a cultural context influence on internalization can still be recognized. Based on a sample of 526 SMEs, the importance of the relationship between individual global mindset and corporate global mindset and the influence on the SMEs' internationalisation factors could be indicated. Culture is a complex construct and can be defined as the impact of language, education and socialization processes on the mindset of the respondents. The country and cultural influence on the behavior of employees and managers and their management knowledge and thinking is a topic of research in the field of international and cross-cultural management.

Calof and Beamish (1995) identified that decision makers perceived benefits, cost and risks of internationalisation culture have an influence on firm's internationalisation.

They draw upon the so-called opportunity-based view, which supports the idea that entrepreneurs can model the organizational behavior and characteristics of their firms to pursue opportunities abroad. Dimitratos, Johnson, Plakoyiannaki and Young

(2016), who performed a case study on high-performing internationalized SMEs in knowledge intensive sectors, indicate that namely risk attitude, market orientation and networking propensity matter for firms regarding the exploitation of opportunities in the context of international ventures.

Knowledge, management skills and cultural understanding have already been highlighted as crucial for executives concerned with international business as well as the importance and the influence of the top management in the context of decision making and SMEs.

Studies referring to firm's international performance and economic success employed a wide variety of export performance measures, ranging from economic (e.g., export sales ratio, export profitability, export market share) to non-economic indicators (e.g., new products exported, export market penetration, and number of export ventures).

However, some researchers criticized the way export performance was assessed. Measuring performance at an overall firm level or the tendency to use unidimensional or global measures is less effective compared to specific product-market level measures.

However, sometimes it is difficult to collect such multidimensional data. They might be confidential, blurred by other influences or have to be interpreted with the help of internal knowledge. Cavusgil and Zou (1994) conclude that the economic success of export ventures, which are defined as a single-product or product line exported to a single export market, can be measured more precisely than periodically added margins related to a product-portfolio.

For these reasons this research evaluates competitive advantage based on a relative comparison to firm's major competitors. Product related aspects such as cost, price and quality are considered as well as customer's perceived product benefit, and descriptive metrics intended to characterize firm's international involvement such as the percentage of sales volume related to foreign ventures or the number of years firm has been involved in international business.

It has already been highlighted that specific organizational capabilities have an impact on the execution of a certain strategy that has the target to achieve a competitive advantage. Furthermore, it has been described that there is a common

understanding among scholars that this competitive advantage finally leads to economic success.

Hence, these relationships can be seen as a chain of effects leading finally to the success in international ventures. Competitive advantage is therefore a concept and an object of interest in the framework and in the context of this research.

3.10 Outcomes from the Literature Review

In order to find answers to addressed research questions a conceptual framework has been derived from the literature review. The components of the theoretical framework drawing on the contingency literature and the resource-based view are intended to describe the mechanism of identified antecedents and influencing factors on strategy development and execution of SME's internationalisation. According to the related research questions, the role of capabilities on international ventures is considered, too.

It has been elaborated so far that different internal and external factors play a role in firm's internationalisation strategy, as well as the product itself. The products and services have to be competitive with respect to different aspects. Customization can be seen as one of them, but also quality and the grade of innovation play an important role. Factors such as organizational capabilities are necessary to transform knowledge into value creation. Networking and collaboration are facilitated by this and helps to overcome the lack of knowledge and capabilities, but also bears risks. External factors such as competition and regulations play a specific role when competitive advantage is based on an innovation strategy particular in the context of internationalisation of SMEs in strongly regulated industries. Regulations, which force to reveal technical details in documents and tests, can create tensions with different impacts on SMEs and MNEs in the context of technical know-how and risk. Foreign country-related topics like risk and cultural distance have more influence on SMEs' decisions.

Particularly to safeguard know how and how to handle cultural aspects characterizes a main difference, whereas criteria like transaction cost seem to work on both SME and MNE.

Hence, stimuli and barriers building the conceptual elements of the framework are considered context specific regards the impact of firm size. Market potential must be addressable and in alignment with SME's strategic possibilities. Following the resource-based view financial and human capital combined with experience are in the focus.

It has also been elaborated that SMEs in the medical device industry have to manage several specific challenges in adopting the right strategy for the future when willing to defend their position or to survive on the long range. While they have to foster continuous innovation and speed they have to follow cost and time-consuming regulation and approval procedures. The lack of know-how and various resources can be limited by certain approaches, but not eliminated. Often they face the problem of finding the right partner to sell and service their products and on the other hand to prevent their know-how, which both have an influence on the internationalisation strategy. Cultural distance and cooperations have been addressed, but as far as they are not covered under the construct of organizational capabilities, they are considered as non industry-specific factors of lower priority. Many SMEs despite of their products and customer markets are influenced by those factors as well as by many other factors, too. Hence, presently they will not be represented as variables in the initial framework.

This is a good example of the applied step approach, which has been already introduced. This step-approach moves the focus from more general aspects of firms internationalisation on SMEs in the MedTech industry and finally on country-specific factors in Germany. The significance of findings based on general theories from the literature, which has been elaborated in a first step, is scrutinized in a second step based on survey findings from previous research with respect to their applicability for MedTech companies. In a third step, the remaining findings have been considered regarding its country-specific SME context. if applicable based on findings from specific surveys.

Consequently, it became apparent that some theories, constructs, and factors might be more applicable than others in the specific context of German MedTech SMEs. Accordingly, the findings from the literature review regarding internationalisation theories have been synthesized with the results, which have been elaborated with respect to the specific context of German SMEs in the MedTech industry.

Based on this, the components of this conceptual framework are intended to focus on the strategy development and execution of SMEs' internationalisation. According to previous research, the construct of strategy capability is driven by specific factors. Dedicated organizational capabilities moderate the relationship of strategy capability and competitive advantage in international ventures.

The specific underlying items and variables, which reflect the already described constructs, are linked to findings based on previous empirical work. Table 5 exemplifies some of these items and the related key sources that describes the concept of 'influencing factors' and consequently its impact on a firm's strategic approach. Most of the applied effects, concepts and relations build on previous non-MedTech research. Atuahene-Gima and Murray (2004) demonstrated the strategy-performance construct based on a survey of 393 US manufacturing firms. Murray et al. (2010) verified in a multiple-industry survey in China with 1,314 firms the impact of capabilities in this context. Julien et al. (2003) investigated antecedents of a competitive strategy based on a survey among 2,991 export engaged SMEs in North America. Geyer and Urie (2012) verified important factors on SME's strategy regarding their internationalisation by assessing 64 SMEs with foreign business in Western Germany.

Although these data sources vary based on time, space or person, the chosen triangulation approach is justified by the work of Barnes et al. (2007), who examined the mechanism of successful international ventures in the context of MedTech companies in the UK.

Summarized, most of the reviewed literature followed a purely quantitative approach. However, out of the 59 empirical studies which have been described in this chapter so far, there is no clear indication that would justify to concentrate further on only a few specific factors and to exclude others from further selection. Hence, prior to a quantitative study a qualitative research stage was found to be particularly useful in order to assess the context-specific factors in more detail and therefore capture the salient beliefs of the intended survey respondents. The impact of such a decision on the methodological approach will be discussed further in section 4.8.

3.11 Development of the conceptual framework

In the previous sections, different theories and concepts from the literature have been introduced. The effects and relations between these concepts will be described and developed next. The initial hypotheses can serve as a starting point where a relationship between specific factors, firm's strategy and its capabilities is suggested to lead to success. The conceptual framework therefore builds on the work of Cavusgil and Zou (1994), where the strategy – performance relationship in international business is investigated. Based on the theoretical work of Aaby and Slater (1989), which highlights that the performance of an export venture is determined by strategy and management's capability to implement the strategy, a substantial link is provided between strategy and performance since the contention is empirically supported. Their model conceptualizes, that strategy impacts firm's internationalisation and that it is influenced by firm, product, industry and market characteristics. The results contribute to a more comprehensive understanding on the variables impinging strategy and performance, which are intended as a theoretical foundation for further inquiries. But also the need for further research has been addressed. Not all variables have been explored and the results may have been blurred due to the intra-group heterogeneity of the sample.

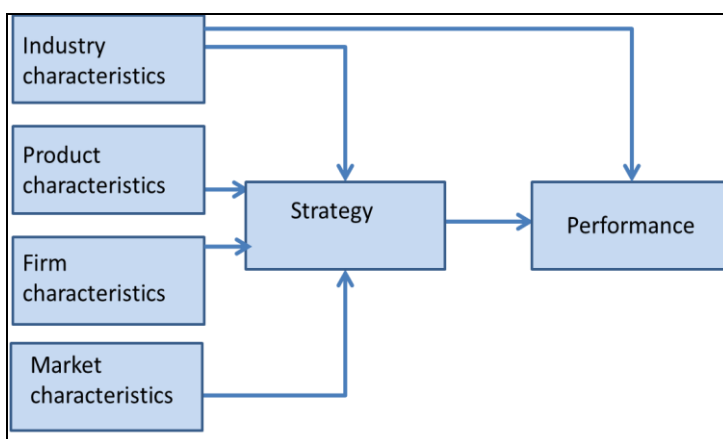


Figure 9: Starting point of the initial model (adapted from Cavusgil and Zou, 1994)

Although the conceptual model is taken as a base for this research, Cavusgil and Zou (1994) addressed to consider alterations e.g. related to the research context. Thus, the influence of other industry structure variables such as the effect of industry

classification and organization structure is investigated in the research context of MedTech and SMEs.

But also findings from the literature review give reason for a further development of the model. The framework is based on the theoretical antecedent that performance is determined by the co-alignment between strategy and internal and external environments of the firm, but it is not conceptualized. Furthermore, performance is understood as examined associations of marketing program elements with single performance indicators and therefore follows the pattern to investigate direct relationships of some international marketing strategy variable(s) with some indicator(s) of performance.

In contrast, Katsikeas et al. (2006) favor a broader approach in establishing a positive impact on performance in international markets by achieving fit between strategy and environmental context. Theoretically, they draw on Day's (1999) fundamental thesis that performance can be derived as a function of the fit between a firm and its environment, fulfilled through the development and its implementation of an appropriate strategy.

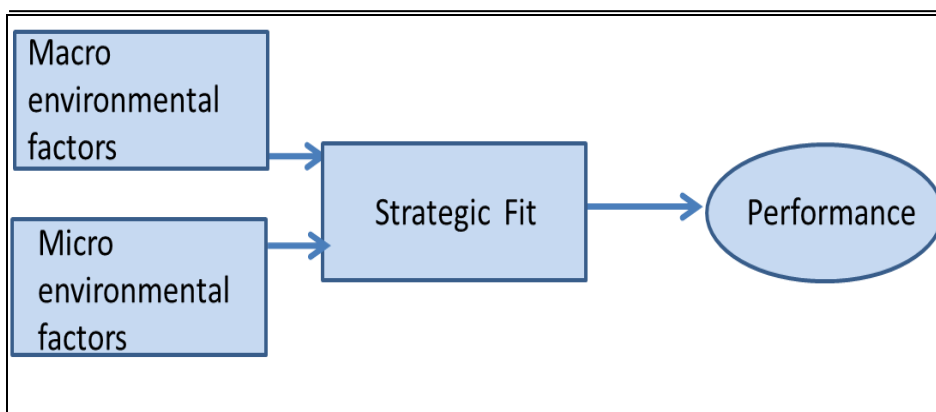


Figure 10: Alterations on the initial model (adapted from Katsikeas et al., 2006)

Consequently, recent research treats performance as a multidimensional phenomenon in order to conceptualize a coherent structure of this multifaceted, interdisciplinary concept.

According to Katsikeas et al (2006), different elements of strategy can be interpreted as the means by which the firm achieves co-alignment between the strategies and the internal and external context of the international venture and finally it is expected

that its performance is influenced positively. In their empirical study of the strategic fit – performance relation they achieved to isolate factors that determine the deployment of appropriate strategies.

Conceptualization and testing of direct relationships between strategy and performance are based on the assumption that a particular strategy enhances performance, while the other inhibits it. This approach is contrary to the strategic fit paradigm, which postulates that performance in international markets will be enhanced only if there is co-alignment between the single strategic elements, and the environmental context (Katsikeas et al, 2006).

However, scholars have long recognized that specific factors characterize firm's strategic approach in international ventures. The initial model conceptualizes, that firm's strategy is influenced by internal, external and product related factors that impact on firm's internationalisation. Nevertheless, higher levels of performance in international markets depend largely on the firm's selection of strategic elements that are appropriate for its unique set of circumstances. Furthermore, it is recognized that the performance of an export venture is determined by strategy and also by management's capability to implement the strategy, which matches to the context in which firm operates.

This is in line with Ventkatraman and Prescott (1990) who highlight if strategy is co-aligned with the context of an international venture as defined by firm, product and industry characteristics, positive performance can be expected.

Porter (1991) has asserted that it is a firm's possession of competitive advantage that drives performance. Following the resource-based view, knowledge is an important resource and the knowledge-based view identifies knowledge as a key antecedent in strategic management. According to Ketchen et al. (2007), only if a firm takes appropriate strategic actions to capitalize on its knowledge can it create a competitive advantage in achieving higher performance. Rather than the knowledge itself, the source of competitive advantage via capability building is how knowledge is coordinated and integrated among functional units (Grant 1996).

DeSarbo et al. (2007) have stressed that a firm's ability to deploy resources through organizational capabilities may be more critical than the resources themselves in helping the firm obtain desirable performance.

Taking these debates together, competitive advantage through capabilities leads to performance. Since influencing factors on strategy such as resources and performance are not directly related, it is imperative to focus on the process through capabilities and competitive advantages in examining the strategy-performance relationship.

This is in line with Murray et al. (2010), who highlight that it is the internal operational component that differentiates firm's ability in capitalizing on the fit of internationalisation strategy results in capabilities that contribute to the desired performance. They draw on the theory of the resource-based view and address on the origins of competitive advantage by arguing that the performance differences among firms result from resources that can be used to create idiosyncratic, inimitable internal capabilities. Referring on previous studies, that investigated the mediating role of different capabilities, their empirical survey results in the support of a moderating effect of specific organizational capabilities, such as coordination mechanism, on strategy and the competitive advantages–performance relationship.

Capabilities are a firm's accumulated knowledge and skills that enable the firm to utilize and enhance the value of resources. As Krasnikov and Jayachandran (2008, p. 2) have stressed, "Capabilities enable a firm to perform value-creating tasks effectively, and they reside in organizational processes and routines that are difficult to replicate". A firm cannot create a competitive advantage unless it successfully develops capabilities (Atuahene-Gima et al., 2004). Antecedents such as resources and their deployment in a co-aligned strategy have only potential value in contributing to desirable performance. Consequently its crucial to realize this potential in developing capabilities in alignment with other important internal factors (Ketchen et al. 2007). Thus, it is necessary to recognize the moderating role of a firm's capabilities in its use of knowledge.

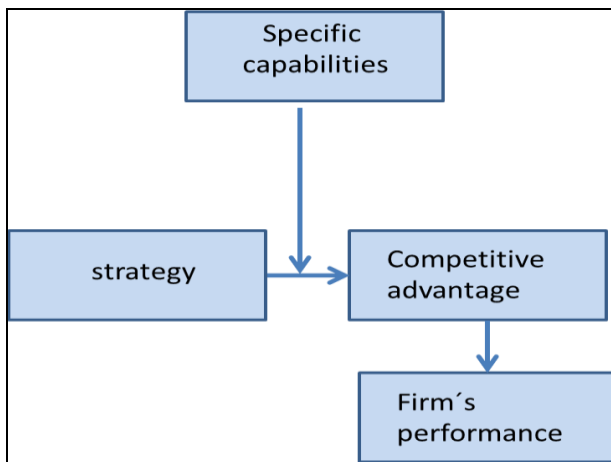


Figure 11: Integration of additional concepts in the altered initial model (adapted from Murray et al., 2010)

Consequently, it is imperative to include the development of capabilities by investigating the internal process through which strategy and performance is influenced. Managers choose or adopt organizational structures, activities, processes, and strategies that reflect the specific conditions of their organizations (Murray et al., 2010). Hence, it is not the factors, nor the strategy approach per se that affects performance. It is the ability of a firm to utilize knowledge and skills and therefore enhance the value of resources. Summarized, different organizational capabilities play an important role, have a moderating effect on the relationship 'strategic approach' – 'competitive advantage' and are adopted as a concept in the initial model.

The indirect relationship of influencing factors on performance through strategy, which fits to the foreign environment, is conceptualized. The moderating effect of capabilities is recognized and as well as the concept of competitive advantage, which is agreed leading to firm's performance. Finally, this leads to an initial conceptual framework.

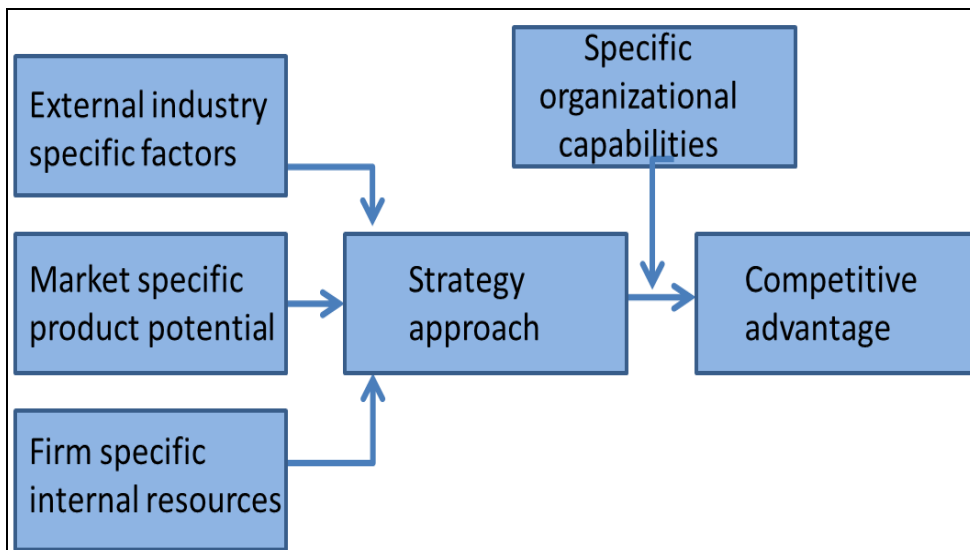


Figure 12: Initial conceptual framework

Hence, in this research the different positions are integrated to show the current thinking. Through the research that will be carried out a new framework is developed, which will be the main contribution to knowledge.

In the following section the different development steps that have been described in the previous sections are summarized in table 7.

3.12 Chapter summary

The research investigates the characteristics associated with SMEs in Germany that operate in international healthcare markets. Although, there is various research in the field of strategy, internationalisation and SMEs the need for further research has been justified since it has been addressed by previous research and due to the fact that theoretical and empirical findings obtained in a particular institutional context are not equally applicable in other countries or industries. This justifies to position the research about internationalisation and SMEs in the context of the German MedTech industry in order to investigate the impact of different factors, the role of capabilities and strategy on international ventures.

The starting point for this research is a conceptual model based on the literature review, in which significant findings could be identified and refined regards country, industry and firm-specific aspects. Nevertheless the model is still initial and the need for further investigation regarding context specific influencing factors on strategy

development has been addressed and will be considered in the following research design. Table 7 gives an overview of the different steps of iteration during the development of the initial framework.

	Developing an initial framework	Further development	Completion of the framework	Modification of the framework
Additional constructs	Industry & country-specific factors, Strategy, Organizational capabilities	International ventures Competitive advantage	External industry-specific factors Market-specific product potential Firm specific internal resources	
Hypothesis	Hi1, Hi2, Hi3	–	–	
Additional variables	Not defined yet	Innovation, Resources Medical regulations Quality Customization	Market potential Competition Management skills Competitiveness Experience Customization Differentiation Unit Cost & price, Channel margins, Various descriptive variables	
Identified key mechanism	Specific factors have influence on internationalisation which differ with respect to industry sectors and firm size	Internationalisation of MedTech SMEs is a consequence and may be a chance but require specific antecedents	Specific antecedents and factors influence firm's strategy approach. This is moderated by specific organisational capabilities, which have an impacts also on the success of international ventures and therefore on the achievement of competitive advantage	
Source or key authors	Practitioner's experience	Wintermantel (2009) Kuhlmann (2014) MacDougall (2011) Wiechers (2016)	Chatterji (2009) Murray (2010) Leonidou (2011) Johansson & Matson (1988) Johanson & Vahlne (1977) Porter (1980) Julien (2003) Murray (2010) Cavusgil (1994) Lages (2009) Geyer (2012) Williamson (1990) Barnes (2007)	

Table 7: Completion of the initial framework

CHAPTER 4: RESEARCH STRATEGY AND METHODOLOGY

4.1 Chapter introduction

This chapter explains the methodology behind the empirical research phase of this study. It is aimed to specify the methods and procedures for collecting and analysing data within the empirical part of the research project. The chapter begins with an overview of the philosophical angle of this study and continues with a description of the research methodology and the overall approach to the research design applied in this study. Furthermore, the author's philosophical approach towards the research questions is discussed. Epistemological orientation in alignment with the research problem is the foundation to select appropriate methodologies for data collection, which will be argued accordingly. Finally, the research design will be justified, including multiple research steps and incorporating different methodological approaches, including remarks on the various triangulations applied in this study in order to minimize the effects of research limitation and bias.

4.2 Understanding epistemological and ontological considerations

The purpose of conducting scientific research is to contribute to knowledge. All research is based on assumptions about how the world is perceived and how it could be understood in the best way (Trochim and Donnelly, 2007). This means that researcher's philosophical perspective on science influences the research and knowledge contributed regardless of whether this is explicit or implicit. The word philosophy stands for the critical examination of the grounds for fundamental beliefs and an analysis of the basic concepts employed in the expression of such beliefs (Encyclopaedia Britannica, 2008).

Different philosophies imply different ways of finding a solution to a theoretical problem. Applying different approaches to the solution of the same problem, however, might generate different results (Sattabusaya, 2008).

The chosen approach is often linked to the philosophy's Ontology, meaning the theory of being, focusing on the beliefs about the real world which is being researched, and to the Epistemology, meaning the knowledge that is required and seen by the researcher (Alrafi, 2007). While epistemology is the philosophy of knowledge, methodology consists of practical ways or methods used to gain knowledge (Kumar, 2005). Use of different types of research methodologies is related to the research philosophy (Boyd, Gasper and Trout, 1993). The research methodology in this context refers to how logical and empirical work is conducted (Lee, 2004).

All research is based on assumptions about how the world is perceived and how it could be understood in the best way (Trochim and Donnelly, 2007). It is often argued that research methods carry with them an inherent cluster of epistemological and ontological commitments, such that the decision for one research method inevitably selects a specific science model and worldview. Research methods, however, are versatile instruments and do not necessarily indicate an assumption about knowledge and the nature of social reality (Bryman and Bell, 2007).

Since there is not just one philosophical approach to scientific research or just one philosophy, a good starting point for identifying researcher's philosophical position is his ontology. Today, ontological views are mainly divided into two opposing schools of thought called *realism* and *relativism*. According to Easterby-Smith et al. (2008) realism emphasises that the world is concrete, external and independent from scientists and their activities. Relativists, on the other hand, argue that the development of scientific laws is always influenced by the researchers themselves, their position and their resources, and thus the truth of scientific laws is never independent from the research process (Easterby-Smith et al., 2008). Between these extreme positions, researchers have recently developed new paradigms, such as the so-called *critical realism*. They can be seen as a compromise between both positions and claims that a reality can exist independently from our knowledge of it, but also recognises that concepts in social sciences are constructed by humans and are thus subjective (Bryman and Bell, 2007).

The author's education in applied sciences favours a perspective towards realism, but with the experience as practitioner and executive for many years it is obvious

that the business world is not a separated laboratory and the researcher himself is not immune against flaws and bias.

This finding, together with the outcome of the literature review, has an impact on the chosen methods, which will be discussed in section 4.8. while considering a mixed method approach.

However, there is not just one philosophical approach to scientific research or just one philosophy. Based on Kuhn (1996) a set of linked assumptions about the world shared by a community of scientists investigating that world is described as a paradigm. More specifically, paradigm could be defined as a philosophical and theoretical framework of a scientific school or discipline. The function of a paradigm is to supply puzzles for scientists to solve and to provide the tools for their solution (Bird, 2008). In other words, paradigms are pushing the development of science and result with new theories and philosophies.

4.3 Major philosophical paradigms in social research

Research philosophy is related to epistemology and research methodology. Epistemology is concerned with the nature, sources and limits of knowledge (Klein, 2005). According to Steup (2005), epistemology is the study of knowledge and justified belief and it is concerned with the questions of necessary and sufficient conditions of knowledge, its sources and its structures and limits. Epistemologies are general sets of assumptions about the most adequate ways of contributing to knowledge about the nature of the world (Easterby-Smith et al., 2008). The ontological school of thoughts, or in other words, a researcher's worldview are generally the base for epistemological decisions. Often, researchers distinguish between two epistemological approaches, which have opposing extreme positions and are rooted in different worldviews: *Positivism* and *Interpretivism* (Carson, 2001).

Positivism holds that the goal of knowledge is simply to describe the phenomena that are experienced and to it claims that the purpose of science is to be focused on what can be observed and measured (Trochim and Donnelly, 2007). The positivistic research paradigm argues that the study of human behaviour should follow the principle of studies that are conducted in the natural sciences. It is based on the

understanding that reality is independent of the observer and exists regardless of whether one is aware of it.

Thus the positivist takes a rational approach to understand the world that is consequently external and objective (Sattabusaya, 2008). In a positivist approach, theories have to be tested, the approach is generally deductive. Firstly hypotheses are developed by the researcher and then the theory is tested by using the hypotheses in order to prove it or dismiss it. In positivism, this process generates objective knowledge gained from direct experience or observation, which is claimed to be the only available source of knowledge for science (Alrafi, 2007).

Whereas Positivism adopts a clear quantitative approach to investigating phenomena, there exist other approaches, which aim to describe and explore in-depth phenomena from a qualitative perspective and are based on the interpretation of the observed phenomena (Crossan, 2003).

Thus, interpretivists believe that reality can only be discovered through an understanding of the multiple social constructs of meaning and knowledge. Interpretivism is based on the belief that knowledge can only be gained through understanding the social construction of the world (Alrafi, 2007). Hence interpretive research gains knowledge of reality through social construction such as language, consciousness, shared meanings, documents and other artefacts.

In interpretive research, the scientists do not focus on models and describing variables. Instead, they focus on the complexity of human sense-making in the situation the phenomenon appears and try to discover structures to explain the phenomena around them (Easterby-Smith et al., 2008).

Both philosophies can be seen as opposing views of the world. Consequently, each paradigm is seen as the ideal approach for research depending on the researcher's philosophical stand.

The following table shows the major philosophical paradigms in social research and describes their characteristics in relation to ontology, epistemology and methodologies.

	Positivism	Post-Positivism	Critical Theory	Interpretivism
Ontology	Naïve realism – “real” reality	Critical realism - “real” reality but only imperfectly	Historical realism – reality is virtual and shaped by society	Relativism – local and specific constructed reality
Epistemology	Objectivist: findings are true	Modified objectivist, critical tradition - findings probably true	Subjectivist - value-mediated findings	Subjectivist - created findings
Methodology	Experimental/manipulative: verification of hypotheses, mainly quantitative methods	Experimental/manipulative - critical multipism, falsification of hypotheses, may include qualitative methods	Dialogic/dialectical	Hermeneutical/dialectical
Source: Based on Guba and Lincoln (2009, p.193)				

Figure 13: Major philosophical paradigms in social research (Guba and Lincoln, 2009 p.193)

Over the last decades, however, a number of further paradigms have been developed. One example is the so-called *Post-Positivism*, which is situated between these two extreme positions and acknowledges that researchers actively construct scientific knowledge rather than passively noting laws that are found in nature (Crotty, 2009).

It has already been highlighted in the previous section while discussing different ontological views, why the author’s philosophical view can’t be characterized by a perspective towards pure realism, neither by a perspective towards relativism. Hence, a post-positivistic paradigm reflects best the ontological and epistemological considerations.

4.4 Justification of Postpositivistic research approach

As Mayer (2002, quoted in Jurkowitsch, 2005) suggests, methodology is the analysis of how theories are generated and tested, what kind of logic is used, what criteria

they have to satisfy and how particular theoretical perspectives can be related to particular research problems. It has already been highlighted before, that the evidence that is needed to solve the research problem from the perspective of the researcher determines the decision on a philosophical paradigm. Each paradigm features a unique approach towards problem solving, because it inherits certain strengths and weaknesses.

The major strength of the positivist paradigm is that it generally provides a fast and economical method for generating evidence in a wide range of situations (Easterby-Smith et al., 2008). At the same time, the positivistic approach is criticised for its inflexibility and to suffer in understanding processes or the significance that people attach to actions. Since positivists usually focus their approach on empirical data, there is a risk of ignoring possible findings that lie outside of the conceptual framework being employed.

Post-positivism emerged as a reaction to these disadvantages, while it links the observer to that being observed, acknowledging that there are no objective things standing apart from human subjectivity (Planing, 2014). Still objectivity is seen as an ideal by Post-positivists; however, given the multiplicity of causes and effects and the problem of social meaning, it requires a critical interpretation to capture the entire meaning (Yolles, 2006). This view of the worldview also has methodological implications. When objectivity can never be entirely achieved, relying on many divergent sources of information decreases the potential of misinterpretations of reality and bias (Guba, 1990).

While positivism prefers objectivity in observation of phenomena through quantitative methods, post-positivist approaches 'give way' to both qualitative and quantitative methods (Letourneau and Allen, 1999). This is described as critical multiplism (Guba and Lincoln, 1994).

The next figure helps to bridge the interrelations between philosophy and methodological interrelations and facilitates the navigation in the field of ontology and epistemology.

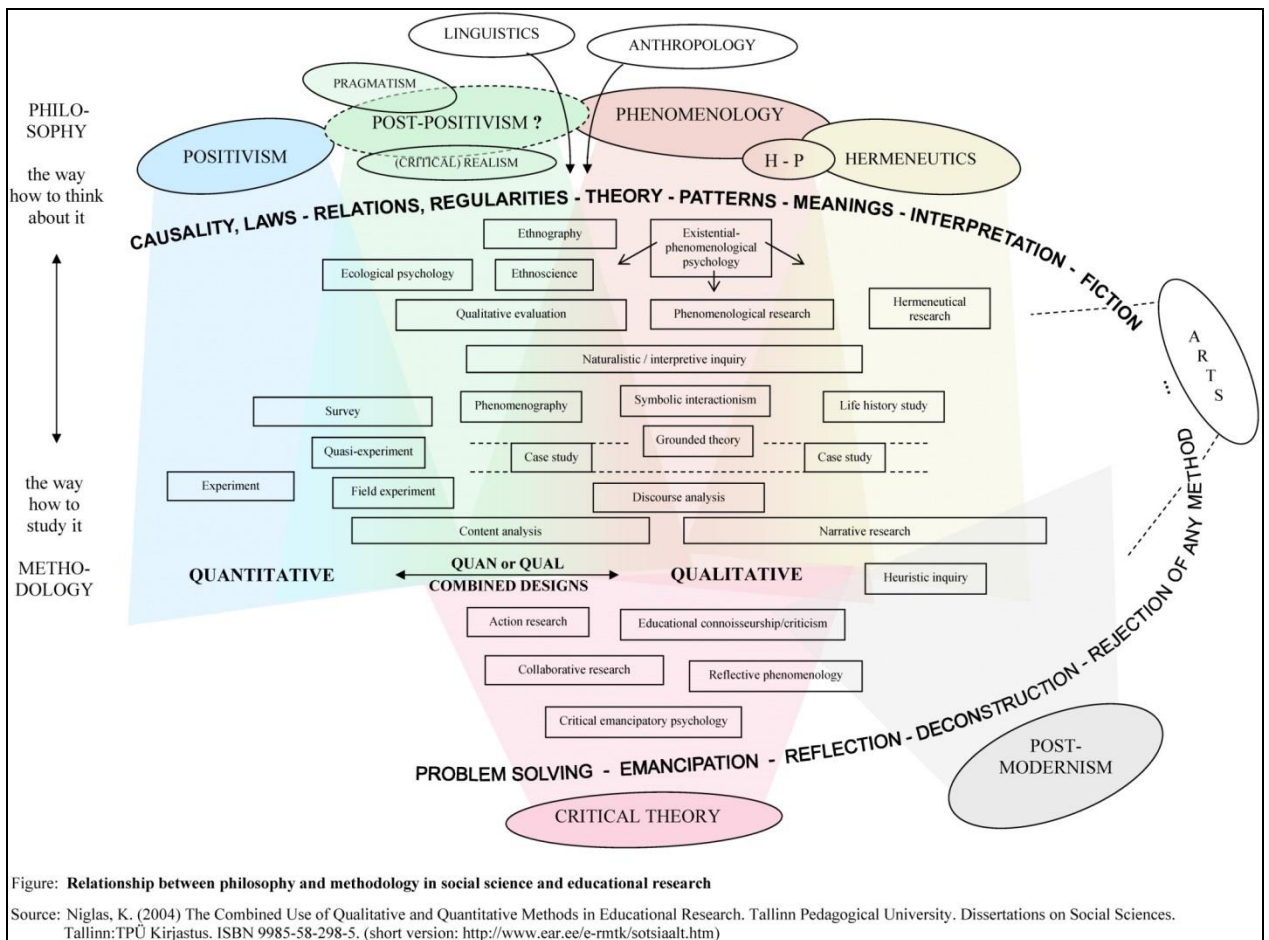


Figure: Relationship between philosophy and methodology in social science and educational research

Source: Niglas, K. (2004) The Combined Use of Qualitative and Quantitative Methods in Educational Research. Tallinn Pedagogical University. Dissertations on Social Sciences. Tallinn:TPÜ Kirjastus. ISBN 9985-58-298-5. (short version: <http://www.ear.ee/e-rmtk/sotsiaalt.htm>)

Figure 14: Relationship between philosophy and methodology (Niglas, 2004; p234)

According to Niglas (2004), in a post-positivistic approach quantitative methods, or qualitative methods, as well as a combined approach are applicable. Different methodologies and consequently different methods have their specific strengths and weaknesses and should not necessarily be seen as polar opposites (Vignali, Vignali and Ryding, 2013). Cahill (1996) stressed that neither qualitative nor quantitative have universal applicability, but qualitative methods can be used to determine the plausibility of quantitative research. Nancarrow et al. (1996) support this approach and believe that an assignment of techniques between both approaches cannot only be beneficial but can significantly add value to the research being undertaken.

The following table summarizes the post-positivistic approach regarding its different interrelations with respect to ontology, epistemology, methodology and methods.

Post-Positivism	Ontology	Epistemology	Methodology	Methods
	Real World exists, but cannot truly be perceived	Inquirer strives to be as neutral as possible Acknowledgement of position	Empirical Perceptual Precision, control and manipulation Triangulation 'Seeks 'understanding' Falsification and discovery Etc	Experiment Observation Survey Deductive Inductive Abductive
Consequences: Knowledge remains tentative Strives for balance				

Table 8: Research Philosophy of a post-positivist (own diagram adapted from Guba, 1990; pp. 17-27.)

There are many factors to be considered when choosing an appropriate research methodology. According to Remenyi et al. (1998), with the topic to be researched and the specific research question being primary drivers for such a decision.

The author's ontological and epistemological background has already been illustrated. The author stands in the tradition of post-positivism, which is a theoretical perspective that reflects that we cannot be positive about our claims of knowledge when studying the behaviour and actions of humans (Burbeles and Philips, 2000).

But the author also recognizes that survey research provides a quantitative description of trends and attitudes, which allows statistical methods and generates predictions.

Considering the research objectives of the present research, one intention is to develop an understanding of which factors influence the strategy development towards the internationalisation of firm's business. The author believes that there is no single and thus entirely objective answer to this question, since the individual decision-making itself is based on human subjectivity. At the same time, the author decided not to employ a pure Interpretivist paradigm, since according to Creswell (2007) this approach would make it hard to develop a representative and predictive answer to the other research questions.

Consequently, a post-positivist philosophical approach best fits the nature of the research questions and the intended process of generating evidence.

Summarized this means, that a post-positivistic paradigm fits best with respect to the philosophical, methodological and research specific context. As noted before, the decision on a philosophical approach has methodological implications, which will be discussed in the next step.

4.5 Methodological considerations

While epistemology is the philosophy of knowledge, methodology consists of practical ways or methods used to gain knowledge (Kumar, 2005).

Consequently, after determining the philosophical standpoint, the next step is to evaluate appropriate methodologies and to make decisions regarding how to approach research goal and address research questions by the choice of an appropriate research methodology. Methodology can be understood as the analysis of how theories are generated and tested. It is also concerned about what kind of logic is used and what criteria they have to satisfy. Hence, methodology links particular theoretical perspectives to particular research problems. There are various classifications of methodologies; the most common, however, is the distinction into quantitative and qualitative methodologies (Bryman and Bell, 2006). Quantitative methodology is usually associated with inferences based on large numbers of dataset observations and statistical analysis, while qualitative methodology bases inferences on relatively few datasets and puts an emphasis on causal-process observations (Gerring, 2012).

There are many factors, which have to be considered when evaluating an appropriate methodological approach in this research.

Evaluating the character of this research, it can be considered as exploratory with respect to selecting influencing factors on firm's internationalisation in a specific research context. Thus, a pure positivist approach to the linked research question would not satisfy the multiplicity of causes and effects and the issues of social meaning in this case.

The literature review showed that a single positivistic approach with pre-defined variables is questionable regarding the aim to capture the entire complexity in the chosen research context.

This research is also about conceptualizing identified specific factors towards firms' strategy, measuring moderating effects of capabilities on the relationships and understanding the best predictors of an outcome. Thus regards the intended generalization a quantitative research approach seems to be applicable, too.

Hence, both methodologies have to be explored in more detail.

4.6 Quantitative Research in Social Science

According to Vignali et al. (2010) different methodologies become popular at different social, political, historical and cultural times in our development and all methodologies have their specific strengths and weaknesses, which should be acknowledged and addressed by the researcher. Different methodologies should not be distinguished in the terms of higher quality in the context of quantitative versus qualitative research.

Quantitative research is generally associated with applying methods and procedures of the natural sciences to the social sciences. The idea is based on the understanding that there are regular patterns in human and organisational behaviour, but these are difficult to detect because a number of factors have to be captured and examined simultaneously to reveal the potential underlying relationships. Multiple factors and variables need to be measured to produce the observed result and consequently, relatively large samples are usually required (Easterby-Smith et al., 2008).

These samples are intended to collect primary data, which are according to Cohen, Manion and Morrison (2011) "those items that are original to the problem under study", Primary data are collected for a specific purpose. The primary data is collected through field research and the methods used can be: "observing and questioning, using different research instruments – questionnaires, mechanical and electronic appliances." (Vignali et al., 2003, p.127). Even though the quantitative approach can be associated with a number of different data collection methods,

surveys or experiments are the most common. Due to the need for large sample sizes in sociology, the survey has emerged as quite efficient method of data collection in this research field (Bryman and Bell, 2007). Thus, also in this research a survey approach is used.

By the choice of quantitative methods when addressing a research problem usually means generating hypotheses that are derived from general theories about the research object. These hypotheses are formulated to represent potential causal relationships between concepts, whereby their degrees of variation and co-variation maybe measured (Bryman and Bell, 2007). Thus quantitative methods require the use of standardised measures to fit the divergent views of people into a limited number of predetermined response categories to which numbers are assigned (Patton, 2005). Usually, this is accomplished by conducting a survey, based on a questionnaire with a number of multiple-choice questions, each asking the respondent to choose an answer on a fixed-point scale.

The review of existing research articles has revealed that surveys were often used as exclusive research method. All of these studies applied standardised quantitative models for predicting the ways of SME ´s successful internationalisation. In accordance with this, the present research will employ a survey method to develop a quantitative model of the effect of organizational capabilities on the strategy of German MedTech SMEs in international ventures. The idea is based on the understanding that there are regular patterns their behaviour, and therefore a number of factors have to be captured and examined simultaneously to reveal the potential underlying relationships. This is in line with Easterby-Smith et al. (2008), who see the need of multiple factors and variables to be measured to produce the observed result based on relatively large samples.

4.7 Qualitative Research in Social Science

Qualitative research is a class of research methods in which the investigator takes an active role in interacting with the participants he or she wishes to study (Muchinsky, 2003). Qualitative research mainly originated from the intellectual field of sociology. Qualitative research has become a fashionable term, being used for any method other than a survey (Bryman and Bell, 2007). Shaughnessy,

Zechmeister, and Zechmeister (2003) see qualitative research characterized in producing verbal summaries of research findings with no statistical summaries or analysis. But also qualitative research can generate large volumes of data and a detailed level of analysis that results even when research is confined to a small number of subjects. (1996). Thus, it is widely agreed that qualitative research might be related to significant efforts. The nature of qualitative research, in contrast to quantitative research, however, is that it produces data defined by the subject rather than structured in advance by the researcher. While quantitative methods reduce data to scales and numbers, qualitative methodologies allow for an interpretation of the rich and complex reality of the world (Mayring, 2002). If there is the need for a certain level of exploration through empirical research, a logical solution is to start the empirical research with the qualitative research, which is 'emergent rather than tightly prefigured' (Creswell, 2007). Its primary objective is to provide insights into an understanding of phenomena.

Qualitative research tends to view actions from the perspective of the people who are being studied. Often used methods such as in-depth or unstructured interviews and group discussion, proved to be successful in generating the necessary empathy to see the world through the eyes of those being studied (Bryman and Bell, 2007). Personal interviews enable the researcher to elicit personal motivations, attitudes and beliefs pertaining to a particular topic (Flick, 2010).

With respect to this research the qualitative approach with in-depth interviews would offer a possibility to cover the explorative nature of the investigation. But it would also be associated with a high degree of efforts with respect to time and cost. As a result, deep and rich insights might be collected, but there is also the danger of gathering just opposed opinions based on different beliefs. The chance to discuss controversially and consequently benefit through sharpening the arguments by debating and disputing is limited due to the reduced character of interaction between the different participants.

Focus group interviews are another qualitative research approach. Focus group methodology is a way of collecting qualitative data by engagement of a small number of people in an informal group discussion, intended to collect participants' perceptions on a particular topic (Wilkinson, 2004). Krueger and Casey (2008) see group dynamics as a benefit in focus groups, since the group environment provides

greater security and anonymity for its members, encourages participants to speak out in front of others, and is also supportive and exciting.

According to Lindlof & Taylor (2002), another advantage is that group discussion produces data and insights that would be less accessible without interaction found in a group setting, being stimulated by listening to other participants' ideas and experiences. However, group dynamics could also cause participants to change their opinions in groups, or the discussion may be dominated by some individuals or participants may be influenced, leaving the researcher in doubt about the validity of expressed opinions (Bristol and Fern, 1993).

According to Vignali (2013) qualitative research and focus groups as part of it, is an excellent way to achieve in-depth information about people's thinking and feeling. Although it is subjective information that is provided by this qualitative method, a dimension of research is added which is not available from other sources. While questionnaires seek responses to a fixed set of questions, interviews and focus groups can explore a topic in depth.

Hence, a focus group discussion is seen a favourable qualitative research method in the specific research context, since it provides a reasonable approach with respect to time and money in order to explore the nature of influencing factors in this research context. Furthermore, valuable in-depth knowledge can be developed by facilitating beneficial group dynamics, which is seen as crucial since the findings from the literature review should to be illuminated.

4.8 Mixed Methods Approaches

Scholars, who are strongly dedicated either to a qualitative or a quantitative research paradigm, have the strong opinion that the paradigms and associated methods cannot and should not be mixed. Over the last decades, however, researchers recognized that qualitative and quantitative methods offer different strengths and weaknesses. Hence the support for a mixed method approach to research increased, and can now be considered as a paradigm in its own right (Johnson and Onwuegbuzie, 2004). A mixed methods approach thus could combine advantages

and bridge disadvantages of both research approaches and lead to an advancement in science (Sattabusaya, 2008).

The aim of using multi-methods is generally to enhance the validity of findings combining approaches (Punch, 2005). By combining multiple observers, theories, methods, and empirical materials, researchers can hope to overcome the weakness or intrinsic biases and the problems that come from single method, single observer, single-theory studies (Denzin and Lincoln, 1998).

There is also criticism of mixing the methodological approaches. The use of a single methodology has been advocated by a number of authors (for example, Miles and Huberman, 1994; Yin, 1994). Many of the supporting arguments are decidedly pragmatic such as time constraints, the need to limit the scope of the study and so on. The main arguments against mixed methods are that research methods are rooted to epistemological foundations, which are often incompatible. Qualitative and quantitative research is considered as two opposed paradigms on their own (Bryman and Bell, 2007).

However, this approach is in accordance with the advocates of both methodologies as long as the purpose of mixing different methodologies can be clearly explained by the researcher, as well as the intended process of combining different approaches (Bryman and Bell, 2007).

It is important to acknowledge that there is no one mixed methods methodology, since there are various ways of combining divergent methodological approaches (Bazeley, 2002). A very prominent way of mixed methods is triangulation.

In social science, triangulation means the mixing of data or methods so that a research topic is investigated from different perspectives. The basic intent of triangulation is to use two or more aspects of research to strengthen the design and thus to increase the ability to interpret the findings (Thurmond, 2001, p.253). Mixing data types is often thought to help in validating the claims that might arise from an initial study, while the mixing of methodologies, e.g. mixing survey and interview methods, is a more profound form of triangulation (Olsen, 2004).

The idea of using triangulation for more than one method of investigation, for instance quantitative and qualitative research methods regards the same research

problem, is often related to the idea of a better understanding due to the different perspectives on the research problem (Bryman and Bell, 2007).

Next to the methodological triangulation, researchers can also combine more than one type of data or more than one type of data analysis technique. The following table gives an overview of the different triangulation methods and their characteristics.

Triangulation Type	Characteristic	Example
Data Source Triangulation	Data sources for investigation vary based on time, space or person	Repeat a survey in different locations
Investigator Triangulation	Using more than one observer, interviewer, coder or data analyst	Using two different researchers analysing the same data set
Methodological Triangulation (within-method)	More than one data collection procedures from the same design approach	Using a survey and secondary data for quantitative analysis
Methodological Triangulation (between- or across-method)	Employing both qualitative and quantitative data collection methods	Using interviews and a survey
Data-Analysis Triangulation	Combination of two or more methods of analysing data	Using different statistical techniques to determine similarities or validate data

Table 9: Types of triangulation, Source: based on Thurmond (2001, p.253)

Next to triangulation, mixed methods can also be applied for exploration. This means that one method is used to identify units of research, which are investigated with a second method (Bryman and Bell, 2007). Besides philosophical guidelines, there are also pragmatic reasons behind the utilisation of mixed methods research, whose

“logic of inquiry includes the use of induction (discovery of patterns), deduction (testing of theories and hypotheses), and abduction (uncovering and relying on the best set of explanations” for understanding research results) (Johnson and Onwuegbuzie, 2004, p.14).

As described in the table above, ‘Methodological Triangulation’ is employing both qualitative and quantitative data collection methods. There is the intention to strengthen the design and thus to increase the ability to interpret the findings by combining both methods. With respect to this research that means that a focus group discussion is used in order to identify and explore a specific topic, which will then be investigated in terms of a more general approach by using a survey.

4.9 Defining a Research Design

As discussed in the previous chapters, the choice of a research approach depends widely on the nature of the research and the philosophical approach towards problem-solving. According to Crotty (2009), the strategy of inquiry or method and the approach of the research translated into practice leads to the design process of research. A sequential process starts with questions and theoretical lenses, followed by the choice of specific data collection and methods. This includes not only the data analysis, research tactics, but most importantly the continuous safeguarding that all pieces of the research fit together and deliver what should be delivered according to the research objectives (Kumar, Aaker and Day, 2002).

In other words, a research design can be seen as a master plan specifying the methods and procedures for collecting and analysing the needed information (Burns and Bush, 2002). Thus the research design helps to align the planned methodology to the research problems in accordance with the research philosophy chosen for a given study (Sattabusaya, 2008). Summarized the research design guides a research study towards its objectives.

The methodological approach for the empirical research is primarily determined by its research philosophy (Easterby-Smith, Thorpe and Lowe, 2008). In accordance with the research philosophy stated in the previous chapter, the author will follow a

post-positivistic approach, which aims at complete objectivity but acknowledges that psychological constructs are based on human subjectivity.

In order to develop the most appropriate research design for the present research objectives, different aspects and several decisions have to be considered. The overall design of this research study is characterized by the combined use of qualitative and quantitative research methods, also called mixed method. As Creswell (2007) suggests, a mixed methods study involves the collection or analysis of both qualitative and quantitative data in a single study in which the data are collected sequentially and the integration of the data during the process of research in order to strengthen the research design.

In correspondence to the combination of two the sequential exploratory and explanatory research stages by triangulation, this study will be incorporating the strengths of both methodological approaches by applying a methods triangulation of qualitative and quantitative methodologies. Further details regarding the selection and application of the single methods to the research context is provided in each method chapter.

The basic research design will include three steps:

In the first step the literature review is going to deliver the basic psychological and behavioural models as well as potential determinants from previous studies partially in a different or more general context. Qualitative research methods offer a deep understanding of individuals' beliefs.

Thus, in the second step qualitative data derived from a focus group-interview will be employed to elicit individual beliefs that are related to the industry-specific influencing factors on the internationalisation strategy of German SMEs. These determinants will be matched against the determinants that evolved from the literature review. The expected results will have the disadvantage that they are usually limited to a non-representative sample and thus increased subjectivity. This means that the findings cannot be generalised for the chosen population. But with the help of the resulting list of potential determinants from the focus group it will be possible to narrow down and constitute the content regards influencing factors as one part of the questionnaire intended to use in the survey. From the view of a post-positivist, theories need to be tested and refined in order to understand the world.

Hence a deductive approach is used, which according to Bryman and Bell (2007) follows sequential stages, starting with a theory, collecting data and supporting or refuting a theory and making the necessary revisions before additional tests are conducted.

Thus, the third step is a quantitative study, where variables are used to answer research questions that present a systematic view of phenomena by specifying relations among variables (Kerlinger, 1979). This is in line with the posed research questions and appropriate to a quantitative survey design. As shown by examples in the literature, quantitative studies in the field of management research often follow a deductive approach. The author favours this approach since it contains determination, reductionism, empirical measurement and theory verification and according to Babbie (1990) data, evidence and rational considerations shape knowledge - which is at the core of this research. Quantitative methods have the advantage of a huge sample size, which comes at the cost of reducing individual beliefs to predefined answer sets.

Hence for each construct, a set of variables will be developed based on the interview results and the literature review of comparable questionnaire formulations. Before data can be collected, the variables have to be defined and described. In order to evaluate the construct 'organizational capability', in this example a ratio variable named 'common work orientated goal' is measured on a seven point scale. This variable describes an important internal capability, called co-ordination mechanism. Other variables such as the 'medical device class' or 'employee's experience in international ventures' are further examples of variables representing other elements such as 'product complexity' or 'export experience', which define other constructs of the model. Finally, scales will be developed for each item and the questionnaire will be administered to a small sample for a pre-test. After necessary corrections, the final questionnaire will be administrated to a representative sample of MedTech firms in Germany. The resulting data will be analysed by using statistical methods. Based on the measured results all operational hypotheses can be tested, and the specific outcomes of the inquiry examined.

The entire process will be described in detail in the method chapter.

It is important to acknowledge, however, that even though quantitative and qualitative methods may provide mutually reinforcing results, the possibility of discrepant findings also exists (Bryman and Bell, 2007).

Generally, discrepancies are not a sign of a flawed research design, but may lead the researcher to probe certain issues in greater depth, which may lead to fruitful areas of inquiry in their own right (Bryman and Bell, 2007). For the present research, triangulation will lead to a multi-stage process in which data from secondary research and qualitative research will build the foundation for a standardised, quantitative research. This approach diminishes differences between the data sets, since the quantitative stage can only produce data within the merits of the results from the qualitative stage. Yet, initial results or hypotheses from the qualitative stage might be refuted due to the analysis of the quantitative data.

4.10 Research ethics

As outlined in the introductory chapter the researcher's experience as a practitioner and his role as a researcher provide a specific advantage. As a researcher, the author takes the responsibility to ensure as far as possible that the physical, social and psychological well-being of their research participants is not detrimentally affected by the research. Hence, by disclosing his role as a practitioner and researcher the research relationships is characterised by mutual respect and trust. On the other hand, this causes to follow strictly ethical guidelines to keep neutrality and avoid bias. Hence, the research design respects the aspects of research ethics and is compliant with the University's Research Ethics guidance, as described in the form of a Handbook of Principles and Procedures.

First, this includes the statement of following ethical principles designed to articulate a common set of values to guide and support the professional conduct of academic research and research-related activities. Thus, in order to evaluate the level of confidence associated with the intended research results, specific measures have been applied through all research activities. For conducting the qualitative research, a set of quality criteria have been defined, established and finally respected. Quality criteria are well known and widely agreed in quantitative research. Recognizing the very wide range of methods that are covered by qualitative research, Dale (2006)

argues that it might not be possible to establish comparable fixed sets of criteria that can be universally employed in every type of qualitative research. Qualitative research literature often recommends outlining conceptions of validity and reliability in the quantitative tradition, transferring some fundamental aspects to the field of qualitative research. "Reliability can be translated into dependability, which can be achieved via an auditing procedure, involving the researchers' documentation of data, methods, and decision-making during a project, as well as its end product" is summarized by Flick (2010, p.396). Guba and Lincoln (1994, p.290) recommend "Internal validity can be transferred to neutrality, and is achieved by basing the findings on the subjects and conditions of the inquiry, rather than on the eventually biased researcher perception". External validity, finally, can be translated into applicability. Providing a detailed, rich description of the study, the author should give readers sufficient information to be able to judge the applicability of findings to other settings (Seale, 2002). Other researchers propose different criteria to validity and reliability, which are rooted in quantitative research. They consider trustworthiness and authenticity as main criteria, which are respecting the different approach of a qualitative research paradigm (Bryman and Bell, 2007). Particularly trustworthiness is reflected by the criteria of credibility, transferability, dependability, and conformability.

Consequently, the researcher tried to avoid, actions which may have deleterious consequences for others. As measures, in the invitation to the focus group discussion by the aims, nature of the research and how the results are disseminated were explained in detail. Possible participants were disclosed to each other, an external moderator led through the discussion, the transcription and translation were executed by a third party and the results have been reviewed and confirmed by the participants. Name and company of the participants have been kept anonymous.

Also, the quantitative part of this research respects the ethical aspects accordingly. It follows five quality requirements based on Flick (2010), which are in line with the post-positivistic philosophical stand and the applied qualitative method in order to explore in-depth insights as preparations for the following quantitative approach: Reliability, credibility, applicability, neutrality, and transparency.

A detailed description of how these quality aspects are understood, integrated in the research design and respected during the conduction of the research is outlined in section 6.8. It can be briefly summarized from the beginning, where the introduction

letter describes the aim, nature of the research and how the results are disseminated. Furthermore, provide exit strategies a withdrawal from the survey at any point in the process. Finally, technical software and hardware standards preserve the anonymity of confidentiality of data and respondents.

Summarized, the general and particular concerns of research in an academic field to conduct the research in an ethical way, is respected by following the principles of the University's general quality assurance systems. Where applicable (see e.g. section 5.3 and 6.8) it is described in detail how the anonymity and privacy of participants are preserved and how personal information is being kept confidential and secure. Furthermore, there is no specific approval from the Research Ethics Committee required since the research does not involve biomedical or clinical intervention, deceptive research or certain classes of covert research. The research does not apply to participants that are under 18, nor does the research go into sensitive topics or involve vulnerable groups

4.11 Chapter summary

Firstly, the researcher's philosophical stand and his ontological view were discussed. As a Post-positivist both a qualitative and a quantitative approach is possible. The methodology has been aligned to the research objectives. The research topic starts towards an exploratory character and ends with an explanatory model.

The result of the literature justifies this approach and hence triangulation is applied in order to strengthen the research design. The mixed methods approach draws on gaining a qualitative in depth-knowledge with the help of a focus group. Based on these results a quantitative survey is planned where identified constructs and relationships are assessed in order to finalize a conceptual model.

CHAPTER 5: QUANTITATIVE RESEARCH – FOCUS GROUP

5.1 Chapter introduction

After a short introduction to the theoretical foundations of a focus group method in qualitative research, the chosen approach is justified and the practical organization of the discussion is described. Followed by considerations with regards to the sampling of the participants and how to achieve the intended results, the execution and the analysis of the content are explained in detail and the conclusions are finally discussed and illustrated. The evaluation of the qualitative research with respect to different criteria is considered at the end of this chapter.

5.2 Decision on a focus group approach as a qualitative method

According to Crotty (2009), qualitative research has numerous strengths when compared to its quantitative rival, because it is based on the richness of words and uses the potential of language with the intention to understanding rather than to describe. Qualitative research captures the perspective of the people who are being studied. According to Bryman and Bell (2007), the interview is one of the most widely employed methods of qualitative research. Some see the flexibility with respect to the researcher as a further advantage of the interview that makes it so attractive although transcription and analysis are recognized as very time-consuming. Others highlight the flexibility of interviews with respect to responding and following on upcoming new aspects by occasion. The degree of following a fixed agenda and schedule is named as main difference between structured, semi-structured and in-depth interview approaches.

In an exploratory study, in-depth interviews can be very helpful to gain new insights. Semi-structured interviews may also be used in this context. In an explanatory study, semi-structured interviews may be used in order to understand the relationships between variables that have been revealed from a descriptive study before.

Structured interviews may also be used in an explanatory context, related to a statistical sense or to identify patterns (Saunders et al., 2009).

After deciding on the interview type, the sample size has to be considered.

According to Marshall (1996), an appropriate sample size for a qualitative study is reached when the research questions can be answered adequately. In principle, there are different ways of deriving a group of interview participants. In statistical or probability sampling, individuals are put together according to certain (e.g. demographic) criteria in order to arrive at a sample that represents the research object's typicality as well as possible (Flick, 2010). In contemporary qualitative research, nonprobability sampling, however, has become more and more common. Usually certain individuals are selected according to their expected level of new insights for the developing theory (Flick, 2010). The qualitative literature recognizes that some respondents are richer informants than others and that these people are more likely to provide an insight and an understanding for the researcher (Marshall, 1996). An a priori estimation of the number of participants needed to reach saturation in a qualitative study is almost impossible since it depends on various factors such as the scope of the study, the nature of the topic, the quality of the data and the research method (Robson, 2009). Consequently, the number of participants needed for interviews usually becomes evident as the study progresses, as new beliefs, categories and values stop emerging and thus data saturation is achieved (Robson, 2009). This requires a flexible research design and an iterative approach to sampling. In general, the qualitative literature suggests that the sample variation is more important than the overall sample size (Kleining, 2007).

An interview situation is often characterized as a face to face situation but also group interviews a common method in qualitative research (Bryman and Bell, 2007).

Kitzinger (1995, p.311) stated that "focus groups are a form of group interview that capitalises on communication between research participants in order to generate data".

Group interaction is explicitly used by focus groups, while group interviews are known for a simple and quick way to collect data from research participants simultaneously. A focus group is a controlled group interview of a target audience selected on demographic or subject-matter reasons and is often led by a facilitator

(Easterby-Smith et al., 2008). A set of questions or topics are covered and the results can provide a dimension that is simply unavailable with the traditional survey approach (Krueger and Casey, 2008). Although focus groups can be a powerful tool in system development, the purpose is to obtain information of a qualitative nature from a predetermined and limited number of people (Stewart and Shamdasani, 1990).

Lindlof and Taylor (2002) imply that group discussion produces data and insights that would be less accessible without interaction found in a group setting - listening to others' verbalized experiences stimulates memories, ideas, and experiences in participants.

So, the author concludes that qualitative research and focus groups as part of it, provides an excellent way to gather in-depth information about what people think and feel about SMEs and internationalisation. Framed by a set of open questions from the literature review, the exploratory character of this qualitative method provides subjective information in a flexible environment, adding a dimension of research not available from other sources. While questionnaires seek responses to a fixed set of questions, focus groups can explore this topic in depth by stimulating a discussion under subject matter experts and guided by a facilitator in order to keep focus. Furthermore, it is an effective and efficient method, which is important due to the fact that the results were essential for the following quantitative part of the research.

Thus, it was decided to invite ten subject-matter experts with experience in the field of MedTech companies by contacting them via e-mail, followed by a phone call and guided by an initial introduction paper. This is in line with Greenbaum (1998), who states that a traditional full focus group consists of a 90-120 minute discussion among 8-10 individuals, who have been selected based upon having predetermined common characteristics.

Typically, the focus group is moderated by a trained expert who runs the session with the support of an interview guide. Usually, this interview guide has been created jointly by the moderator and the sponsor.

5.3 Quality criteria of qualitative research

In order to respect ethical guidelines and to assure quality aspects through the scholarly activities associated with the intended research results, a set of quality criteria have been defined, established and finally respected. Qualitative research literature often highlights conceptions of validity and reliability. As discussed in section 4.10, this research follows five quality requirements based on Flick (2010), which are in line with the post-positivistic philosophical stand and the applied qualitative method in order to explore in-depth insights as preparations for the following quantitative approach:

1. **Credibility:** This has been a major aspect of the communication plan from the very beginning up to the post-processing of the focus group summary report. The idea has been that prolonged engagement in the field can foster the trustworthiness of qualitative research reports. With the help of the experience as a practitioner in the field of management and internationalisation in the MedTech industry for many years, a heterogeneous sample of participants have been selected and encouraged to open up for deep insights from their view as experts. The results have then been summarized and reviewed by the participants. A synthesis of this chapter has been published in an academic journal (see publication list), allowing for an open discussion of the findings. Furthermore, the outcome of the qualitative part of the research will be validated in the quantitative part of the research since it defines the content of the model that is tested.

2. **Applicability:** The development of concepts and categories is described in detail and enables the reader to judge whether or not a particular concept might be transferable to another context.

Furthermore, the results of the present study are comparable to the results from other inquiries in different areas of firm's internationalisation, since the research is based on established theories or concepts and findings from other studies. Consequently, knowledge from this study can be re-transferred and checked against results from other fields of firm's internationalisation.

3. **Consistency:** In order to ensure that any repetition of the focus group discussion in a similar setting with similar participants leads to similar findings, the author aimed

for maximum sample heterogeneity within the chosen interview participants. In sum, it is thus expected that an acceptable level of consistency was obtained.

4. **Neutrality:** In order to increase neutrality, the discussion has been facilitated by an independent moderator, who was also involved in the preparation and post-processing. Data translation and review was conducted with the assistance of the moderator, one further research assistant and the author independently. By comparing the results triangulation ensured that the results reflect the entire verbal and non-verbal communication in its full meaning. Participants' review of the discussion summary prevents from bias of the researcher. Findings have been evaluated and consequently lead to modifications in this research.

5. **Transparency:** This is essential for any kind of quality assessment. Thus, transparency as a requirement is respected during the research process at different points. A detailed description of how the study was conducted and the data was analysed is provided in this chapter. The details can be seen in the primary transcript, which is attached in the appendix.

5.4 Agenda and frame for the focus group discussion

Starting with a mind map to facilitate the brainstorming on ideas it became very clear that the intended schedule with a target date of the event until November 2016 would be ambitious. The author has experienced that for executives the year-end often goes along with a finish in business activities and with a loaded book diary. Nevertheless, the planning for the preparation of the focus group discussion started and a project management approach was used in order to align all the different tasks and activities.

The intention was to get a deeper insight regarding the most relevant factors, which impact MedTech SMEs while considering the internationalisation of their business.

The agreement on a day and on a location had to be in alignment with the targeted participants that had to be invited and facilitated during the discussion. The discussion itself had to be prepared as well as the recording and the following transcription.

The help of an experienced moderator, leading an established regional networking platform for Healthcare executives, could be enlisted for moderating the meeting and helping on the organization of the upcoming event.

The appropriateness of the location was considered in the next step since it is possible that the place of conducting the discussion may influence the response rate of the targeted executives and the data, which can be collected. The location may have an impact upon the convenience of the participants and the responses they are likely to give (Saunders et. al 2009). Furthermore, the infrastructure should be adequate with regards to the technical aspects of facilitating the discussion as well as to the logistic aspects of the respondents.

For this reason it was decided to choose a location, which is attractive for the intended participants so that they feel comfortable and familiar. A well-known Hotel in the city center of Hamburg, which prepared for formal and informal business-meetings seemed to be a good choice.

The next sections describe the interrelation between date, information policy and attracting the intended participants more in detail. Furthermore, details such as the invitation letter with information regarding the participants, location, time etc. can be found in the appendix.

5.5 Preparing information supply, story board and moderation

It is crucial to plan precisely how to demonstrate credibility and obtain the confidence of the targeted respondents, particularly when personal insights of executives are expected.

To be knowledgeable about the research topic and organizational and situational context in which the interview is to take place is a prerequisite.

In addition to the literature review, the experience as a practitioner in this industry helped the author to develop an introduction letter and to address and attract respondents that are interested in and engaged with the discussion topics.

The supply of relevant information to participants before the interview can also promote credibility (Bryman and Bell, 2007). Thus, with the help of introduction letter

the participants received initial context-related information and before the event they were provided with a list of the interview themes. The list of themes should also promote validity and reliability by enabling the interviewee to consider the information being requested and allowing them the opportunity to prepare themselves for the discussion in which they are to engage. The letter and the list of themes can be found as a part of the appendix.

The list of attendees cannot be provided since confidentiality was agreed with respect to concerned persons and companies. This is the reason why the participating persons in the transcript are represented as 'N'1 to 'N10' and companies are illustrated with alphabetic characters. Before opening the discussion a keynote presentation illustrated the case of a specific MedTech company from southern Germany and how it experienced its internationalisation process. The intention was to map different themes of the discussion in practice and to open up a faithful atmosphere by providing subjective and confidential information.

The ability to draw on this type of information in the group discussion should help to demonstrate credibility and encourage the interviewee to offer a frank and detailed account of the topic in the discussion.

The following moderated discussion was sometimes controversial and often fruitful and inspired the respondents to contribute with their own experience. It lasted 1½ hour, was recorded and processed to a transcript. After the event a summary was elaborated and distributed to the participants.

5.6 Selection and invitation of the participants

For the purpose of this research, a sample of 15-20 managers from German MedTech companies should be selected. This sample was higher than the needed size of respondents according to the literature. It was recognized from the very beginning that the assembling of ten high-level subject-matter experts would be a challenge, even if the topic is attractive and the respondents are willing. Based on the moderator's experience in a similar context it was assumed that up to 50% of the respondents deny or call of their participation during the first confirmation until the day of the event, a fact which didn't release the situation. In autumn 2016 some

exploratory talks with potential respondents, that were known by the author personally, gave evidence that the focus group event had to be postponed into the beginning of next year. The coming end-of-year business would have made it for many potential respondents impossible to join, but it was a good moment since it was the time when many of the managers were filling the first quarters with appointments around the long-range business trips and the important trade shows. The 16th of February 2017 was identified as favourable, since the week was after regional holidays and before important trade shows. Furthermore, it was a Thursday which made it possible to use the event in Hamburg as an anchor for planning meetings before or after the event somewhere in northern Germany or just using this as starting point for a long week-end in an interesting city.

In order to increase the sample heterogeneity, different companies with different medical products in northern Germany were selected by mailing lists of the relevant industrial, business and trade organizations. As far as insiders from that industry in their function as a peer weren't familiar with them, an Internet research elucidated whether they matched the criteria to be a MedTech SME with international business.

It was expected that the owner or CEO would be the right person to contact first. In some cases they proposed another employee such as the export manager or another representative of the top-management. In order to further increase the heterogeneity of the sample it was intended to cover the also companies having their focus on Software as well respondents which were known for having experience during their working career in SMEs as well as in MNEs.

From 20 companies, which were contacted, 7 companies agreed at once, 6 of the companies refused to participate for different reasons and 7 did not respond at all. In a further attempt via social media and personal phone call some day later 3 agreed and 2 denied and 2 of them didn't react at all. Two of the companies, which agreed in the first or in the second step called off their participation later, one of them could arrange a colleague as substitute. Another participant came with a friend of himself, who was not invited initially but certainly was welcomed since he met the criteria as well. Out of ten companies, 9 participants in the interview were male and 1 participant was female. This was not surprising due to the fact that executive positions in management are not balanced regarding gender, which is not a problem of this research, because there was no intention in selecting sample by sex. A

minority of the participants knew each other since they worked together in a former company or because they knew each other from business.

During this focus group discussion 10 subject-matter experts discussed antecedents, influencing factors and important ingredients for successful international ventures in the context of German MedTech SMEs. Each of the participants has a profound business experience of more than 15 years, at least 5 years in this industry. Most of them hold or held a management position such as founder, CEO or manager in SMEs with international business activities, in addition many of them have also experience on a management level in MNEs or as consultants and therefore all of them could make significant contributions by their own experience. Due to the selection of the heterogeneity and qualification of the participants most aspects along the value chain could be considered as well as their specific impact compared with other industries or MNEs.

Summarized, getting the right respondents on board was the most critically and time-consuming undertaking regarding this qualitative approach, but also the most beneficial.

5.7 Defining a recording concept

The interview responses have to be recorded in a way that enables the researcher to analyse the content at any later point of the project without any loss of meaning (Flick, 2010, p.294). According to the intended interview design it was expected to record a considerable amount of verbal content as a result and the need for an efficient documentation system was obvious.

Consequently, the author decided to use an audio-taping system, which should enable a digital recording of the interview discussion. Furthermore, a loss-free reproduction of the interview audio track at any time should be assured. The practicability and quality were tested in advance.

The author consciously refrained from taping any visual data, since literature suggests that compared to audio taping, video taping has an irritating effect on respondents and thus might impede them from opening up (Lamnek, 2005).

An additional protocol was kept in order to allocate the audio data to the specific person in case of uncertainty regards the identification of the respondent's voice.

The protocol was also useful for the documentation of observed behavioural changes and emphases made and for remembering the main topics discussed so far in order to choose the right subsequent questions.

One of the shortcomings of non-standardised interviews is that an a priori estimation of the overall interview duration is not possible. Literature suggests an average duration of approximately sixty minutes, which might change considerably depending on the context and interview setting (Lamnek and Krell, 2010).

In the course of the present research project the interview duration was not limited by a schedule, but a light dinner announced for the later evening gave the possibility to close the discussion after more than 1 ½ hour, although some attendees proceeded with the discussion of some details until the late evening by a light dinner and some drinks. Although this was not recorded and analysed, a substantial amount of data was recorded and had to be transcribed in the following stage.

Figure 15 provides an impression regarding the location and the discussion of focus group event.



Figure 15: Impressions of the focus group event (own drawing)

There were no problems occurring during the focus group discussion, but it was wise to prepare a list of questions for discussion in order to hold direction with respect to the research focus. It was also beneficial to decide on an experienced moderator, whose authority was accepted, since managers on this level are used to act in a controlled way and express or do not express according to their intention. So it was the task of the moderator to facilitate a discussion which should create an atmosphere of open talk and frank discussion, but should not get out of hand.

This was successfully managed. Nearly all of the participants opened up and reflected accordingly, not only with respect to their own success stories but mentioning also failures and mistakes. There was a high level of willingness to contribute to this research project among all participants and the dapper location and arrangement facilitated an atmosphere of mutual respect.

5.8 Transcription

Transcription means the conversion of spoken material into textual data, which in general implies a reduction of audio/visual data into a written form (Mayring, 2002). Particularly in non-standardised (qualitative research) interviews, the interview is normally audio-recorded and subsequently has to be reproduced as a written account using the actual words.

This is the foundation for the further elaboration of the material (Kowal and O'Connell, 2009). A transcript enables the researcher to develop a reproducible interpretation which is later available for critical appraisal and thus offers a high level of methodical validity (Lamnek and Krell, 2010).

Development of the transcript

In a face to face discussion, the way of exchanging information is not restricted to the audio data. Behavior, facial expression, gestures can also transport additional information, as well as emphasis, loudness or tone. Hence, an interviewer would be

interested not only in what participants said, but in the way they said it as well (Saunders et al. 2009)

This is the reason why in the recording concept it was taken care of additional notes, in order to ensure the words can be linked to the contextual information that locates the interview. Consequently, the task of transcribing the audio-recorded interviews was quite time-consuming as there was the need not only to record exactly what was said and by whom, but also to try to give an indication of the tone in which it was said and what was the non-verbal context.

There are no general rules provided by the literature with respect how to arrange the transcription. According to Bryman and Bell (2007), meeting quality criteria such as objectivity and being systematic guides this process. Hence, transcription aims at the maximum exactness in classifying and presenting statements. In qualitative research, however, the question of appropriateness for the given research process has become more important (Robson, 2009). In order to judge the appropriateness of a transcription method, a variety of criteria were developed, such as manageability, readability, learnability, and interpretability (Flick, 2010).

Consequently, for the purpose of the present research, the interviews were first recorded on tape, and along with field notes made during the interview, were later transcribed into written verbal data. Nonverbal aspects, such as pauses, pitch or facial expressions, were integrated into the transcript only as far as they were judged as a surplus of information in regard to the research objectives. Moreover, the interviews were transcribed in German standard orthography, meaning that verbal colloquial expressions were transformed into written standard German expressions. The sequence of dialogue items was transcribed line-by-line in descending order, representing the chronology of the interview. The change of speaker from interviewer to interviewee was clearly marked and transcribed into a new passage.

Since the task of transcribing an audio-recording is extremely time-consuming, some research methods texts suggest a touch typist for help. The initial transcript was elaborated with the help of such an expert. It took her still more than one day to develop the first draft. The typist wrote the content, which was recorded on the audio tape, in a word file while listening to the tape. This initial document was then approved independently by the author and a peer in two steps by comparing first the contents of the audio tape with the transcript and finally with the notes. It was

recognized that due to the specific background and experience of the attendees many technical terms and industry-specific descriptions and acronyms were used, which made it sometimes difficult to capture and set into the right context from the very beginning. Consequently, it was helpful to transcribe and review the interviews as soon as possible after they were undertaken. The translation was done in a further step by using a conventional translation software. Passage by passage was translated and in parallel, the author made sure to capture the original content by reviewing the translation with original German meaning documented in the transcript. Wherever necessary, the translation was rectified and at the end, the summary of the transcript was provided to the participants two weeks after the event. The intention was to provide the outcome as the base for learning from the mutual discussion and in order to provide feedback or corrections if necessary. Because no further adjustments were addressed, the process was evaluated as time-consuming but effective and therefore in line with Flick (2010), who denotes that “a transcription system should be easy to read and easy to search” (Flick, 2010, p.300). The result of this process is called primary transcript, which reflects 1 ½ hour of focus group discussion, can be found in the appendix.

Reduction of the data

The amount of verbal data produced in this way substantial, thus methods of reduction were necessary. The first step for simplification of material or data is to select the part of data that covers the topic relevant to the research objective. Thus, for most contributions of the participants during the discussion, the author reduced passages from the transcript if they were not directly orientated at the research objectives. Also, any off-topic conversation, not related to the discussion topics, was reduced, leaving a richer content for further analysis. The following passage gives an example of the reduced and translated transcript.

...

N1: I at least partially can understand this. ... As a device manufacturer, it is easy to get (revenues) from the service (budget). When a company is leading (product and market position) and the customer gets good service, they have good cards selling new devices. When they build a sales and service network based on distributors, it is more difficult for them

to get to the customers directly, since you do not have access to your own installed product base (and make less money). "P" organized the sales through dealers, but tried to keep the service in their own hands. If the performance of a dealer was bad, "P" gets the early response and warning through the (own) service channel. That is why it was and is important for "P" to keep the service in its own hands.

N3: Perhaps this leads to the general aspect and question regarding cooperations.

A medium-sized company in the medical technology sector can hardly afford to have own companies all over the world. For such SMEs a separate organization is too expensive; Companies like "P" and "O" can afford this.

NN: What are the advantages and disadvantages of SMEs versus large global companies?

N4: There is a difference between a trading company, whether big or small, and a manufacturer. Service for Surgical instruments service is different than for x-ray equipment. They have a harder time (than a trading company) to make money with the disposals / devices (surgical instruments) in the service than a large device manufacturer. ... For "Z" service was extremely important, but at least to be able to focus on service and at the same time focus on other improvements e.g. if you have quality problems. With a growth out of product sales alone, you cannot grow out of the problem, this is the wrong strategy.

...

It has already been mentioned that for confidential reasons the participants can only be separated in the transcript by an abstract code such as "N1", any other individual indication such as company names are replaced by abbreviations such as "Z", the symbol "..." in the meaning of three dots represents a reduced phrase and the moderator was given the code "NN". She led through the discussion and took care that the discussion was directed to the research objectives. If applicable she introduced questions based on the list of the interview themes, which has been mentioned in the section above and can be found in the appendix as well.

However, it has to be acknowledged that any reduction of the volume of text affects what finally constitutes data for the purpose of the research and thus may have an influence on the research findings (Dey, 1998). Using these techniques, the overall volume of the transcript could be reduced. It was taken care not to change the

underlying meaning of the text by approving the summarized transcript of the respondents.

5.9 Qualitative data analysis

Content analysis

The data collected by the focus group discussion was interpreted by a content analysis.

According to Collis and Hussey (2003) content analysis represents a formal approach to qualitative data analysis. Dawson (2002) describes content analysis as a method where the researcher systematically works through each transcript assigning codes, which may be numbers or words, to specific characteristics within the text. Once identified, the content components could undergo qualitative or quantitative analysis or both (Kondracki, Wellman and Amundson, 2002).

A broader view is given by Stempel (1981, p. 119), who considers content analysis as “a formal system for doing something that we all do informally rather frequently, drawing conclusions from observation of content”. Mostyn (1985, p.117) refers to it as “the diagnostic tool of qualitative researchers, which they use when faced with a mass of open-ended material to make sense of”. And Shapiro and Markoff (1997, p. 14) suggest, content analysis refers to “any systematic reduction of a flow of text (or other symbols representing the presence, the intensity, or the frequency of some characteristics relevant to social science”.

The process of such a reduction is described by Kondracki et al. (2002), who sees content analysis as a coding of raw messages according to a classification scheme and a following identification of the content components. According to Given and Julien (2002, p.73), content analysis reflects “the intellectual process of categorizing qualitative textual data into clusters of similar entities, or conceptual categories, to identify consistent patterns and relationships between variables or themes”.

Three basic methodologies of content analysis are suggested by the literature, which can be regarded as supplementary rather than competing strategies: Summarizing content analysis, explicative content analysis, and structuring content analysis.

In a 'summarizing content analysis', the text is paraphrased and less relevant passages and paraphrases with the same meaning are skipped (first reduction). Then similar paraphrases are grouped and summarized (second reduction). The result of this content analysis is a text on a higher level of abstraction.

'Explicative content analysis' is aimed at clarifying unclear, diffuse or ambiguous passages by involving text from either inside the text (narrow context analysis) or from external material (wide context analysis). On this basis, explicating paraphrases are formulated and tested.

Finally, the paraphrased text can be restructured in such a way that the internal structure of the text helps in explaining the phenomenon under study, which is captured under the term 'structured content analysis' (Flick, 2010).

Hsieh and Shannon (2005) define qualitative content analysis as "a research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes". They see three distinct approaches: conventional, directed, or summative.

All three approaches have one thing in common since they interpret meaning from the content of text data. The major differences among the approaches are coding schemes, origins of codes and the time of defining the codes. Hsieh and Shannon (2005) distinguish between conventional, directive and summative approaches. In a conventional content analysis, coding categories are derived directly from the text data whereas a directed approach starts with a theory or relevant research findings as guidance for initial codes. A summative content analysis compares and counts keywords or content and finally interprets the underlying context.

In this research, a two-step approach was followed. Codes which could be linked to existing categories from the literature review guided the development of initial codes, categories for new codes were developed in a next step following a summative approach. More details are provided in figure 17.

It has already been highlighted that qualitative research is interpretive. Content analysis involves close reading of text. Qualitative researchers using a content analytic approach observe that text is open to subjective interpretation, produce multiple meanings, and is context dependent (Given and Julien, 2002). When analyzing qualitative data such as interview transcripts, analyses across the whole

collection of data typically generate clusters or codes that translate into 'themes' (Creswell, 2007).

In general, coding leads to the development of theories through a process of abstraction. Even though there are different approaches to coding, such as 'open coding', 'axial coding' and 'selective coding', in practice there are no clear distinctions between these methods (Flick, 2010).

Open coding means, to develop codes and attach them to parts of the texts or to single words in a first step. If possible, these codes can either be formulated based on relevant literature on the topic or they can be rephrasing parts of the text as closely as possible (Dey, 1998). Codes that are rephrasing parts of the text are called in-vivo codes, while codes based on literature are called constructed codes. In a second step, codes are categorized by grouping them around phenomena discovered in the data. The result of open coding should be a list of the codes and categories attached to the text (Flick, 2010).

According to Strauss and Corbin (1998), axial coding is aimed at revealing the relations and dependability between categories and codes. After identifying a number of relevant categories and codes, a differentiated picture of their relation to the research topic can be developed in a next step. The aim of this process is to identify which category or code causes a phenomenon and which category or code is the consequence of a phenomenon. As an intended result a structure of the hierarchy and relations of the categories, which are relevant to the research questions, should be finally developed (Flick, 2010).

Selective coding continues axial coding on a higher level of abstraction. This step focuses on potential core concepts and compares and contrasts them to other groups. The result of selective coding should be one central category and one central phenomenon. According to Dey (1998), qualitative data analysis is a circular process. Description lays the basis for analysis, but analysis, in turn, lays the basis for further description. From initial description, the process continues with classifying the data and then aims to connect the concepts developed so far in order to provide a basis for a new description of one phenomenon or central category. Selective coding develops this central category in its dimensions and features and should then be linked to all other categories.

Finally, the theory is developed in more detail and checked against the data. If further coding or enrichment of categories don't seem to promise any new insights into the topic theoretical saturation occurs and the process of coding finally ends (Flick, 2010). How this described process steps in data analysis has been applied as a procedure in the content analysis of the current research project is shown in figure 16 in detail.

Applied approach to the content analysis

Rather than being a single method, current literature of content analysis show different approaches and there is no single way or best approach in the context of this research.

The focus group discussion was based on open-ended questions, which are rather aimed to stimulate the discussion rather than to frame the discussion. The overall approach could be characterized as explorative, because it was intended to find out whether and which influencing factors are relevant in this research context. During the literature review, different influencing factors have been already revealed and also an approach how to group them had been already developed. Hence, the content analysis includes also a confirmatory approach and since it was the intention to find out about the most relevant factors, at the end the qualitative approach involves a quantitative aspect, too.

To discover influencing factors, which have not been considered yet, a qualitative conventional content analysis was selected for data interpretation. An open coding approach was adopted. Influencing factors had already been revealed during the literature review, as well as other constructs of an initial framework. The result of the summarizing content analysis in form of in-vivo and constructed codes could therefore be categorized directly and set into the context of the literature review. Drawing on this knowledge there was no further need for axial coding and selective coding.

This is in line with Flick (2010), who highlights that in general, the process of text interpretation begins with open coding, whereas the need for axial and selective coding emerges during the procedure. With respect to this part of the content analysis elements of a directed approach have been adopted.

Summarized the content analysis contained the following stages, which are widely accepted (sources are attached in brackets):

- Data reading in order to achieve immersion and obtain a sense of the whole (Tesch, 1990);
- Data reading in order to derive codes by highlighting the exact words (Morgan, 1993; Miles and Huberman, 1994; Morse and Field, 1995);
- Making of notes of (researcher's) first impressions, thoughts, and initial analysis;
- Paraphrasing the text and skipping less relevant passages and paraphrases with the same meaning (1st reduction). And grouping similar paraphrases and summarizing (2nd reduction) the text to a higher level of abstraction (Flick, 2010).
- Sorting of codes into various categories (i.e. meaningful clusters) based on how different codes are related and linked; and clarifying unclear, diffuse or ambiguous passages (Flick, 2010)
- Organization of a larger number of categories into a smaller number of categories (Hsieh and Shannon, 2005)
- The development of definitions for each category, subcategory and code and identification of the relationship between categories and other eventually other constructs (Morse and Field, 1995).

In the 'data reading' phase, the recorded material was observed. Initially, the audio recordings were examined and transcribed. After having examined and added contextual information from the notes, the focus was shifted again to the audio records of the focus group discussion. Since the first reduction as part of the summarizing content analysis had already been performed during the transcription process, the analysis continued with the next steps, the translation followed by the grouping and summarizing of similar paraphrases. After this first familiarization with the text, the main task was to translate the key ideas into more abstract concepts, which became the labels for the underlying phenomena in the text. This process is known as open coding – the categories are allowed to emerge from the detailed analysis of the text. As far as the phenomena could be linked to existing concepts from the literature review they were grouped to already identified categories.

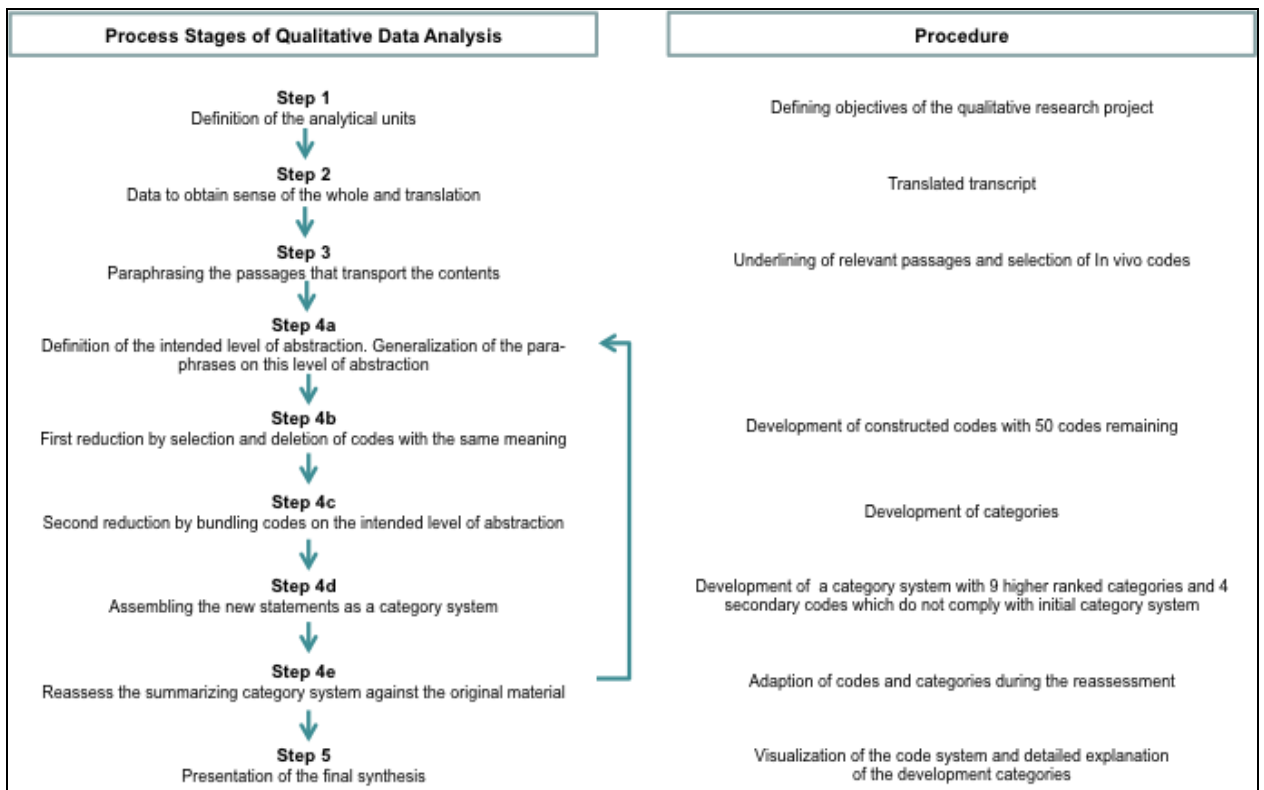


Figure 16: Stages and associated procedures of the content analysis

The content analysis was performed after the translation. In order to receive an intended level of abstraction, the steps 4a to 4e can be characterized as iteration loops. The intended level of abstraction was reached when the code could be linked to identified factors with respect to the described concepts from the literature review.

Coding scheme

The coding scheme was adapted from the identified concepts, which have been described in the literature review. Particularly the grouping of influencing factors as shown in table 5 guided an initial scheme. For the purpose of better understanding, the codes in the content analysis were coloured differently, which can be understood as a visual clustering of the different paraphrases (Vignali et al., 2003). Where statements, questions or answers are related to phenomena emerging as new or not considered as relevant yet, they were coloured red. Statements, questions and answers related to already described and as relevant accepted categories were coloured according to a specific scheme, which is shown in figure 17.

Shades of green colour e.g. will be used only to identify code related to company-specific (internal) factors, such as physical capital or human capital. The parts of the

transcript, which confirm propositions associated to an environmental context such as market and competition will be highlighted in shades of grey. For phrases concerning the evaluation of firm's products and services in the context of having an influence or reflecting an advantage, the colour turquoise is used. Keywords for the analysis of correlations between the strategy and the business result will be bolded. An overview of the different colours used to highlight and categorize the code is given after an example of the transcript, which shows an extract of coded phrases for a better understanding.

N1: ...As a device manufacturer, it is easy to get (revenues) from the service (budget). **When a company is leading (product and market position) and the customer gets good service, they have good cards selling new devices.** ... If the performance of a dealer was bad, "P" gets the early response and warning through the (own) service channel. That is why it was and is important for "P" to keep the service in its own hands.

N3: Perhaps this leads to the **general aspect and question regarding cooperations.** A medium-sized company in the medical technology sector can hardly afford to have own companies all over the world. For such SMEs a separate organization is too expensive; Companies like "P" and "O" can afford this.

NN: What are the advantages and disadvantages of SMEs versus large global companies?

N4: There is a difference between a trading company, whether big or small, and a manufacturer. Service for Surgical instruments service is different than for x-ray equipment. ... For "Z" service was extremely **important, but at least to be able to focus on service and at the same time focus on other improvements** e.g. if you have quality problems. With a growth out of product sales alone, you cannot grow out of the problem, this is the wrong strategy.

Figure 17 shows the coding scheme. Codes which could be linked to existing categories from the literature review are named accordingly, categories for new codes are developed in a next step and initially marked in red.

Market potential	Com- petition	Medical regulations	Product competitiveness	Product innovation	Product quality	Physical & human capital	Management skills	International experience	New codes
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Figure 17: Coding scheme and associated colours

Explaining interpretation and meaning

For a better understanding, an extract of the content from of the translated transcript with respect to its meaning and interpretation is shown in the following passages.

Key words and coloured codes show the development of the categories, explained by comments and some detailed contextual descriptions. Since not all text and codes of the transcript can be shown in this section, the analyzed and coded transcript is called secondary transcript and can be found as an attachment to the appendix.

NN: What is your experience as subject matter expert from the SME sector, or if meanwhile company has grown to a bigger player or you have another role may be in a larger MNE, what knowledge would you contribute in retrospective? What is the role of external factors such as market, competition, etc. and internal factors such as HR, employees, organization, processes, etc.?

N1: "Z" was direct competitor to "P" at the time. Two (other) competitors had catapulted directly from the market because they underestimated the FDA. Important factor is the Regulatory, such as FDA. The **Regulatory** has great influence.

...

N1: You have mentioned FDA, whoever is involved in the international market can not only count on highly profitable and more sales, he also needs to **know what this means (in terms of efforts) for his the quality system**. Many of them fail; others say I do not go with it and retreat (from this market).

N3: An important point and we have many projects with SMEs and also with MNEs ...that **quality systems impose on you when you want to operate internationally are immense**. ...Key point: Medium-sized companies have jump fixes in costs. **You have to buy people who have know-how who have knowledge about markets**, licensing, etc. When you think about success factors, and from your own experience out of projects, **cooperation and networks are important**. If you act as a medium-sized company and think as fast an flexible as an SME (should), it is an important and crucial point to cooperate so that you can reduce costs!

...

The regulatory impact has been highlighted at first, because some of the respondents experienced the exclusion of single products or complete product lines from the US market since they were inhibited from selling and/or using due to violating medical regulations. This seemed to be an existential experience. Further implications of medical regulations on a company, its structure and consequently its necessary efforts are developing in the discussion. Thus, medical regulations are evaluated as an important influencing factor and confirmed as initial categorization. The discussion spans from related efforts to main cost drivers and their specific impact on SMEs. Other aspects such as having experience, affording resources and cooperating in networks emerge or the first time as respondent's experience in the internationalisation of SMEs.

Some of them could be recognized as already identified during the literature review.

...

N4: ... I believe the success factor to build a sales in the international context is very simple, not to say, is in any case much easier than a **Service & operation** to build up. This could be that this (service & operations) **is the essential success** factor. The brand can bring the sales forward, but at the latest after one year - the quality - if one can no longer supply spare parts and has to form hubs, these are enormous lead costs...

N2: ... If you want companies **to grow and especially grow in the US, you have to invest** Sales force, Service, Distributors. We made the mistake because we said we tried to approach the whole country (not several key areas). We paid a lot of money in distributors, service providers, and at the end we were then forced to step back because the service was performing, we did it (to internationalize in the US) twice because **without (good)service you can't generate follow-up sells.**

N1: If one wants to operate service profitably, one must be **appropriately organized, also regionally, but then again also sustainably.** This is a challenge for all, but especially for the mid-sized companies. Large companies, such as "P" and "G", can take advantage of other possibilities (resources) and structures (when making business in large overseas markets).

...

N5: Important is the issue of **processes related to international growth.** Important for us was and is, first to make processes IT-supported...

In this passage, as well as in the following passages the importance of service is highlighted. This is due to the reason, that developing and providing products and services are the main elements in the business model of German MedTech SMEs. Good products are a nucleus for successful international ventures, which has been highlighted before (Wintermantel, 2009; Martin, 2005). It is widely agreed that particularly for high-tech products, which are in need of explanation and intended to be fail-safe, service is crucial. In the discussion the perception is developed, that good products and services must be related to good processes in order to perform such activities. The word 'process' in the context of internationalisation is named the first time and will be developed further in the discussion as an important factor.

...

N6: Export is a very small part of our business and is reduced to our small production and development department in Wedel. **But we can note that regulatory requirements are a very critical area.** I reduce this now to our sales, where we are not only manufacturers, but make trade and are service partners I reduce this now to our trade (distributor) business; In the clinical sector, it is difficult for us. We **need to have service to secure new business,** and as a value-added sales force,

we need to be able to generate service out of the investment goods sector, which is in opposite to the trading and spare part and replacement business. Only from the service (revenues) we could not live.

N1: ...As a device manufacturer, **it is easy to get (revenues)** from the service (budget). **When a company is leading (product and market position) and the customer gets good service, they have good cards selling new devices.** ... If the performance of a dealer was bad, "P" gets the early response and warning through the (own) service channel. That is why it was and is important for "P" to keep the service in its own hands.

N3: Perhaps this leads to the **general aspect and question regarding cooperations**. A medium-sized company in the medical technology sector can hardly afford to have own companies all over the world. For such SMEs a separate organization is too expensive; Companies like "P" and "O" can afford this.

NN: What are the advantages and disadvantages of SMEs versus large global companies?

...

In this passage, a new aspect is developed on the idea that particularly SMEs have a lack of resources to provide good services worldwide. The aspect of whether the market enables any form of cooperation is identified as an antecedent as well as the capability to develop and maintain relationships in order to foster beneficial cooperations with foreign partners.

N4: There is a difference between a trading company, whether big or small, and a manufacturer. Service for Surgical instruments service is different than for x-ray equipment. ... For "Z" service was extremely **important, but at least to be able to focus on service and at the same time focus on other improvements** e.g. if you have quality problems. With a growth out of product sales alone, you cannot grow out of the problem, this is the wrong strategy.

N1: What is different for the customer is in the service. I do not make a mistake when I buy from "G" because they are too big in the American market (to afford bad service quality). **If I do not get good services I will switch to another company.**

N7: Another Example: Three companies in the internationalisation process. Two leading German companies from the Stuttgart region were sold. Internationalisation reversed: Chinese have smelled blood on the German mid-sized companies. ... In Asia native SMEs are also more than good! Try to set up a collaboration! **Appraisals about German mid-sized medical companies go hand in hand with their solid product and processes, but how to handle with so-called "crooks from the far east"?** What role do cultural aspects play, and what does the mean for the resource "employee" in a medium-sized company?

NN: Continuing with and reconciling again to advantages and disadvantages of the middle class of medical technology against large enterprises of the medical technology!

N8...What are our success stories regards entering the market on their own or together with a large company?!? **Culture is also a great success factor.** We can leave culture for the moment, but is a big factor! **Quality, product portfolio ... service, product solutions**! How do they integrate their customers into product development? ... We are developing on a new level, we can not only look at the old stage and continue linearly. There's more to it! .. if we have more cognition, we can also develop other organizational models of the future, or those that are better suited to a new

environment... companies on the next evolutionary stage of the organizational model as postmodern pluralistic companies. **They are companies that operate on the basis of culture**, which have different values that involve each individual in the organization. This does not work for large companies (which might be an advantage for SMEs also in the context of internationalisation)

The cultural aspect arises in the discussion, it will be highlighted by many of the respondents. In addition to cooperation, culture is added as a second new category. Besides the cultural aspect, product-related aspects such as quality and innovation are identified to have a strong influence, which is in line with the findings of the literature review.

...

N3: We have a similar situation .. two players: the star-ups and companies that have a **structure to drive innovation** forward. Here we have the race for resources. It was already stated, (that) Capital was a limiting factor. Money is not an issue at many start-ups, because they are flooded with it. But the resource **"time" is a limiting factor**. Who is faster?. SMEs are always faster and more innovative, and have the culture of innovation ...I and do not think in regulatory affairs and standard processes, which can also hinder the ability to innovate. But: One cannot be (successful) without the other. If I want to internationalize, **I have to think a bit further in this direction of standardization and service, otherwise it does not work.**

N4:Perhaps there is a formula for this? That would be the question! The formula is: **What size is necessary to manage globalization** in this context? ... Boston Consulting (BC Matrix Market Growth and Reliable Market Success) says: There are 6 **Success Factors, One of which is Operational Excellence**. This is important in the medical technology sector. Operational excellence cannot be achieved by small and mid-sized companies

N5: But **Innovations** are no longer dominated by... You can **find (small sub) manufacturers** of various kinds (who supply the innovative modules).

N2: I would like to have a look towards IT and human interface and the (device in its)application. "z" was the **first company which had smartphone technology integrated** (in its medical devices)

It's the question with high-tech machines, how can I operate them (easily and intuitively)!?! You do not always have to think about tangibles and hardware. An important topic today is also the connectivity, the software that is in products. Is it really a domain of operational excellence?

...

Based on the concept of innovation theoretical considerations are leading to the organizational aspects of processes and the results which should be achieved by adapting them as standard procedures and routines. The term operational excellence is introduced that also seems to have an impact on successful internationalisation, whereas there is developing a discourse whether SMEs can reach a level of operational excellence which is competitive in foreign markets due to

resource limitations. Hence, resources are confirmed to be crucial for SMEs, operational excellence is added as a third new category.

...

N2: The home market was stable. Market growth was in China and the USA. One of the key factors for the growth (in the US) **was finding the right sales partner.**

This resulted from the weakness of "G", when they decided to make the sales on themselves and not through distributors. We had one (of the now obsolete distributors) who knew the market, the customer and the technology and this was the key success factor for sales.

N4: My perception the last 5 years. Against "Z" as a German market leader, "P" had no chance! "P" had resigned. "P", if clever and strategic, "P" **would have bought the distributors** away. Difficult market, ...

N2: Just a remark on the aspect where we compare large and medium-sized businesses regards the advantages and disadvantages. **In the end "Z" was in the niche, it was the compulsion to excellence and specialization and here is the advantage of the middle-class SMEs can focus more strongly.**

N9: There are several points to me when you work in a global organization for a long time: ... We have very often discussed **what is a success of "Z". Why "Z" expanded the portfolio not only up but also down? "P" has a wide product range. "Z" was forced to survive with their product.** .. Advantages and disadvantages of SMEs: **the decision-making process is shorter. .. it is and has always been a critical issue, then it was financing and capital,** the bank! ..

N2: I try to be open: **We have tapped and tapped the banks to borrow money...**

N8: I think, when we talk about the chances of German SMEs, as far as internationalisation is concerned, especially in the field of medical technology, or when it comes to **technically demanding products**, "Brand Engineered" attracts international customers. **There are many "hidden champions" who are very specialized** and sell internationally. Specialization counts! Precisely the perception of the solid German middle class is already good and that is a strength...

Several aspects are recaptured, from a competitive point of view product features and market needs are discussed and the aspect of being able to design competitive products is developed in the context of SMEs versus NMEs on the example of different competing companies. Competitive products are highlighted as an important antecedent for firm's international success as well as resources.

...

N4: **German quality work is when you do everything yourself!** If you depend on distributors, this is the case. Quality control and manufacturing etc., then it gets a different dimension.

...

N4: ... **How much culture, American, Chinese, German do you need?** How to control do you need over the management layers? How much culture do you need here? How much can you control

yourself? ..., the German middle class, like most **German companies, are defined by the quality of technology and engineering.**

NN: What is your opinion and experience regarding HR and culture?

N5: *The main difference is growth and internationalisation. When I internationalize, I must grow as I grow in the country. If I am bigger I may have a better quality. As a big company, I usually get the better quality. **Then comes the question of culture.** It is important to transform the quality of the enterprise in internationality, i.e. into a country culture and inter-culturalism. ..*

N6: *Own experience: Culture and number of employees play a certain role in a company, sometimes even a big role. And it is surprising how you can still be culturally different after 5 years, with such small groups. The identification with the company is extremely dependent on the owners. **When other countries, other cultures come together, ..., this is a giant ramp to organize this internationally.** It is a huge challenge, regardless of the product. It is a great, a **tremendous management task to solve this sensibly.***

...

N3: *This international mind-set, which you need to go international, certainly depends heavily on how many nations and cultural areas you have in the company. The core of a medium-sized company is not international, but very regional. Making the leap internationally also means becoming very international in the mind set. A company, which is lucky enough to be internationally established due to its size, is quite different. **This has to do with the ability to absorb cultural differences and work with them.***

N2: **I can confirm this,** it is not easy to transport that ...

Quality and cultural aspects are repeated and confirmed. Culture as a phenomenon is sharpened by the role of capabilities in order to manage cultural differences. From an organizational point of view, they have to be acknowledged. Then, the role of management comes up in this context. From a managerial point of view, leadership is seen as crucial to enable internationalisation in the context of different cultures and consequential challenges.

Hence, quality products as a base for foreign ventures as well as the role of management are confirmed as important factors.

N5: *... In the US, a new strategy is being considered, a new sales strategy is on the way. Germany is getting this marketing strategy as an experimental country. Large companies are making more capital for "trial and error" in order to endure this. Most times it did not work for the first time, then it was adjusted. Reversal for us SMEs: To approach the market differently, to roll up the sleeves more pragmatically. Not the mind-set: What to say, from the big up there, but to say: **Now I have my Mind Set and look after, how does the market look, how does the medical technology market look at all. Can I produce it there as well..***

It depends on the management team and the people.

N10: **...It depends on the management team and the people.** Courage, courage and leadership, as well as the corresponding organizational structures, are needed. The international setting is extremely

important, also allowing different meanings. "I had the local office in Schwabenland and it was not easy for the German people to accept again and again any change.

...

N4: ...if one does not see the differences in the countries, one will not gain a foothold with German innovation in India, nor in the USA. Previously, innovation was all that is true today! Innovation is becoming more and more expensive. It is also a medium-sized business to think globally. What is this market: What is a feature worth with a certain value proposition in a local market!?! What is a value proposition for the medical professional, for the respective health system, etc. worth it? If you cannot answer this...

N9: I can only agree! We were at "G" World Champions to produce things that no one wanted to have. What you said earlier, however, is that quality and innovation do not matter, so I can also go with them in this context, in part also for medical technology. We have always looked at the markets in which these companies are on the road...

N1: ...Knowledge of the health systems is necessary and it is important to determine this in advance, because the financing varies greatly from country to country. It is important to know which financing models, DRGs exist. These are very different from country to country. You can have the best technique but fail because the gameplay is very different in terms of financing. This is why it is important: What financing models are available in different countries?

N8: Great point! There are roughly three different financing systems. The privately financed system, as in the USA., the state-funded system, as in GB (NHS), and the mixed form, the social insurance and privately financed system, as in Germany. This benefits medium-sized companies to insist on such markets. A driver is the topic of integration. The topic of integration (integrated care/value based care) does not work well in Germany, but well in other countries. We're trying to take a look. Here is the niche for the SME's. What makes a lot of sense for a SME, in which niche I can enter, which tactic is beneficial for me.

The discussion is developing towards foreign market potential and how managers, who have knowledge, experience and cultural understanding can drive its development. Particularly management skills and experience with regards to country and industry-specific knowledge is addressed as crucial due to SME's resource situation.

NN: Question: Which capabilities does a leader need to bring in? Which "raw material" must be a leader of a medium-sized company in medical technology? What does a leadership role need to bring to internationalisation?

N9: ... To know: How do systems work! What is important to my customer. What do I have for a lobby organization? One must have standing and the cultural, intercultural aspect is extremely important.

N1: How do you manage at all? The means of communication are different (visual communication is another type of management). Large companies are decentralized. If an SME expands, you cannot always go on the spot. You cannot see the others reactions, or the body language, you must develop as a leader the capacity of understanding, and this also in the context of the other culture.

N5: Important is how you think! There's a lot going on the visual! You need good empathy in the other culture. My experience, when I give German, Swedish, Indian, Brazilian engineers together a task, does not come out much. There are nationalisms, since everyone fights for his location, wants and

has to assert himself and be responsible. *It is important to use the strengths of the respective nation, example of the Indian SW developers. Clear interface definition is important*

N3: *Leadership in different cultures is different in every country. This makes it difficult for the management. One must understand how to tick the others to achieve common goals*

N5: *Project management, software development. You think you talk about the same standard. Over morning finished, same terms and yet the international colleagues, Indians, have completely different pictures in mind English is the conversation language and, you think, you have understood it! However: You already realize how difficult it is in your own culture. It is already difficult to communicate with one's own culture...*

At the end, management is considered in a broader approach. Managers have to fulfill their leadership role as well as their role towards developing an adequate strategy in the context of internationalisation and organize its execution in the daily business. Thus, the importance of management as a valuable resource and in the context of knowledge is highlighted and confirmed.

Summarized, valuable new aspects emerged out of this content analysis. Some codes were used only by some of the participants, whereas others were mentioned by all of them. New categories could be identified. The results are analysed in the next chapter.

5.10 Results of the content analysis from the transcripts

As an intended result of the focus group discussion already identified influencing factors from the literature review, that are evaluated as important also in this research context, ought to be confirmed and other influencing factors or relevant concepts should be discovered and developed.

Different new aspects emerged by and through the discussion. Participants' references, which did not match with the existing coding scheme and which were identified as relevant, were coded in red, paraphrased and bundled to a higher level of abstraction. This leads to 3 new categories.

These new categories, finally named as operational excellence, cooperation and culture were identified as crucial and consequently will be respected and integrated into the existing concepts. Table 11 shows participants' nominations regarding these new developed categories.

	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10
New categories		Cooperation	Cooperation	Cooperation						
	Processes	Processes			Processes					
		Culture	Culture	Culture	Culture	Culture	Culture	Culture	Culture	Culture
				Operational excellence				Operational excellence		

Table 10: Participants’ references coded as new aspects leading to new categories

In total, a lot of different aspects in the context of SME’s internationalisation have been mentioned and recognized as specific from the view of the participating managers working in the MedTech industry. Many of the codes address aspects that have already been highlighted before or can be grouped under the umbrella of the initial concept ‘influencing factors’. This has been developed and explained in the literature review and therefore categories have been predefined and representing influencing factors have been proposed.

But some of the influencing factors and categories, known from the literature and considered as important, were mentioned less frequently. Table 12 provides an evaluation with respect to the degree participants agree or do not agree with the findings from the literature review. The predefined categories, which reflect important influencing factors from the literature review, are marked with different colours according to the scheme of the content analysis. The participants are named with the letter N1 to N10 in order to respect their anonymity. The cross reflected by the letter ‘x’ gives evidence, which participant evaluated an influencing factor grouped under the predefined category as shown as important. In case that phrases coded in the same colour and therefore belonging to the same category is mentioned more than one time, the cross is highlighted in form of a bolded capital ‘X’.

predefined categories	Market potential	Competition	Medical regulations	Product competitiveness	Product innovation	Product quality	Physical & human capital	Management skills	International experience
N1	x		x	x			x	x	x
N2			x	x	x		x		
N3			x		x		x		x
N4				x	x	x	x		
N5	x				x				x
N6			x	x				x	
N7						x			
N8	x				x	x	x		
N9	x			x			x		
N10								x	

Table 11: Evaluation of the predefined categories

The evaluation of the content analysis, as summarized in table 11, tends to result in:

- That 4 out of 10 participants (40%) confirmed market potential as well as medical regulations as an important external factor with respect to firm's internationalisation strategy.
- That 5 out of 10 participants (50%) confirmed product competitiveness as well as product innovation as important product-related factors factor influencing firm's internationalisation strategy, whereas quality as a factor was confirmed by 30% of participants.
- That 6 out of 10 participants (60%) confirmed physical resources such as capital as well as human resources as an important internal firm-specific factor.
- That management skills and experience are confirmed as an internal firm specific factor by 30% of the participants, whereas nobody mentioned competition as an influencing factor with high importance regards firm's internationalisation.
- Cooperations and processes have emerged as frequently named antecedents named by 30% of the participants.
- Operational excellence in the context of processes has been identified to have an impact on the success of international ventures.
- Cultural aspects have been named by 9 out of 10 participants (90%) as crucial in the context of firm's internationalisation.

5.11 Discussion of the results

In the literature review competition was identified as an important influencing factor with regards to strategy, since it is a central variable in economy (Porter, 1980). But competition can also be seen as one existing force besides others, which is inherent when companies act in domestic or foreign markets. Maybe this is a reason why most of the participants did not highlight the role of competition in this research context. The general characteristic of competition is perceived as a matter of course that is always present. This is in line with many theories in economic research, which often see competition as constant (Barney, 1986).

Some more specific characteristics of competition are investigated in the empirical research as the relations of competition with respect e.g. to specific products or competing companies. According to Cavusgil et al. (1994), the competitiveness of the product often depends on the technology intensiveness and intensity of price competition and product characteristics can affect competitive advantage. According to Murray et al. (2010), a firm can create a competitive advantage by taking appropriate strategic actions and consequently achieves higher performance than its competitors (Murray et al., 2010). These specific characteristics of competition have been taken into account in the constructs of product-specific influencing factors and competitive advantage.

Thus competition as an external industry-specific factor is replaced by the newly emerged category which is named cooperation. This is in line with the findings from the literature review, where Mathew (2001) describes the importance on the development of leveraging SME's capabilities by cooperations and Johanson and Vahlne (2009) highlight the importance of networking and cooperations in their enhanced internationalisation theory, which is based on the investigation of MedTec SMEs.

'Processes' has been derived as a new category from the content analysis, too. According to Murray et al. (2010) resources are combined and transformed into value offerings, resulting in firms' competitive advantages, by organizational processes. Dosi et al. (2000) indicate that knowledge is embedded in an organization's routines and standard operating procedures, in its products and processes. Thus processes can be considered as an additional important influencing

factor among the other selected internal firm-specific factors.

Their differentiation between management skills and experience has been turned out to be blurred during the content analysis. It has been highlighted by the participants of the focus group discussion that both, experience and management have an impact on firm's strategy. It has also been addressed in the literature review that management has a leading role in term of strategy development, execution and decision making particularly in SMEs (Scharrer, 2001). According to Geyer and Uriep (2012) the lack of experience within the decision making team is a barrier to their internationalisation. Katsikeas et al. (2006) see competitive advantage linked to specific competencies and capabilities in a managerial context. Martin (2005) addresses the complexity of decision-making processes in SMEs with respect to their specific outcome in terms of their implemented business strategy. There is a close interrelation of skills experience in the context of achieving competitive advantage in international ventures and therefore both aspects are combined under the term of 'qualified management' in this further research.

According to this framework, competitive advantage can be gained by the utilization of superior skills and resources. The content analysis confirmed the importance of resources also in this specific research context. The importance of processes as an intangible resource has already been addressed. The so-called category of 'physical and human capital' has been confirmed, too. In order to condense and distinguish it better from the processes it is renamed as physical resources, representing various kinds of tangible resources such as capital or employees.

Researchers agree that capabilities are crucial to the firm's success in competing in both domestic and international markets. Dosi et al. (2000) have stressed that capabilities enable a firm to perform value-creating tasks effectively, and they can be found in organizational processes and routines that are difficult to replicate. This is closely related to the meaning of operational excellence, which has its focus on meeting customer expectation, all while stressing the application of a variety of principles, systems, and tools towards the sustainable improvement of key performance metrics (Ackroyd et al., 2005). The impact on the success of international ventures is confirmed by the experience of the practitioners during the focus group discussion. The newly emerged category of 'operational excellence' is adopted in the concept of 'organizational capabilities' as subconstruct.

The third aspect that emerged during the focus group discussion was captured under a new category, named culture. It was considered as important by the majority of the participants. The meaning of this topic is understood in the sense of to know and to accept cultural differences and how to handle with these facts in an international managerial context. Cultural aspects have been already discussed in the literature review. The theory of cross-cultural communication (Hofstede, 1980) justifies the relevance of cultural differences in the context of international business. Thus, cultural competence is a further specific aspect for firm's internationalisation, which is adopted in the construct organizational capabilities as a next second-order construct. Based on the described adoptions and adjustments figure 18 shows the most important influencing factors based on the number of nominations, which were addressed by the participants of the focus group event with respect to this specific research context.

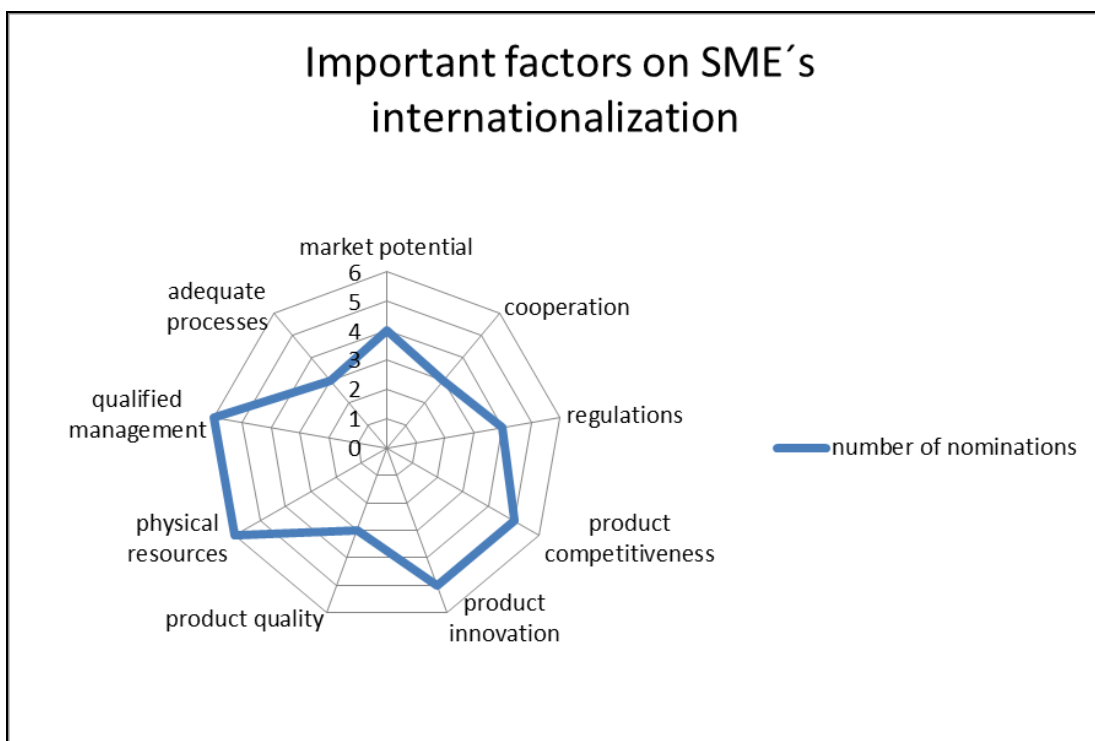


Figure 18: Most important factors - evaluated result of the focus group discussion

The figure shows that not all factors scored the same number of nominations. It is obvious that factors such as resources or qualified management were ranked higher as e.g. factors such as product quality or adequate processes. There was a broad agreement in the group that all factors, which have been discussed, have a significant impact. As a result of the discussion, some seem to be more crucial than

others. All factors that have been finally adopted and newly grouped are based on a score of at least 30% of the participants.

Nevertheless, it is surprising that e.g. particularly the role of product quality is ranked lower than expected from the outcome of the literature review. One explanation might be that some factors, which were mentioned once or twice, might be assumed as a matter of course and therefore not considered to be necessarily highlighted again.

However, it was not the intention to perform a statistical evaluation of the internal ranking of such factors. The purpose was to select and confirm a group of important factors in order to develop and refine the conceptual model.

5.12 Adoption of factors and adaption of the model

As a final result of the analysis and evaluation, many of the identified factors from the literature review could be confirmed as being significant. Some factors, which have been considered as less important by the participants, were replaced by new factors. These new factors have been integrated and the initial framework was adapted. The factor “processes” was adopted as a firm-specific resource factor, whereas the factor “cooperation” was adopted as an external industry specific factor. Figure 20 shows as a result of the focus group discussion and the following content analysis, the adapted itemization of the influencing factors, which have been grouped as described in section 3.6. named firm, market and industry-specific.

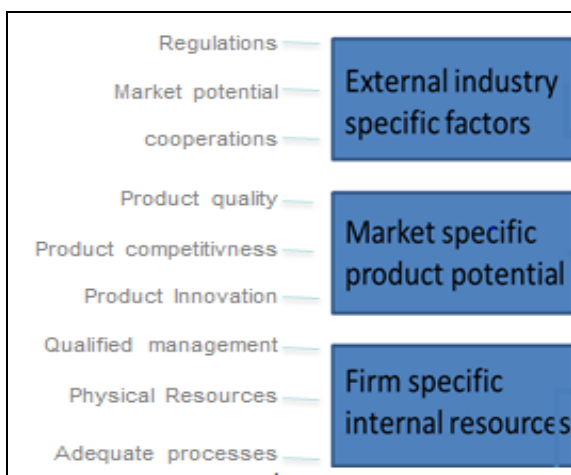


Figure 19: Modified construct – itemized influencing factors

Furthermore, also the impact of specific internal capabilities, as elaborated in section 3.8 was confirmed. The factor ‘cultural competence’ had high nominations and therefore has been adapted as moderating variable in the sub-construct ‘relationship capabilities’. The factor ‘operational excellence’ was named also as an important factor and has been adapted in the sub-construct ‘organizational learning capabilities’.

Specific internal capabilities		
Organizational learning capabilities:	Relationship capabilities:	Coordination mechanism:
commitment to learning	long term relationship	cooperation
shared vision	cultural competence	common work orientated goal
operational excellence	partner involvement	communication

Figure 20: Result of the focus group – itemisation of specific internal capabilities

Cultural aspects in the context of internationalisation have been identified and discussed during the literature review. It was expected that the cultural phenomenon is not industry or SME specific and therefore it was initially not included. As a result of the focus group discussion this was corrected and the concept of relationship capabilities is now respecting the cultural impact on international ventures.

Summarized, the findings of the qualitative research result in the adoption of factors and consequently the adaption of the initial framework. It was the intention to sharpen the results of the literature review, particularly where the need for further investigation had been already addressed, and consequently the framework could be modified. Knowledge from industry insiders and management practitioners enabled to select the most important influencing factors on firm’s strategy in the specific research context and to refine the concept of specific organizational capabilities as well.

5.13 Chapter summary

In order to adapt reliability and validity in this qualitative research a set of different criteria has been defined at the beginning that are reflected in its different steps.

After a short introduction in the theoretical foundations of a focus group method the practical organization of the focus group discussion is described. The intended sampling of high-class participants has been experienced as challenging but also as crucial for the outcome of the research.

The transcription and the analysis of the content were explained in detail in order to provide a maximum of transparency and the conclusions were finally discussed and illustrated. As a result the initial conceptual model could be widely confirmed, but also new key mechanisms were identified.

Thus, the qualitative approach contributed valuable knowledge with respect to the itemization of the variables, which were adapted and modified accordingly.

Table 12 shows the entire development of the concepts and the model. This modified framework is now the base for the following quantitative approach.

	Developing an initial framework	Further development	Completion of the framework	Modification of the framework
Additional constructs	Industry & country specific factors, Strategy, Organizational capabilities	International ventures Competitive advantage	External industry-specific factors Market-specific product potential Firm-specific internal resources	none
Hypothesis	Hi1, Hi2, Hi3	–	–	-
Additional variables	Not defined yet	Innovation, Resources Medical regulations Quality Customization	Market potential Competition Management skills Experience Customization Competitiveness Differentiation Unit Cost & price, Channel margins, Various descriptive variables	Competition Qualified management Cooperations Adequate processes Organizational learning Steering capabilities Relationship capabilities
Identified key mechanism	Specific factors have influence on internationalisation which differ with	Internationalisation of MedTech SMEs is a consequence and may be a	Specific antecedents and factors influence firm's strategy	Developing and maintaining international co-operations based

	respect to industry sectors and firm size	chance but require specific antecedents	approach. This is moderated by specific organisational capabilities, which have an impacts also on the success of international ventures and therefore on the achievement of competitive advantage	on cultural understanding and developing and steering an organization by organizational learning towards operational excellence
Source or key authors	Practitioner's experience	Wintermantel(2009) Spectaris (2015) Kramer (2012)	Chatterji (2009) Murray (2010) Leonidou (2011) Johanson & Mattson (1984) Johanson & Vahlne (1977) Porter (1980) Julien (2003) Murray (2010) Cavusgil (1994) Lages (2009) Geyer (2012) Williamson (1990) Mitchell (1992) Barnes (2007)	Focus group discussion

Table 12: Modification of the initial framework

CHAPTER 6: QUANTITATIVE RESEARCH – internet-survey

6.1 Chapter introduction

The aim of this chapter is to develop a conceptual model for the internationalisation of German MedTech SMEs, with respect to influencing factors, the impact of strategy and the role of specific organisational capabilities in this context. Therefore the hypotheses, which have been developed in the previous chapters with a maximum level of confidence, will either be confirmed or rejected. Several criteria have to be fulfilled to finally meet this objective. In order to test the hypotheses, the conceptual model should be based on a sufficiently large and representative sample of the target group and a valid operationalisation and measurement of the chosen concepts in the form of a questionnaire (Planing, 2014). For a comprehensive analysis of the data captured from the survey results as well for the use of statistical test usually valid descriptive scales are processed which are suitable for the research but do not bias the results in any path.

Thus, the available methods for data collection and appropriate sampling methods will be discussed in the first step. Next, items and scales will be developed in order to operationalise the research hypotheses and to construct a research questionnaire, which is consequently administered to a representative sample of the target population. The resulting data will be interpreted by applying appropriate statistical tests and procedures in order to arrive at a conceptual model. Finally, in this chapter the survey findings are presented and interpreted. One purpose of conducting the survey was to test several findings revealed in the qualitative stage of empirical research on a larger sample. Furthermore, the survey provided an opportunity to test the potential influence of various descriptive variables (e.g. firm size, medical product class, international experience, etc.) on firm's strategic approach towards internationalisation, which have not been obvious from the qualitative stage of this research up to now.

6.2 Decision on a survey as a quantitative method

Every research study faces certain limitations and therefore the determination of limits is necessary in order to identify potential weaknesses of the study (Creswell, 2008). Due to their context, some limitations are research methodology related, while others are caused by research topic specifics and research stage specifics. Every research method has certain limitations due to its nature, with no exception (Trochim and Donnelly, 2007). Qualitative research methods are usually criticized for their 'subjective nature and absence of facts' (Malterud, 2001, p. 483).

Furthermore, qualitative research is very detailed and time-consuming and is unlikely that other researchers would be willing to replicate it (Zalan and Lewis, 2004). Hence generalizability is often limited and findings are sometimes only applicable in the context where they have been obtained.

On the other hand, quantitative research is considered much less subjective but not an appropriate method for explorative research (Creswell, 2008). In order to minimize limitation effects related to research methodology, both qualitative and quantitative research methods are applied.

A survey is a common method in quantitative research (Bryman and Bell, 2007). Many of the researchers, whose findings have been discussed during the literature review had organized a mail survey. It is characterized by a questionnaire, distributed in a postage-paid return envelope and included in the mailing package. Often several hundred firms in the appropriate industry sector are randomly selected from a directory provided e.g. by the chamber of commerce or databases from federal bureaus of statistic. With the help of the returned answers a body of quantitative data is collected and in connection with the coded variables the answers from the questionnaires are prepared for further statistical analysis (Saunders et al., 2009).

Although questionnaires are often used in quantitative research, they have their limitations with respect to exploratory or other research that requires large numbers of open-ended questions. They work best with standardised questions that will be interpreted the same way by all respondents (Robson 2002).

Questionnaires therefore tend to be used for descriptive or explanatory research.

Descriptive research, such as questionnaires of organisational practices, identifies and describes the variability in different phenomena.

In contrast, explanatory research examines and explains relationships between variables. These two purposes have different research design requirements (Gill and Johnson, 2002). It differs according to how the questionnaire is administered and to the amount of contact, which is needed with the respondents. Self-administered questionnaires are usually completed by the respondents and often administered electronically using the Internet (Intranet-/Internet-mediated questionnaires). In contrast, questionnaires posted to respondents who return them by post after completion (postal or mail questionnaires), or delivered by hand to each respondent and collected later (delivery and collection questionnaires) have to be administered and the data has to be entered in a database.

There is also the possibility to record interviewer-administered questionnaires by an interviewer on the basis of each respondent's answers. Questionnaires administered using the telephone are known as telephone questionnaires and refer to those questionnaires where interviewers physically meet respondents and ask the questions face to face (Saunders et al., 2009).

The choice of questionnaire will be influenced by a variety of factors related to the characteristics of the respondents, the importance of reaching a particular person as respondents, the size of sample required for analysis, and therefore the likely response rate, number of questions you need to ask to collect your data and many more. Table 13 gives an overview regarding these different aspects influencing the researcher's choice.

Attribute	Internet- and intranetmediated	Postal	Delivery and collection	Telephone
Confidence that right person has responded	High if using email	Low	Low but can be checked at collection	High
Likelihood of contamination or distortion of respondent's answer	Low Highest level of perceived anonymity	Moderate, direct access to widely dispersed samples and samples that cannot be reached via fax or online Answers may be contaminated by consultation with others		Occasionally distorted or invented by interviewer

Likely response rate	Variable, 30% reasonable within organisations via intranet, 11% or lower using Internet	Variable, 30% reasonable		High, 50–70% reasonable
Time taken to complete collection	2–6 weeks from distribution (dependent on number of follow-ups)	4–8 weeks from posting (dependent on number of follow-ups)	Dependent on sample size, number of field workers, etc.	Dependent on sample size, number of interviewers, etc., but slower than self-administered for same sample size
Main financial and resource implications	Flexible Design (skip patterns etc.) Automated data encoding Efforts of Web page design, although automated expert systems providers are reducing this dramatically	Outward and return postage, photocopying, clerical support, data entry	Field workers, travel, photocopying, clerical support, data entry	Interviewers, telephone calls, clerical support. Photocopying and data entry if not using computer aided telephone Programming, software and computers if using such Software

Table 13: Characteristics of survey methods (own diagram based on Saunders et al 2009, p.364 and Easterby-Smith, Thorpe and Jackson, 2008, pp.219-225)

In this research, not all aspects will apply equally to the choice of questionnaire. The confidence that the right person would respond or a likely high response rate would argue for delivery and collection or telephone interviews. But otherwise, they were not considered as favourable in terms of time and money and with respect to experience gained from the organization of the focus group event.

Postal and internet-mediated questionnaires can make sure that the respondent is from the targeted company what is wished to answer the questions and thus increase the reliability of responses. On the other hand, for quality reasons one has to know or to find out the right person to address. Even if a postal questionnaire is addressed to a company manager by name, there is no way of ensuring that the manager will be the respondent.

Internet-mediated questionnaires, and in particular those administered in conjunction with email, offer greater control because most users read and respond to their own mail at their personal computer (Witmer et al., 1999).

On the other hand, the likely response rate based on a mail survey is described in the literature with 30% as reasonable, whereas via internet, it is indicated with 11% or lower (Saunders et al., 2009). Furthermore, financial resource implications have been considered. An internet-mediated questionnaire needs Web page design and was considered as time and cost consuming, although automated expert systems providers are reducing this dramatically.

Finally, based on these considerations a postal mail survey was considered as feasible and beneficial, as well as an internet-mediated questionnaire. Other reasons, which will be discussed later, lead to the decision to a survey based on an internet-mediated questionnaire.

The academic intention to produce findings, which will lead to a deeper understanding of the behaviour of SMEs in international ventures in a specific industry sector can be supported by a mail as well as by internet-mediated survey. Both ways can address practical questions to identified respondents, their answers are intended to derive managerial implications and are therefore supposed to help practitioners to internationalize their business within this industry.

Another intention was to respect the interests of business support providers and governmental institutions which can assist firm's internationalisation e.g by providing national programs or individual consult in order to increase industrial growth and national economic wealth.

Governmental institutions or policymakers, such as the chambers of commerce or industry associations have been identified as an important target group in the present research project. Hence, it was decided to co-operate with one or more of them in order to use their expertise in contacting the right firm and respondent. Furthermore, there was the intention to increase the response rate by achieving their 'official' support in terms of Internet teasers or blogs about this research on their website. An example how this was transferred in the present research is provided in figure 24. There was also the idea to use them as a pilot in the questionnaire review and in general as peer-reviewers. More details about such organizations in

Germany, which are often founded and financed by the federal state governments and members such as companies acting in the healthcare industry, will be provided in section 6.7. It can be recognized that such organisations were willing to support this research only in their established formats and digital communication structures, which led to the decision to choose the method of a cross-sectional survey through a self-completion of an internet-mediated questionnaire.

6.3 Questionnaire design

Although the decision on an internet-mediated survey was based on the many advantages linked to this method, in order to collect measurable data from a specific group of people it is necessary to create a survey questionnaire. According to Fanning (2005), its design is probably one of the most challenging tasks when conducting social science research. Dillman (2000) has established a scientific basis for survey research methodology, where the overall objectives are to provide a valid measure of the research question, get the cooperation of respondents and elicit accurate information. The success of the survey will be the response rate. In order to achieve that many responders to the survey, specific topics have to be considered (Fanning, 2005). They also apply to online surveys and special attention has to be given to the initial design considerations such as the cover and cover page, the directions, the ordering of questions, the navigational path and the page design. Since the researcher is usually not present when the respondent fills out the survey, Robson (2009) highlights that the exact question wording, the question sequence and the survey layout are crucial elements that determine whether the responses given are the answer to what was asked or to something completely different (Robson, 2009).

Survey questions should thus be designed in order to help achieve the goals of the research and, in particular, to answer the research questions (Kumar, Aaker and Day, 2002). The researcher's task in this process is to link the research questions to the survey questions.

Many scholars agree that the language should be kept simple, the questions should be kept short and that it is crucial to ensure that the question wording means the same thing to all respondents. Even though there are no established and widely

accepted procedures that will lead consistently to a good questionnaire, a vast amount of rules and procedures, which should be considered before actually writing questions, have been developed in order to guide researchers through this process (Dillman, 2000; Kumar, Aaker and Day, 2002; Robson 2009).

In order to strengthen the effectiveness of this survey, the guidelines for making decisions about the questionnaire's organization and format have been evaluated and applied. Surveys often bring together words and graphic symbols. Both work in concert, stimulate, and emulate the flow of an interview (Fanning, 2005). A survey questionnaire can be made interesting by improving its layout, design and ordering questions (Dillman, 2000). Although these topics are reflected in many facets and can be discussed in considerably more detail, the purpose of this section is to provide transparency by giving an overview of applied rules and related motivation. Hence, some of the most important topics have been selected for discussion by following the guidelines of Fanning (2005). Four identified topics will now be explicated further, beginning with the 'formatting' followed by the 'cover' as the first impression, the 'ordering of questions' and finally 'the navigational path'.

Formatting refers to how the questionnaire survey is laid out, how its information is organized and presented, and specifically the size, colour, and shape of each side of the questionnaire how it is perceived on the monitor by the respondent (Fanning, 2005).

Formatting of a survey is crucial because a well-formatted survey is easier for the respondent to read and complete it – which after all, is one of the key goals in using a survey (Bradburn, Sudman and Wansink, 2004). If the respondent finds the survey easy to read and follow, the response rate will improve. According to Dillman (2000) the design of a survey will be driven by the following factors: The goal of each question, the respondent's visual perception of concepts and the respondent's comprehension. The visual perception of concepts pertains to how the respondent processes what they see, based pattern recognition, graphic layout, figure-group format and bottom-up to top-down processing.

For this particular survey, the decision was made to use a provider with a powerful online survey software called 'research.net', because this survey tool was widely accepted in academic research due to its expert-certified survey questions and templates, custom reports, phone and email support and a industry-leading data

security, which is even in compliance with the US Health Insurance Portability and Accountability Act (HIPAA) so that respondents have trust in sharing firm-specific information, while keeping their anonymity. Furthermore, it should be and turned out to be simple to create custom branded surveys by getting access to various features, analytics, and support. As an example for such features can be given comments, advice in form of pop-ups in case of inconsistency and even a bar-graph showing the level of completion after each page or section during the survey, which on top could be answered in different steps and on different days up to the perception of the individual respondent.

UNIVERSITY OF GLOUCESTERSHIRE

SME Internationalization Survey

Strategy approach

1. With regard to your company strategic approach, to what extent did you agree or not with the following sentences?

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
In our company we have a regular formal mid- or long-term planning process	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In our company there may be a strategic approach but this is the task of the top management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Business-strategy and functional strategies guide our business decisions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The measuring of strategic goals and related activities are supported by metrics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Previous Next

Figure 21: Questionnaire design - example of the internet-mediated survey

The example shows that the formatting is based on a clear structure for each question, using the logo of the University to capture the intention of a survey based academic research among industry experts. Shades of blue and grey pick up the corporate design of the University stand for seriousness and are highly independent of any well-known firms' corporate design in the MedTech industry. The title of the survey and the specific field of interest reflecting the different concepts of the framework can be found on every page. The questions and their sequence are ordered by numbers. The different statements, which can be ranked individually are

distinguished by a shaded background and are orientated to the related Likert scales by tag-boxes positioned in the interception point of the virtual lines representing a grid, which reflects the underlying columns and lines of a virtual table. The push buttons for navigating between the pages are centred at the bottom of each page.

The purpose of the cover of a survey is to invite and inspire the respondent and make them willing to participate. Often, the opportunity to achieve the respondent's trust and to create a feeling of connectedness and importance provides room for creativity. Simultaneously, it is crucial to keep it simple and official looking (Dillman, 2000).

The appearance of the questionnaire, especially the first impression, is vital for a high response rate (Kumar, Aaker and Day, 2002; Robson, 2009).

This online-survey started with a cover page, which follows the same formatting rules as indicated in figure 24. Each page includes a short, simple title called 'SME Internationalisation Survey'. As already introduced, a logo together with a balanced design based on an elaborated formatting provides salience. Sponsor's name and address are provided as well some initial directions in order to build up trustfulness and confidentiality and to provide guidance. The whole internet-mediated questionnaire can be found in the appendix.

The way of ordering the questions of a survey is important because it is crucial to group the single topics. The order of questions establishes both the survey's logic and flow (Babbie, 1973; Bradburn, Sudman and Wansink, 2004).

It has to be emphasized that next to the wording, the sequence of questions is the most important factor in facilitating recall and motivating more accurate responses (Kumar, Aaker and Day, 2002). Grouping the questions in a way that conveys respect to the respondents for participating by supporting ease of answering is the main target. Less methodical grouping may discourage and confuse them (Dillman, 2000).

Thus, initial questions should be easy and interesting (Kumar, Aaker and Day, 2002). Middle questions should cover the more difficult areas. The last questions should again be more interesting to encourage the respondents to finish the questionnaire (Robson, 2009).

In this online survey the respondents are asked to answer 15 questions. To guide a logical flow while respecting the rules discussed before, the questions are grouped into different sections. A product, market, organizational and strategy related section, which is more linked to hard facts or evaluations drawn from respondents everyday business experience is followed by the next section, which gives attention to the more socio-economical topics in the context of organizational capabilities. Finally, some competition-related information is required together with some firm-specific descriptive business metrics, which are considered to be easy to complete for the respondents known as insiders and experts in their subject matter.

The navigational path in a survey explains how a survey branches, or in other words the path the respondents should take, based on the way in which they answer certain questions (Fanning, 2005). To communicate this, Redline and Dillman (2002) highlight to create a navigational path that is orientated on a defined desired path, to create visual navigational guides and to develop additional visual guides to interrupt prior established navigational behaviour.

A clear order for the respondent in form of an easily understandable wording and a formatting that helps to guide makes it obvious to follow the correct method. The questionnaire design, which is highly similar through all pages of the online survey, supports the respondent to use the correct method consistently. Passages or sentences bridge between the different questions or sections if necessary. Comments and pop-up windows guide the respondent when a procedure is incorrect or incomplete. In case questions are not applicable to all respondents or it is allowed to indicate that specific information cannot be provided, this is represented by a specific tag box.

Next, to these basic guidelines, a number of other factors have to be considered when designing a questionnaire. Robson (2009) argues that with self-completion surveys, the length and the complexity of the questionnaire have to be kept to a minimum.

Dillman (2000) suggests to paying attention to the target audience's stamina. In case that a survey is too long, the participants may start to select from only the first answer options out of tiredness. One possibility to improve response rates is to shorten the surveys. However, there is a limit to this effect, since the quality of information of the responses then becomes questionable. Especially in an online

setting, the clarity of wording, the simplicity of the design and the perceived ease of use of the user interface are essential for a high response rate (Saunders, 2009).

Thus, for the present survey, the questionnaire is designed in a way that limits the response time to below fifteen minutes. Next to this, clear instructions are provided and the online setting of the survey tool allows to interrupt the survey and to re-respond at any time during the survey runs open.

Questionnaires are especially vulnerable to a number of response bias factors that can negatively affect the respondent's motivation and the overall results.

The most common response bias are according to Kumar, Aaker and Day (2002) concerns about invasion of privacy, time pressure and fatigue, prestige seeking and social desirability responses, courtesy bias with a tendency to avoid causing discomfort and uniform response or response style error (e.g. inappropriate bipolar word pair to choose from).

The selection of widely accepted online research tool, which guarantees privacy and anonymity, the possibility to interrupt and re-start the online survey by the respondent at any time without losing already provided information, the overall design of the questionnaire and all other measures which have been already described before, help to overcome these response bias factors. Figure 21 gives an impression how the online tool was operationalized and table 14 illustrates the different steps of validation through this process.

Next to the questionnaire, the cover letter is of crucial importance, too. Even though a web-based survey does not include a traditional cover letter, a short introduction in an email or/and on the front page of the survey will post a carefully worded introduction text. According to the literature, this text should indicate the aim of the survey and convey its importance for the research purpose. Furthermore, it should be tailored to the audience and should give the name of the sponsor or organisation carrying out the survey (Robson, 2009). An example of the introduction letter is provided in the appendix.

For the present research, it has already been described how the survey introduction at the landing page of the online survey explains the purpose of the research in short words. It conveys that this piece of research is that one that investigates the characteristics associated with Small and Medium Sized Enterprises (SMEs) in

Germany operating in international healthcare markets. Specific antecedents for their internationalisation and the effect of organizational capabilities on their strategy are the central objects of this research. It addresses that the individual respondent has been selected as one of the main experts in the German SME market for medical devices, and that is why his feedback to this survey is important. This approach is aimed at creating a moral obligation to finish the survey for the common good.

In addition to this introduction, instead of a cover letter, a teaser has been posted on the Internet portal of the organization that supported the survey by advocating it to its members. This organization called 'Life Science NORD' will be described in detail in section 6.7, as a significant number of MedTech companies in Northern Germany are members of this organisation and are therefore supported by this organisation in various ways. The organization, which is funded by the federal states of Schleswig-Holstein and Hamburg and by its members, represents the majority of healthcare companies in this region. Now, with the support of the already mentioned teaser, the context, background, research objectives and intended purpose in terms of use and meaning for the practitioners of this industry could be presented on a higher level of detail. The teaser is shown in figure 24, the complete cover letter can be found in the appendix

The image shows a screenshot of a website. At the top left, it says "INNOVATION FOR YOUR HEALTH. Hamburg, Schleswig-Holstein". At the top right, there is a logo for "LIFE SCIENCE NORD". Below the header is a red banner with a search bar and a Facebook icon. Underneath the banner is a navigation menu with links: "START", "AKTIVITÄTEN", "NETZWERK", "INNOVATIONEN", "BERUF & KARRIERE", "ÜBER UNS", and "DE | EN". Below the navigation menu, there is a "NEWS" section with a link to "NEWS" and "NEWSLETTER ABONNIEREN". The main content area features a headline: "11. MAI 2017 STUDIE ZUR INTERNATIONALISIERUNGSFÄHIGKEIT VON KMU IN DER MEDIZINTECHNIK". To the right of the headline is a logo for "car.us". Below the headline is a logo for "Med survey Tech" and a short text snippet: "Agilität ist ein Anspruch, der tief mit der Medizintechnik verwurzelt ist. Die Branche lebt von Innovationen, die gerade von KMUs getragen werden. Sie entwickeln mittels Hightech und Spitzenleistungen Lösungen für Patienten, um diesen eine neue Lebensqualität zu ermöglichen. Die Medizintechnik gilt seit vielen Jahren als deutscher Exportschlager. So profitiert".

Figure 22: Teaser with embedded cover letter introducing the internet-mediated survey

The teaser in the figure above is meant to attract the attention of the targeted respondents by using a logo with a keyword, which links to the cover letter. The cover letter starts with some specific attributes of the MedTech industry, such as the high innovation rate fostered by SMEs and resulting challenges for the future, which have been described in chapter 2, and invites to the survey by referring to the questionnaire.

The development of the questionnaire followed different stages over several months while focussing on different key aspects. There were several peer reviews and pre-tests performed. Finally, one version of the questionnaire went through the pilot-testing, in order to identify and detect potential problems and to improve the questionnaire, which is proposed as a common method in the literature to assure the quality of a survey (Martin and Polivka, 1995, quoted in Malhotra and Birks, 2006; Malhotra and Birks, 2006).

The questionnaire structure was based on the theoretical framework and findings from the literature review reflecting the research propositions and initial hypotheses from the qualitative stage of research. Content and operationalization of the constructs were based on the results of the literature review. In many cases and as far as possible the questions were derived or adopted from previous research such as from Lages et al. (2009), Murray et al. (2010) etc., in other cases they had to be developed based on reasoning on the results from the literature review and refined in different steps.

Structure, content, and wording of the questions concerning the section of organizational capabilities were mainly discussed and peer-reviewed during a conference focussing on SMEs business (USE, Groningen 2015).

**SME's internationalization:
Organizational capabilities developing strategy in the German MedTech industry**

Research constructs and related questions of the questionnaire (2)

Relationship capabilities

Question: With regards to firm's relationship with the importer of the of the selected export venture, how do you classify the following sentences?
(scale 1= 'strongly disagree' and 7= 'strongly agree')

Long term relationship
We focus on long term goals in this relationship
Maintaining a long-term relationship with this importer is important to us
We are willing to make sacrifices to help this importer from time to time

Information sharing
The importer frequently discussed strategic issues with us
The importer openly shared confidential information with us
This importer rarely talked with us about ist business strategy

Importer involvement
We are frequently in close contact with tis importer
Our importr seldom vists our plant
This importer gives us feedback on product quality and delivery

Datum USE2015: Understanding Small Enterprises
www.useconference.com

share your talent. move the world. 12

Figure 23: example of the peer review of the questionnaire during the USE conference

The figure above shows a slide from conference presentation as an example, where e.g. representing factors of relationship capabilities and their operationalization had been discussed with respect meaning and wording.

The section reflecting the concept of strategy and influencing factors was mainly discussed and peer-reviewed during a conference focussing on management and globalization (Circle Conference, Naples 2016)

Research constructs and related questions of the questionnaire (4)

External factors

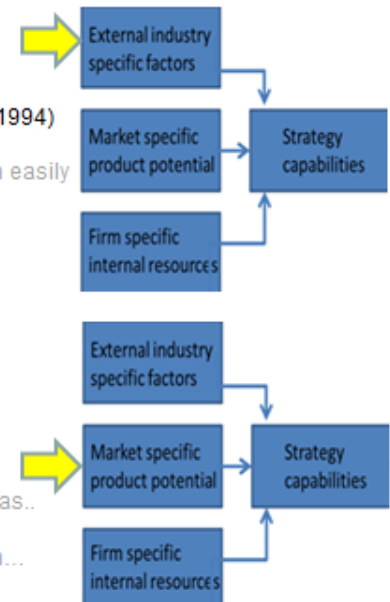
Question: With regard to your company competition situation, to what extent did you agree or not with the following sentences? (adapted from Cavusgil, 1994) (scale 1= 'strongly disagree' and 7= 'strongly agree')

Anything that one competitor can offer in our export market others can match easily
One hears of new competitive move in our export market nearly every day
Competition in our export market is a cutthroat

Market specific product potential

Question: With regard to your company resource situation, how do you assess the situation regards? (adapted from Murray, 2010) (scale 1= 'considerably low' and 7= 'considerably high')

Our brandrecognition by foreign customers is ..
Our foreign partner evaluates the degree of cultural specificity of the products as..
The age of the products in foreign ventures since commercialization is ...
The quality of product offered overseas is compared to the main competition...
Our foreign partners recognize the degree of uniqueness of our products (such as design, features etc.) as ...



10/28/2017

Circle Conference Naples 2016

DBA Cand. G. Heiss

Figure 24: Example of the peer review of the questionnaire during Circle conference

After the refinement of structure and content, a draft paper version of the questionnaire has been developed. The first version of the questionnaire consisted of a total of 30 questions, including the questions related to the firm's descriptive characteristics, designed as multiple choice answers, together with the Likert scale to measure the preference level.

After the pre-test with subject matter experts, a revised version of the questionnaire was then administered and pre-tested by academic advisors to assess its face validity. As a result, one focus was to reduce the number of questions and therefore also directly the time of the respondents and indirectly the rate of non-respondents.

Finally, the questionnaire was transferred into an online-survey format and pre-tested with respect to the measures, the clarity of the questions, response formats and its length by subject matter experts having experience with online surveys.

Up to now, the questionnaire development was conducted in a few steps over a period of several months in order to refine various aspects through several pre-tests, which is reflected as an iteration loop between step 4 and step 6 in figure 27 below.

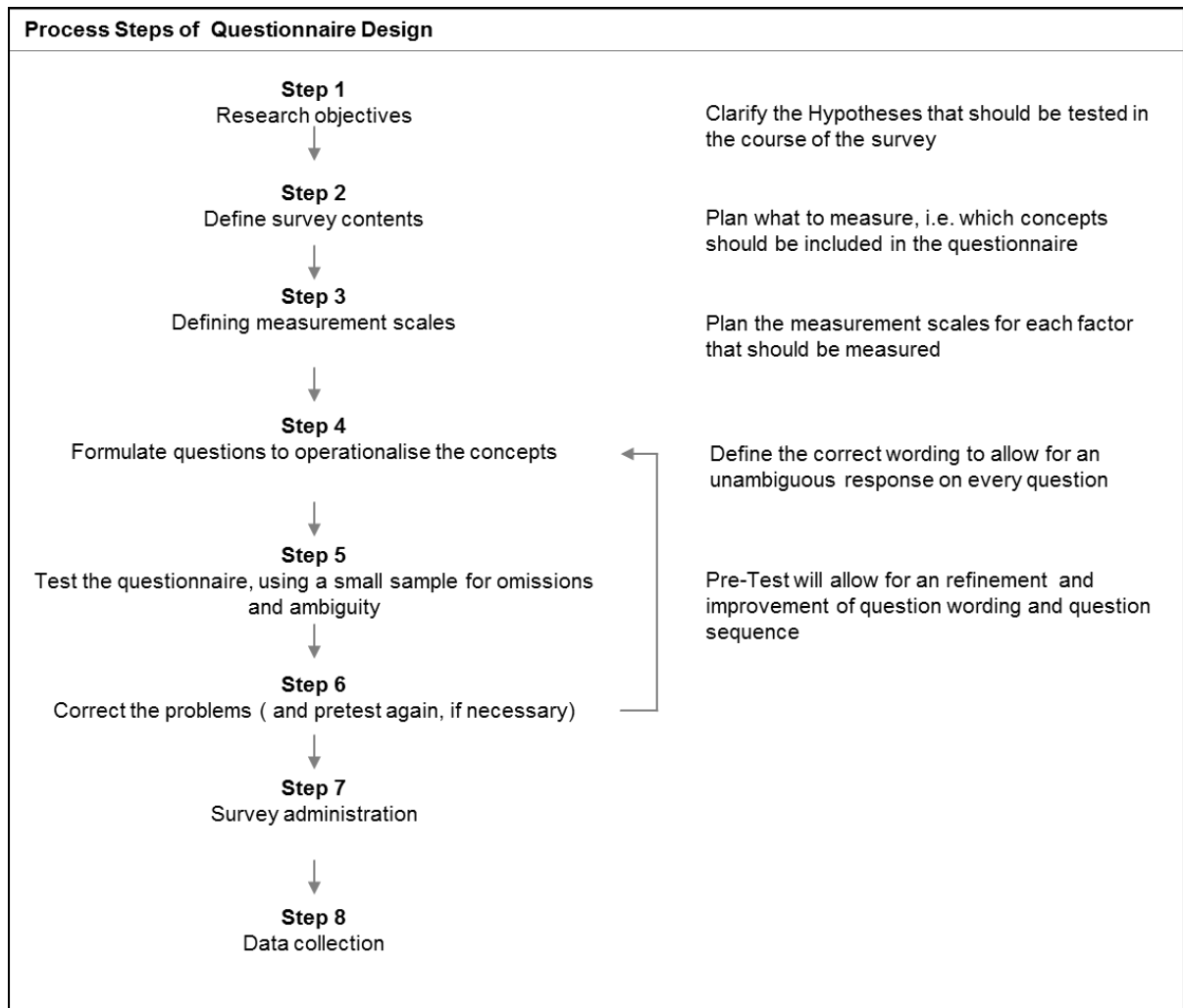


Figure 25: Research propositions, hypotheses, and the questionnaire design

The figure above gives an overview of the questionnaire design process that was applied in order to develop the survey for the present research. As a final outcome of step 6, there was a preliminary online survey that was used for a pilot testing in order to detect last possible matters with the questionnaire. The participants were employees from the already mentioned 'Life Science NORD' organization, who support surveys and projects and were also familiar with the context of the industry, but no native speakers or researchers. They were briefed about the purpose of the research and received a hard copy of the questionnaire. There was no time limit for

the filling of the questionnaire, but the majority of respondents fished with their answers after less than 15 minutes.

After the survey was completed, all participants were briefly interviewed about the questionnaire, following the procedure of ‘respondent debriefing’ (DeMaio, Rothgeb and Hess, 1998).

Table 14 shows the development of the questionnaire by summarizing the findings of the different tests with respect to adopted changes. The findings are described in more detail next.

Changes adopted regarding	Peer reviews	pre test subject matter experts	Pre-test academic advisers	Pre-test survey experts	Pilot testing
Structure & ordering		x		x	x
Operationalization of variables / related questions	x		x		
Exact wording	x	x	x		
Scales			x	x	
Facing validity & consistency				x	x
Easy to use / time to fill out		x	x		x

Table 14: Questionnaire development

The questionnaire based on the literature review was refined in different iterations as shown in table 14. Different aspects have been developed based on the findings from the peer reviews, pre-tests and the final pilot test.

During the peer-reviews, the discussion moved from finding the right headlines and wording concerning cultural aspects and related questions to the ranking of questions in the specific concepts. Additional considerations came up highlighting the impacts of international markets and the SMEs employees in this context itself. As a result, those questions that would reflect the single concepts best, were identified and additional questions leading to aspects, which had not been covered yet, were adopted.

In the pre-test, besides questions concerning the clarity of the wording, subject matter experts proposed to optimize the navigation by changing the ordering of the

questions and consequently to improve logic and flow by leading from the question over the answer to next question.

In addition, subject matter experts proposed to change some of the wording as well as specific academic words in order to achieve a better understanding for non-native speakers, who may be not familiar with definition or scope of some – for them - foreign expressions. Hence, explanations or synonyms were put in brackets and inserted where necessary.

Academic advisers suggested to rework on some questions regarding the operationalization of variables through the linked questions and to add exact measures to the scales if applicable. Furthermore, the number of questions and the length of the questionnaire were seen as critical. Findings by the survey experts were related to the layout, the clearness and description of scales and exact wording.

Survey experts responded that one of the scales would be a bit odd - perhaps due translating it into English. Hence, it was changed accordingly. Also in one case, the pair of adjectives describing the scales was corrected from lower/bigger to smaller/bigger. In addition, it was a common understanding that a better overview for the respondents regarding the progress.

It was also suggested to integrate a tool, which would allow the respondent to monitor the progress in answering while conducting the survey, since that would motivate them to answer the remaining questions.

The participants of the pilot-testing reported that the questionnaire was mostly understandable. The major remarks were about the so-called 'briefing' or how to introduce the survey to the respondent with respect to the intended contribution. Hence, the research background was explained in more detail at the beginning of the survey and besides the introduction letter. Furthermore, in order to guide the respondents better from question to question, particularly from strategy, to international markets and influencing factors the ordering was adopted again with respect to the ranking of orders reflecting specific concepts. The time was recorded with 10-12 minutes and therefore under the upper limit of 15 minutes. By collecting the feedback during personal phone calls a few pilot-testers expressed their concerns that the decision of conducting the survey in English would lead to a higher rate of respondents who would not finalize the survey after filling the first pages. However, the majority confirmed that those respondents who could contribute to a survey about internationalisation would not be influenced by conduction the survey in

English. The online survey itself can be found as a pdf document in the appendix.

6.4 Developing scales

In order to measure objectives their location on a scale with the help of scaling factors has to be identified (Bradley, 2007). In general, numbers are assigned according to rules that should correspond to the properties of whatever is being measured (Kumar, Aaker and Day, 2002).

Since most objects in social research are not numeric in nature, the researcher has to develop a descriptive scale that fits with the research object but does not bias the result in any direction. This could be a very simple rule, such as allocating two different numbers for gender (nominal scale), or a rule that allocates numbers according to the rank of various objects (Easterby-Smith, Thorpe and Jackson, 2008).

Table 15 gives an overview of the types of scale and their properties.

Type of Measurement Scale	Rules for Assigning Numbers	Typical Application	Statistical Tests
Nominal	Objects are either identical or different	Classification (by gender, attribute etc.)	Percentages, mode/ chi-square
Ordinal or Rank-Order	Objects are greater or smaller	Rankings (preference, class standing)	Percentile, median, rank-order correlation
Interval	Intervals between adjacent ranks are equal	Index numbers, temperature scales, attitude measures, time scales	Mean, standard deviation, product moment correlations / t-tests, ANOVA, regression, factor analysis
Ratio	There is a meaningful zero, so comparison of absolute magnitudes is possible	Sales, income, units produced, costs, age, weight	Geometric and harmonic mean, coefficient of variation

Table 15: Types of Scales, own diagram based on Easterby-Smith, Thorpe and Jackson (2008, pp.230–231) and Luebke and Vogt (2014, pp 2-4)

The selection of the scale type is linked to the chapter objectives, i.e. to enable a validation of the hypotheses developed so far, the different properties of the various scale types have to be compared. Since ratio scales are not applicable for psychological constructs in social research, mainly ordinal scales are used to enable a statistical validation, which is required in order to test the hypotheses developed so far. Consequently, nominal, ratio and interval scales will only be used to measure numbers used as descriptive statistics.

When defining ordinal scales, according to Kumar, Aaker and Day (2002) different aspects have to be considered, such as the number of categories, as well as the types of poles used in the scale, furthermore whether or not to label every category of the scale and it has to be decided whether or not to balance the categories.

Fortunately, there are some standard rating scales that have proved to be applicable in most cases of survey research, and some of them have also been used in previous research from which some of the questions and consequently also the related scales have been adopted. Two of the most widely used scales are the Likert Scale and the Semantic Differential Scale (Bradley, 2007).

The Likert Scale is a rating scale used to measure the strength of agreement towards a variety of statements related to the attitude or the object. Usually, a Likert Scale consists of two parts: an item part, which is essentially a statement about the object, and an evaluative part, which is a list of response categories ranging from e.g. "strongly agree" to "strongly disagree" (Saunders et al., 2009). The Likert scale demands that the researcher determine items that express strong positive or negative attitudes (but no neutral ones). Then the respondents are asked to rate each statement on a 5- or a 7-point scale ranging from "strongly agree" to "strongly disagree". To be retained in the final Likert attitude scale, an item must meet the criterion of internal consistency, meaning that responses to the item discriminate between people with different attitudes towards the research object (Fishbein and Ajzen, 2010).

It has to be acknowledged that there is a debate in the literature as to whether or not Likert Scales are producing ordinal-level data or interval-level data. Some authors claim that Likert Scales always produce ordinal-level data, since they only allow for a ranking of categories (Jamieson, 2004). Other authors, however, argue that Likert

Scales can be interpreted as interval scales, since the continuum between the poles enables one to measure intervals (Allen and Seaman, 2007). Empirical evidence supports the position that treating Likert Scales as if they were interval measures provides more advantages than disadvantages (McNabb, 2008). The author will reconsider this discussion when selecting appropriate statistical tests in a following section.

The Semantic Differential Scale is a rating scale that asks the respondent to state his or her position on a line or space between two descriptions (Robson, 2009). Usually, this involves a bipolar word pair (i.e. good/bad, old/new) that describes the end points of the scale. The respondent is free to choose either position or a given point on the continuum between the poles (Babbie, 2010). Especially bipolar scales raise the question whether to include a neutral point as a “don’t know”, or “escape option” for the respondents.

According to Bradley (2007) some authors argue that including a neutral point does influence the results, but the majority of meta-studies conducted towards this issue reported an increase in data quality and response rate when a neutral point was included (Bradley, 2007). Thus, for any bipolar rating scale within the present research, a neutral point will be included.

Regarding the descriptive figures and items, different scales have been employed depending on the type of item. Interval and ratio scales are used to measure the number of employees. Sales volumes could theoretically be measured on a ratio scales, based on firm’s exact financial figures. With respect to the ease of use in responding and analysing, sales figures and number of years that firm has been involved in international business are measured in interval scales, whereas the medical device class of firm’s main product is measured by nominal scales.

6.5 Sampling

The survey is concerned with German MedTech SMEs. They have been illustrated in detail in section 2.3 and sum up to approx. 1,200 companies (Beeres, 2016). A survey targeting to collect responses from more than one thousand different companies is considered as a very time and resource-consuming project, particularly

when it is crucial to address the questions to the specific expert in each company. When taking the response rates of an internet-mediated survey into consideration, it will obviously not be feasible to collect data from the entire target group. Budget and time constraints lead to the idea to select, a sample, which should represent the entire population. In general, there are various ways of deriving a sample from a given population, which can be broadly categorised into probability and non-probability samples. Probability or representative sampling generally means that every individual in the population has a chance (greater than zero) to be selected for the sample. This is usually accomplished via simple random sampling or systematic forms or random sampling (choosing every n^{th} person). But also stratified or cluster sampling approaches are used as a probability sampling approach particularly if the population is in discrete geographical clusters or has relevant strata (Saunders et al, 2009).

Non-probability sampling, on the other hand, could be achieved by simply asking the nearest and most convenient respondents (convenience sampling) or by setting up fixed quotas for certain characteristics in the population (quota sampling). Moreover, there are various other sampling methods, such as extreme case sampling or rare elements sampling, that are used for special purposes (Robson, 2009). In general, the sampling method has to be chosen according to the population of interest and the type of research intended. But choices regards an adequate sampling frame approach will be dependent on the ability to gain access to organisations. The considerations summarised earlier must, therefore, be tempered with an understanding of what is practically possible (Saunders, Lewis and Thornhill, 2009).

In this research, the process of probability sampling was conducted in several stages, which will be described next.

First, a suitable sampling frame based on the research objectives was identified. A sampling frame is a complete and most accurate list of characteristics of the overall population of interest (Babbie, 2010). The main characteristics were to address respondents of German SMEs, which are on an executive level and willing and able to contribute on aspects of internationalisation within the healthcare industry concerned with medical devices. Furthermore, gaining access to organisations and to the right persons is a major concern. As described in the section before there are good arguments to co-operate with organisations covering governmental and

industry representatives such as 'Life Science NORD' and therefore this quantitative study has its focus on firms located in Northern Germany. According to the 'Life Science NORD' organisation 90% of all MedTech SMEs in Hamburg and Schleswig-Holstein are organized as members within this organization and thus i.e. about 180 firms that stands for the target population and are intended to reach with this quantitative study. By using this approach it is supposed that the population of MedTech SMEs in northern Germany is representative and has the same characteristics as the entire population. This will be one of the tests, which will be performed and the results are discussed in section 6.8 later.

Second, the suitable sample size has to be decided. Any generalisation drawn from a probability sample of a population is based on statistical probability. The general rule of thumb is: the greater the sample's size, the lower the likely error in generalising to the population (Saunders, Lewis and Thornhill, 2009).

Obviously, time and budget constraints demand judgement on the minimum acceptable sample size needed. This minimum is determined by three main factors: the margin of error that can be tolerated in the sample and the level of confidence needed (e.g. the level of risk the researcher is willing to take that true margin of error may exceed the tolerated margin of error), and finally the estimation of variance in the primary variables of interest in the study. The level of confidence and the level of potential error tolerated depend largely on the analyses and standard tests that will be carried out with the sample. In general, most authors agree that for a given piece of survey-based social research, a confidence level of 95 percent and a margin of error rate of 5 percent are sufficient (Adler and Clark, 2008, Gray, 2007, Blankenship, Breen and Dutka, 1999).

In order to estimate the variance within a sample without preliminary data (pilot studies or split sampling), one must determine the inclusive range of the scale, and then divide by the number of standard deviations that would include all possible values in the range (Bartlett, Kotrlik and Higgins, 2001). Since a variance proportion of .5 indicates the maximum variability in a population, most authors use this value when there is limited knowledge available about the sample heterogeneity. Due to this, the estimated minimum sample size may be larger than if the true variability of the population attribute were used (Israel, 2009).

Some scholars suggest that the minimum sample size (n) should be n>100 or better n>200, others refer to a minimum related to the number of parameters (t), which have to be estimated based on measuring model (Kline, 2005; Trochim 2002).

According to Cochran (1977), also smaller sample sizes can be calculated on the base of the population size (N), the margin error (e), the confidence level (z) and the percentage value (p). The required minimum sample size can be calculated according to Cochran's formula (1977) as follows

$$N_0 = \frac{(z^2 \times (p) (1-p)) / e^2}{1 + ((z)^2 \times (p) (1-p) / (e^2 \times N))} = \frac{(1,64)^2 \times (0.5) (1-0.5) / (0.1)^2}{1 + (1,64)^2 \times (0.5) (1-0.5) / (1,200 \times (0.1)^2)} = 63.67$$

Where (z) is the confidence level (the z-value for an alpha level of .1, which equals a level of confidence of 90 percent, is 1.64 for sample sizes above 120), (p) is the estimate of standard deviation in the population (in this case .5) and (e) is the acceptable margin of error for the mean being estimated (in this case .1).

Consequently, for the present survey, a minimum of 64 participants will be needed in order to arrive at a representative sample of the target population. In order to arrive at this minimum acceptable sample size, it is necessary to develop a strategy for attracting respondents, which will be discussed in the next section.

Third, to select the most appropriate sampling technique is influenced by different factors. The sampling approach should attract a sufficient sample size, which is a key issue in any form of survey research. For mailed surveys, it is necessary to estimate the potential response rate in order to ensure that the minimum acceptable sample size will be reached by sending out a given number of mailings (Bartlett, Kotrlik and Higgins, 2001). Response rates below .20 are not uncommon for these types of surveys (Kaplowitz, Hadlock and Levine, 2004). It has been already mentioned that the direct mailing of the chosen institution to the respondents was intentional to achieve a high response rate. In addition for attracting potential

respondents blogs and bulletin boards were published to prepare and to attract respondents to take part in the survey in order to follow the stratified sampling approach in the present research.

It has to be acknowledged that one prerequisite for stratified sampling is that each individual from the population is only represented in one stratum (Daniel, 2012). This prerequisite cannot be met by the present study due to specifics of the internet. In general, online communities do not restrict their access to certain firm sizes such as SMEs. Thus, it is even likely that MNEs will participate in this survey, since nearly every MNE uses the internet for communication, which might not be true at the same level for SMEs. In sum, however, the sampling approach, together with the allocation strategy followed in the present research, is expected to improve the sample representativeness by reducing the potential biases of the sampling approach. Furthermore, It has to be respected that the strategy described above also involves some risks. First of all, the methodology of attracting participants by a web-based questionnaire limits the sample to firms using the internet. However, the rapid diffusion of Internet access in Germany and the use of the internet in business also by German Medtech SMEs increasingly reduce this threat. Consequently, the internet bias are expected to have only a minor effect on the sample representativeness.

Second, attracting potential respondents based on a mailing list limits the sample to users who are on that list. This further limitation of participants could be a substantial constraint to the representativeness of the questionnaire, especially as the study concluded that not all MedTech companies in the selected area are on the mailing list or are likely to participate via this communication channel. However, as a result of the sampling approach, approx. 90% of all MedTech companies in Hamburg and Schleswig-Holstein turned out to be represented in this mailing list. Furthermore, the chosen approach targeting a high response rate also supports the goal to reduce the potential biases of the sampling approach.

6.6 Operationalization of the concepts

As a next step, formulations had to be developed and so-called items, representing each of the factors, were included in the questionnaire. In other words, the contents

of the questionnaire had to be operationalized. As highlighted before, the exact wording of each item is a prerequisite for a good match between the responses given and the answer to what was asked (Bradburn, Sudman and Wansink, 2004; Robson, 2009). Generally, the best way to avoid ambiguous or misleading formulations is to start with reviewing scientific publications and as far as applicable to apply similar factors. If a factor has demonstrated to be a valid and significant explanation, it is more likely that it was also successfully operationalized in the respective study (Kumar, Aaker and Day, 2002).

Thus, by adopting formulations from related research and by complying with the general rules for questionnaire design, discussed in section 6.3, the most appropriate formulation for each question item will be developed in order to reduce misinterpretations and by using successfully operationalized formulations.

Furthermore, it has to be distinguished between singular items and multiple items. Sometimes, it is sufficient to develop singular items for each construct but often multiple items will be needed for a sufficient measurement of the factors. According to Churchill (1979) almost every psychological construct involves different dimensions, which cannot be measured with a single item scale. Moreover, he argues that by using multi-item measures, the specificity of items can be averaged out when they are combined. Consequently, an increase of the reliability can be observed since measurement error decreases as the number of items in a combination increases.

Thus, multiple-item measures tend to be more reliable because they enable the computation of correlations between items. If the correlation is positive and characterised by a high average, this is an indication of internal consistency of all the items in representing the supposed underlying attribute (Bergkvist and Rossiter, 2007).

There is no general rule regarding an optimal number of items developed per construct. More items can further reduce measurement error. However, the larger the number of synonymous items the researcher attempts to generate, the greater is the chance of including items that are not proper synonyms of the original attribute descriptor (Bergkvist and Rossiter, 2007). Although this varies from study to study, many researchers use three or four synonymous items to measure a psychological construct.

Finally, the number of items used for a construct is constrained by the number of constructs and consequently by the number questions and therefore the length of the questionnaire. Correspondingly, between two and three items will be developed in the next step for every construct that will be part of the questionnaire.

Consequently, the content of the questionnaire was now defined in order to test hypotheses. A detailed overview regarding the hypotheses is provided in section 6.9.2, where the measurement models, variables and supposed relationship are shown. The questionnaire itself had to include 25 questions representing nine independent variables, and two dependent variables, which were linked to different concepts. Two concepts were represented as first order concepts and one concept was represented as a second-order concept.

As discussed in chapter 3, previous research gave evidence on some of the concepts and relations, which have been built on to develop the conceptual model of this research. Hence, questions that are related to such concepts and which have been successfully tested by previous research have been adopted as far as applicable. This is in line with Kumar, Aaker and Day (2002) who see it most likely that if an item was valid and significant in previous research it will also be successfully operationalized in the respective study.

Starting with the construct of influencing factors it has already been highlighted that Lages et al. (2009) focuses on product uniqueness, innovation and quality. He summarized that the export performance literature suggests these elements as critical product-related performance drivers. Murray et al. (2010) highlight a significant relationship between market orientation and firm performance in international ventures. Thus, product competitiveness is crucial especially in international ventures. Hence, as the item was valid and significant it was decided to adopt the related questions also in this research. Beyond that, the results of the focus group discussion lead to further items to operationalize.

An overview regarding research question, related construct, variables and linked questions is provided in the next tables.

Research Question	Second Order Construct	Variable	No	Question	Source			
Which specific factors influence the strategic approach to international ventures of German small and medium-sized enterprises (SMEs) in the medical technology industry (MedTech)?	External industry-specific factors	Market potential	2	With regard to your firm's international ventures in foreign markets, to what extent did you agree or not with the following sentences?				
			2.1	The market potential in our foreign markets is very attractive				
			2.2	Medical device regulations in foreign countries are sometimes a real challenge				
			2.3	Without cooperating with our network-partners foreign ventures would be difficult for us				
	Market-specific product potential	Innovation	3	With regard to your company competition situation, to what extent did you agree or not with the following sentences?				
			3.1	Anything that we can offer in foreign markets our competitors can match easily.		Murray 2010		
			3.2	The quality of our products and services is better than that of our major competitors.		Lages 2009		
			3.3	Compared to similar products developed by our competitors, our product will offer unique beneficial attributes to the customers ...		Lages 2009		
			4	With regard to your company resource situation, how do you assess the situation regarding?				
			Firm-specific internal resources	Resources		4.1	The headcount and the financial commitment, which our firm provides for international ventures is ...	
						Management	4.2	The amount of skilled managers with international experience in our firm can be considered as...
							Processes	4.3

Table 16: Itemization of influencing factors

In the work of Cavusgil et al. (1994) emphasized that the performance of an international venture is determined by strategy and management's capability to implement the strategy. Hence, the itemization of the construct /strategy approach` is operationalized in two sub-constructs distinguishing the planning or development from the implementation and application in daily business.

Research Question	Second Order Construct	Variable	No	Question	Source
What is the impact of strategy development on the internationalisation of German MedTech SMEs		Strategic planning	1	With regard to your company strategic approach, to what extent did you agree or not with the following sentences?	
			1.1	In our company we have a regular formal mid- or long-term planning process	
		1.2	In our company there may be a strategic approach but this is the task of the top management		
		1.3	Business-strategy and functional strategies guide our business decisions		
		1.4	The measuring of strategic goals and related activities are supported by metrics		
		Strategy implementation			

Table 17: Itemization of strategy

Capabilities enable a firm to perform value-creating tasks effectively. It is the task of the management to adopt organizational structures, activities, processes, and strategies that reflect the specific conditions of their organizations (Murray et al., 2010).

Hence, it is the ability of a firm to utilize knowledge and skills and therefore enhance the value of resources. Organizational capabilities play an important role and this multidimensional concept is reflected accordingly by previous research (Lages et al, 2009; Murray et al. 2010) and from the results of the focus group discussion.

Research Question	Second Order Construct	Variable	No	Question	Source
How do organizational capabilities affect the internationalisation strategy execution of German SMEs in the MedTech industry?	organizational learning capabilities	Commitment to learning	5	With regard to your company situation, to what extent did you agree or not with the following sentences?	Lages 2009
			5.1	The sense around here is that employees learning is an investment, not an expense	
			5.2	There is a total agreement on our business unit vision across all levels, functions, and divisions	
	Organisational relationship capabilities	Organizational excellence	5.3	In our company everybody knows what is his contribution for success	Lages 2009
			6	With regard to firm's relationship with your partner in foreign venture, to what extent do you agree or not with the following?	
			6.1	Our firm pays close attention in establishing and maintaining long-term business ties with other organizations in foreign markets	
	Long term relationship	Cultural understanding	6.2	Our firm places a high value on open-mindedness towards our foreign partners' culture	Lages 2009
			6.3	Our firm frequently discusses strategic issues with our foreign partners based on a shared cultural understanding	
			7	With regard to your company situation, to what extent did you agree or not with the following sentences?	
	Involvement	Alignment	7.1	Functional areas in this company work together in pursuing common goal	Murray 2010
			7.2	In our company there is a sense of teamwork	
			7.3	There is a strong formal and informal communication through the whole organization	
	Organizational coordinating mechanisms	Cooperation	Communication		

Table 18: Itemization of organizational capabilities

It is widely agreed that the achievement of competitive advantage, which in this research is latent seen as a variable, has a significant impact on the performance of international ventures (e.g., Cavusgil and Zou 1994; Morgan et al., 2004; Murray et.al, 2010). Consequently, the itemization draws back on previous research, where indicator variables such as cost, price, margins and perceived customer benefits are itemized. The related questions focus on the position of respondents firm relative to its major competitors in overseas markets with respect to these indicators.

Finally, the respondents are asked to provide some business metrics. Thus, firms' and its international ventures should be described by descriptive metrics such as firm's head count, turnover, export rate, international experience and product's medical device class. The entire questionnaire is shown in the appendix.

6.7 Operationalization of the survey

A survey, together with details on the purpose and the intended contribution of the respondents should be successfully communicated to a large audience in order to achieve a high response rate (Reynolds, Woods and Baker, 2007). In mailed or email surveys, this is usually accomplished by sending out a cover letter together with the survey to the home or email address of selected participants (Easterby-Smith et al., 2008). In web-based surveys, a complementary strategy must be adopted to attract respondents. Publications in blogs or bulletin boards or word-of-mouth recommendation can increase the attractiveness to participate in a survey (Harris and Dennis, 2007). For the present research, the author decided to use the this combined approach. It was decided to capitalize on the instant communication possibilities offered by blogs and bulletin boards in addition to the direct mailing of respondents and word-of-mouth communication. These platforms are effective one-to-many communication channels in which information can be rapidly spread among a community.

For the present research it has been already described how and why to adapt a specific sampling approach by collaborating with the 'Life science NORD', which can be described as a so-called Medical Technology Cluster organisation. Such specific organisations or institutes play an important role in the German industry by connecting industry, science and federal institutions and are supported by

networkers and lobbyists. This specific form of such networks is called Medical Technology Clusters and Germany has currently more than 30 specialized cluster networks focusing on medical technology. Their goal is to achieve and promote continuous innovation in research and development as well as in sourcing, manufacturing, service or go-to-market strategies by connecting med-tech companies, hospitals, universities, research institutions, life sciences organizations, start-ups and public institutions in healthcare. Dedicated cluster management teams help obtain funding for joint R&D projects, provide shared facilities, assist with legal or tax-related support or product certifications, organize training programs or focused networking and matchmaking activities for their members particularly in an export context. The majority of the cluster activities are funded by the European Union, the German Federal Government, and the individual German Federal States, while many of them are open also to international companies. Most incentive programs are research driven and offer funds for personnel costs linked with innovative R&D projects, specifically for technological transnational partnering activities. The common research often results in joint patents and scientific publications.

One of the most important clusters in North of Germany and leading clusters in Europe is the Cluster 'Life Sciences NORD' including more than 240 medical technology companies, in addition approx. 300 Biotech and Pharma companies, 2 major university hospitals, numerous research institutes totalling up to more than 42,000 highly specialized professionals. All activities are supported by the City of Hamburg and by the State Schleswig-Holstein. Both states are holding 40% shares each at the Life Sciences Nord cluster. Furthermore, more approx. 260 companies and organisations in the Life Sciences and MedTech industry formed the industry association "Life Sciences NORD e.V.", which operates as a registered association (eingetragener Verein), and hold the rest of 20% shares in the cluster and represent the interests of its members. The main work of the cluster covers advice services, the initiation of strategic projects for the development of innovative products, technologies or services and brings together representatives from large MedTech companies located in the area of Hamburg such as Philips Germany and Olympus Europe, several SME organizations, research and university institutions and political experts from North of Germany which contribute to an additional gross value added since 2004 with more than € 1,4 bn. and an average annual growth of 1.3%. Specifically, the SMEs in this cluster are the main economic contributors to this

growth. About 68.7% of the cluster's value-added activities were produced by SMEs (Ostwald et al., 2015).

The questionnaire was designed and implanted in research.net at the 17th of April 2017. Due to public holidays and preparations on the side of the cluster organisation it was decided to wait for a time window where many of the respondents were expected to be in their office. The questionnaire was administered between the 11th of May and the 12th of June 2017. During this period, the link to the survey was posted on 3 different blogs and bulletin boards, usually after the start and in the middle of the survey by contacting the board- or blog-owner personally. Examples can be found in the appendix. Furthermore, respondents were contacted directly via email based on a cluster's mailing list one week after the survey was opened and finally by a reminder via email one week before the survey was closed. Figure 30 shows the administration of the survey over the time.

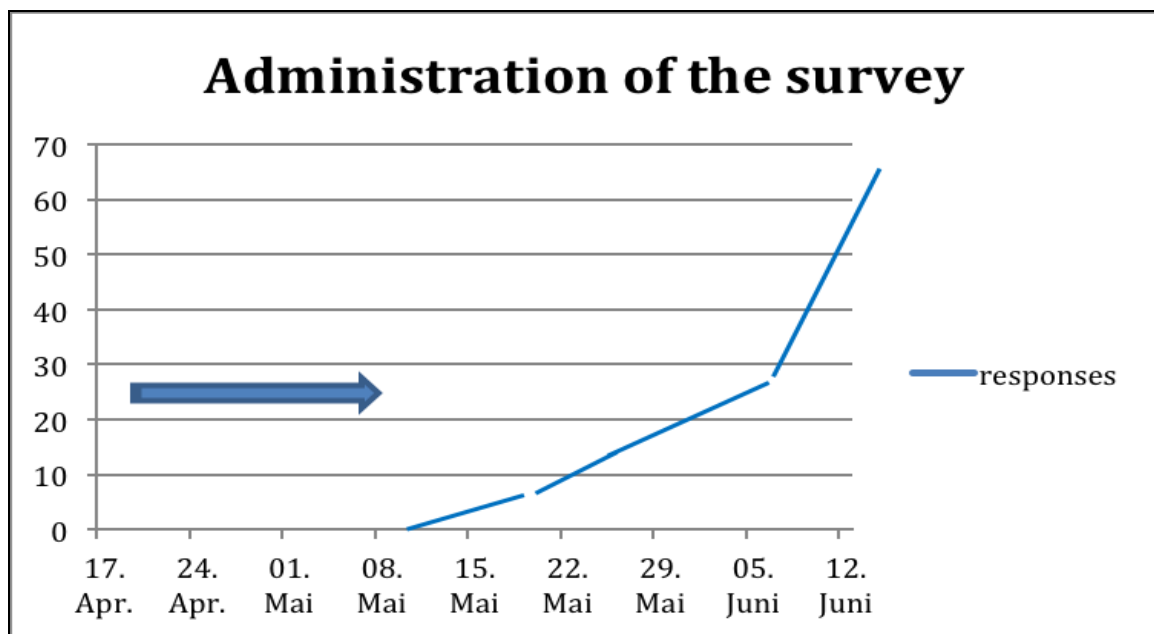


Figure 26: Administration of the survey and responses over the time (own diagram)

Although after two weeks more than 50 clicks could be recognized, it is obvious that different blogs and bulletin boards attracted attention but did not convince the readers to respond to the questionnaire.

The direct contact via email together with a cover letter and the survey link improved the response rate, while a personal reminder with a notice to near the end of the survey resulted in a strong increase of responses.

In total, 65 respondents started the questionnaire, of whom 65 finished it. The datasets were exported directly from research.net into an SPSS file. Examples of the SPSS and PLS files and more detailed figures are provided in section 6.9. A manual typing of data is often affected by human errors in the transition process towards data analysis. Hence, the automatic export function of research.net was used in order to minimize this risk and a first analysis was performed to identify abnormalities in the data set. This process was performed in SPSS and revealed 4 responses that showed answering patterns or extremely inconsistent responses (continuously or alternating extreme cases). These cases were consequently deleted from the data set.

In sum, 61 responses remained for further analysis. In the next step, PL-S will be used to evaluate the sample population for its representativeness using the sampling frame discussed in the previous section.

6.8 Quality assurance

It has already been mentioned in section 4.10 that research ethics is a sensitive issue in scholarly activities. Particularly, dealing with confidential data such as strategic positioning of companies and personal evaluations of executives from such companies may cause deleterious consequences. Hence, also the quantitative part of this research incorporates several measures with respect to ethical principles and procedures. First, in order to protect the rights of the respondents, this research respects the required ethical guidelines of the University. The selection of the 'research.net' platform (see section 6.3) enables coding in order to assure the anonymity of questionnaire respondents and the responses from the questionnaires will only be used for research purposes, since firm's strategic information such as export rates or quality information needs to be kept confidential. Neither the organization's nor the participant's names will be mentioned in the research study. The data will be stored securely and will be deleted once they are no longer required for research purposes. It has been highlighted before that the chosen survey

platform 'research.net', which is widely accepted in academic research, provides an industry-leading data security that is even in compliance with the US Health Insurance Portability and Accountability Act (HIPAA). Hence, the technical standard to keep anonymity and to assure confidentiality against third parties lays a foundation so that respondents have trust in sharing firm-specific information. In the cover letter it has been highlighted that responses will be confidential and identifying information such as name, email address or IP address will not be collected. It is reassured that all data is stored in a password protected electronic format and in order to protect confidentiality, the surveys will not contain information that will personally identify the respondent. Secondly, the analysis of sample population is fundamental for the following statistical conclusions. The main target in this section is to find out whether or not the sample derived so far is truly representative of the target population of German MedTech companies. To answer this question the group characteristics w. As discussed in the previous section, the representativeness of the sample will be judged using a sampling frame based on respondents' firm characteristics, supplemented with firm's descriptive metrics, namely firm size, employees and turnover comparisons. Before starting this analysis it has been elaborated that the 'Life Science NORD' cluster is an acceptable representative of the German MedTech industry with respect to turnover, employees and particularly in the context of the role of SMEs.

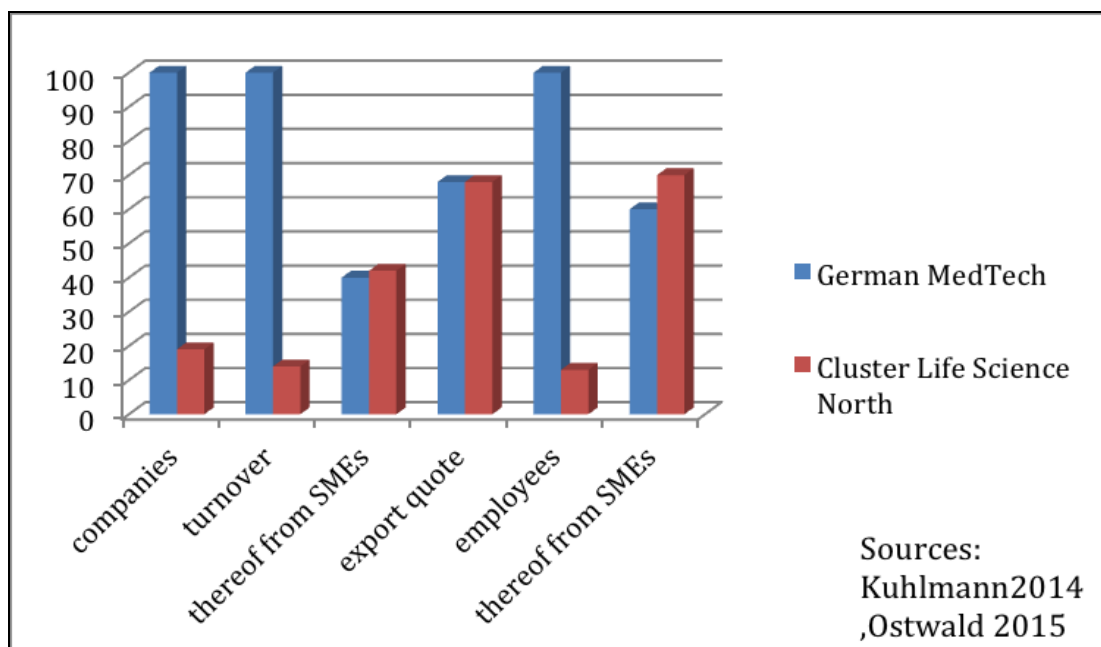


Figure 27: Comparison of German MedTech industry and the 'Life science NORD' cluster based on key figures (own diagram derived from figures 3 & 6 in section 2.2 and section 6.7)

The diagram shows that the 'Life Science NORD' cluster represents 10-15 % of the German Medtech industry in terms of turnover, employees or number of firms.

Furthermore, it can be highlighted that 40% of the turnover in the German MedTech industry is generated by SMEs, respectively 42% in the Life Science NORD' cluster and these SMEs have an export rate of 68% in Germany as well as in the 'Life Science NRD' cluster.

Consequently, the chosen sampling frame is expected to represent the targeted population and it is not expected that the respondents from 'Life Science NORD' cluster will significantly vary with respect to the overall population.

6.9 Data Analysis

Data analytics based on statistics is mainly concerned about questions such as (Luebke and Vogt, 2014) :

- Is the data appropriate to answer the research questions?
- What is the meaning of the data?
- Is the data accurate?
- How can the data be analysed?
- What is the implication from the results?

In order to reply to those questions, the researcher has to go step by step through different stages of the analysis, which have to be defined in advance. Special attention has to be given to the application of controls in order to ensure validity of data. In this section the different stages of the data analysis are presented. The 4 stages comprise the revisit of the sample population, measuring models and test design, descriptive statistics, testing observed variables and hypothesis with the help of SEM. The presentation of each stage is ordered in steps, in which the theoretical foundation is provided to the related tests, the operationalized tests are presented

and its results are analyzed and discussed. At the end of the section the implications are summarized.

6.9.1 Revisit of the sample population

It has already been highlighted that it is a vital interest to analyse of the response rate and the representativeness of the target population. A sample analysis compares firm characteristics and descriptive metrics of the sampling frame. Consequently, it will provide an indication whether or not the chosen strategy was successful in attracting a sufficiently large and representative sample of the target population

First, response rates are measured to avoid non-response bias. If persons who respond differ significantly from those who do not, “the results do not directly allow one to say how the entire sample would have responded. The most commonly recommended protection against nonresponse bias has been the reduction of nonresponse itself” (Bauer, 1948; cited in Armstrong 1977, p1). Consequently, to test for non-response bias Armstrong’s (1977) guidelines are followed. In the preparation of the questionnaire and the sampling approach the targeted response rate was at the upper level of internet-mediated surveys. With a response rate of approx. 25% the procedures seemed to be appropriate. Furthermore, the comparison with known values for the population may be used for an estimation of nonresponse bias.

Hence, the results of the survey are compared with “known” values for the population (see section 2.2 & 2.3). However, as the known values come from a different source instrument, differences may occur as a result of response bias rather than nonresponse bias. In the following diagrams the sample is compared with the sampling frame.

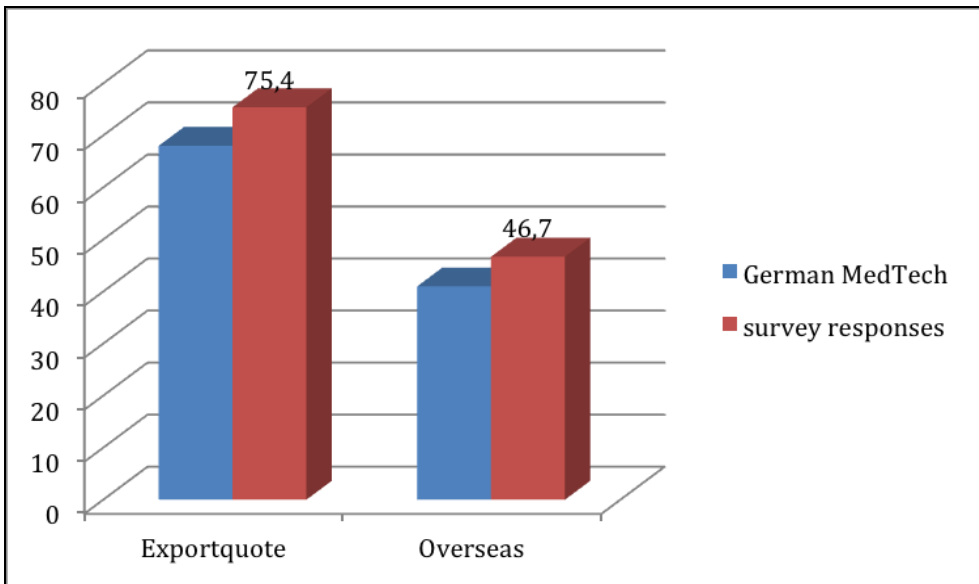


Figure 28: Comparing the sample to the sampling frame based on business metrics (own diagram, sources as indicated in the diagram)

The export quote is in the German MedTech industry with 68% slightly lower as it is indicated as result of the survey based on the responses from MedTech cluster in Northern Germany. Also, the turnover generated in non-EU countries is slightly lower, which summarized means that the survey respondents are orientated a bit more “international”. The reason is not obvious, maybe it is a bias or it is caused by the famous trading tradition of this region. However, the discrepancy is low and therefore taken as an indication that the sampling approach fits well.

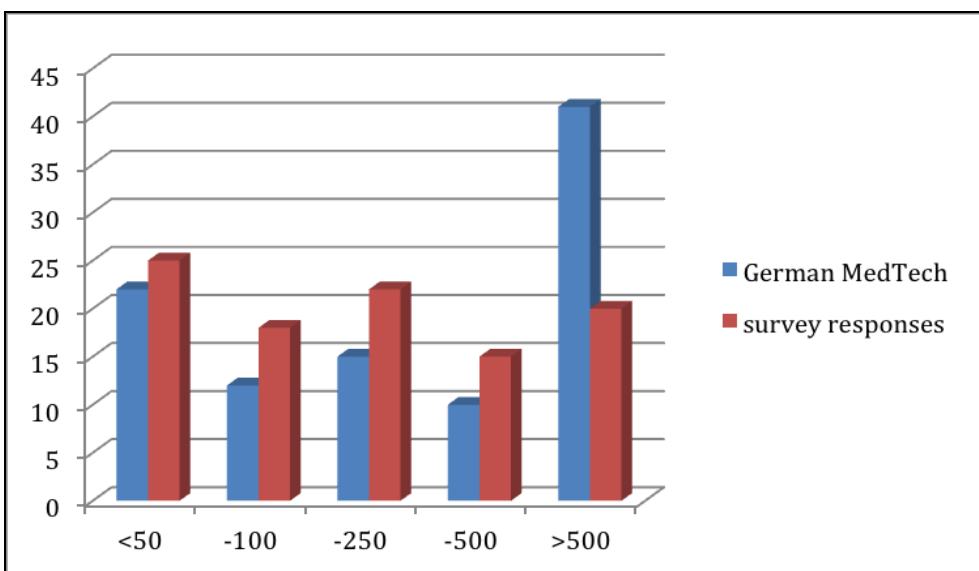


Figure 29: Comparing the sample to the sampling frame based on employee distribution (own diagram, sources as indicated in the diagram)

The diagram above shows, that based on the responses from MedTech cluster in Northern Germany, there have been more responses from SMEs in each interval compared to the distribution expected from the entire population. This is in line with the results from figure 31, where it is shown that there are more SMEs in the cluster than in the entire population. This is evaluated as favourable since the research is about SMEs. This is furthermore an indicator, that the non-response bias can be estimated as insignificant.

In conclusion, the sampling strategy followed by the author (contacting MedTech SMEs via internet-mediated by a cluster organisation) was succeeded in generating a representative sample in regard to these characteristics. In sum, the comparison of the sample with the target group has shown a good match. It is expected, however, that the absolute number of responses will cause limitations, although a considerably high response rate could be achieved by this strategy.

6.9.2 Measuring models and statistical tests

The quantitative analysis is based on supposed relations between the concepts mapped in the conceptual framework. Different statistical tests have to be selected and applied to derive the intended results. Which test to apply depends on the nature of the variables and their relationship and on the complexity of the model reflecting the conceptual framework. There are two different kinds of variables used in the present research, those that are measured directly by the researcher (called observed variables) and those that are not measured directly but are inferred from observed variables (called latent variables) (Meyers, Gamst and Guarino, 2006). In the present research the framework exists of different constructs and both types of variables. Consequently, two different measuring models have to be applied also in this research.

However, in the social sciences, it is quite common that the characteristics the researcher is interested in cannot be measured directly. Thus the researcher has to select a set of items that are assumed to reflect the construct. The relationship between the set of observed variables and the construct that they are intended to measure is called the measurement model. The rationale behind this model is that the answers to multiple observed items combined together better represent the complex notions of a construct than any single measure could do (Easterby-Smith,

Thorpe and Jackson, 2008). A measurement model thus allows for “a greater richness in measurement, capturing nuances of a construct, and it also allows the researcher to assess how reliably the construct has been measured” (Easterby-Smith, Thorpe and Jackson, 2008).

Figure 30 links the different variables of distinguished concepts to the different measuring models, which cause the already mentioned different statistical tests.

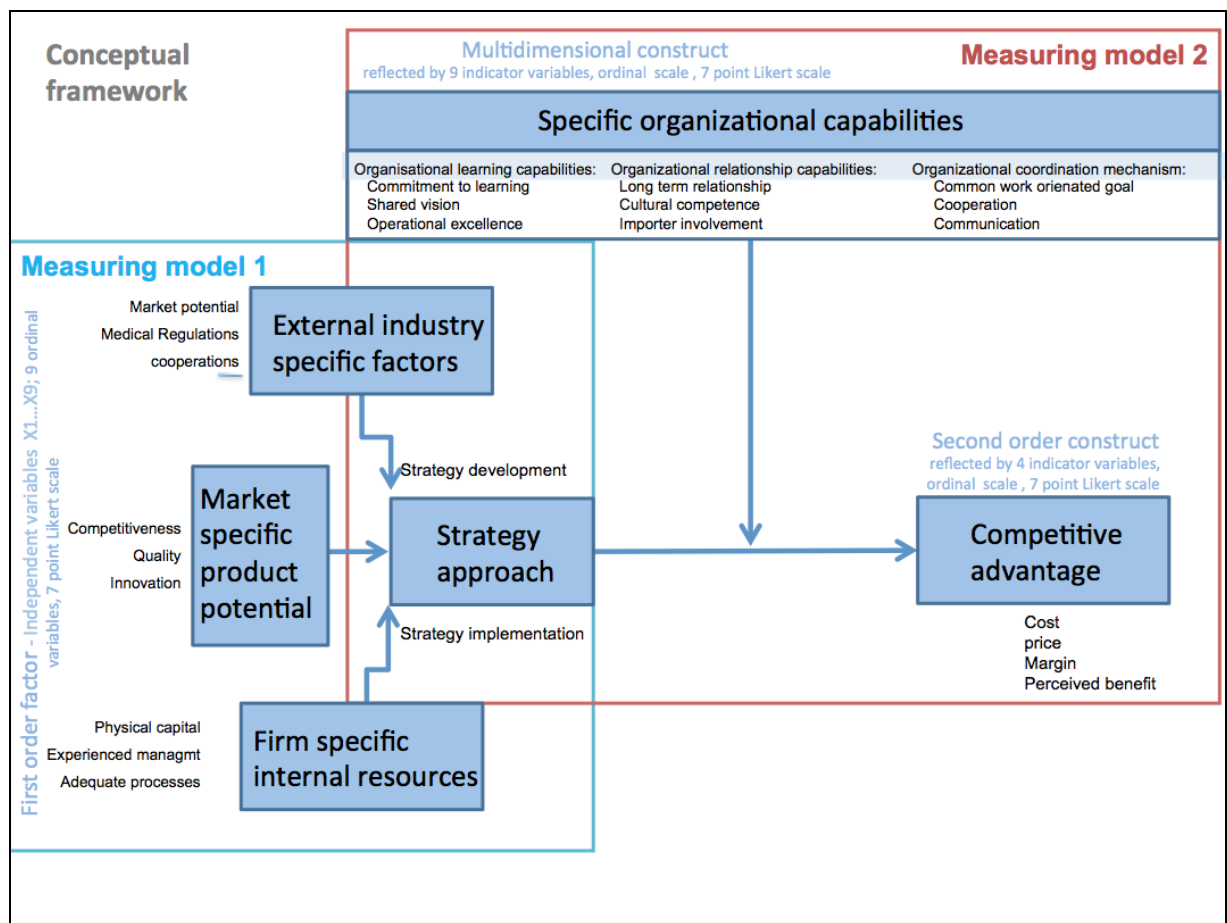


Figure 30: From the conceptual framework to the measuring model

Cross-tabulations will show descriptive statistics and contingency tables the employment of relations. Initially, validity and reliability of measurements scales will be tested as recommended by Gerbing and Anderson (1988). The internal consistency will be examined by using a confirmatory factor analysis (CFA) and item-to-item correlations in order to check how valid and reliable the variables for

each measured topic will be. The following table shows the intended relations between the independent variables X1..X9 and the depend variables Y1a and Y1b.

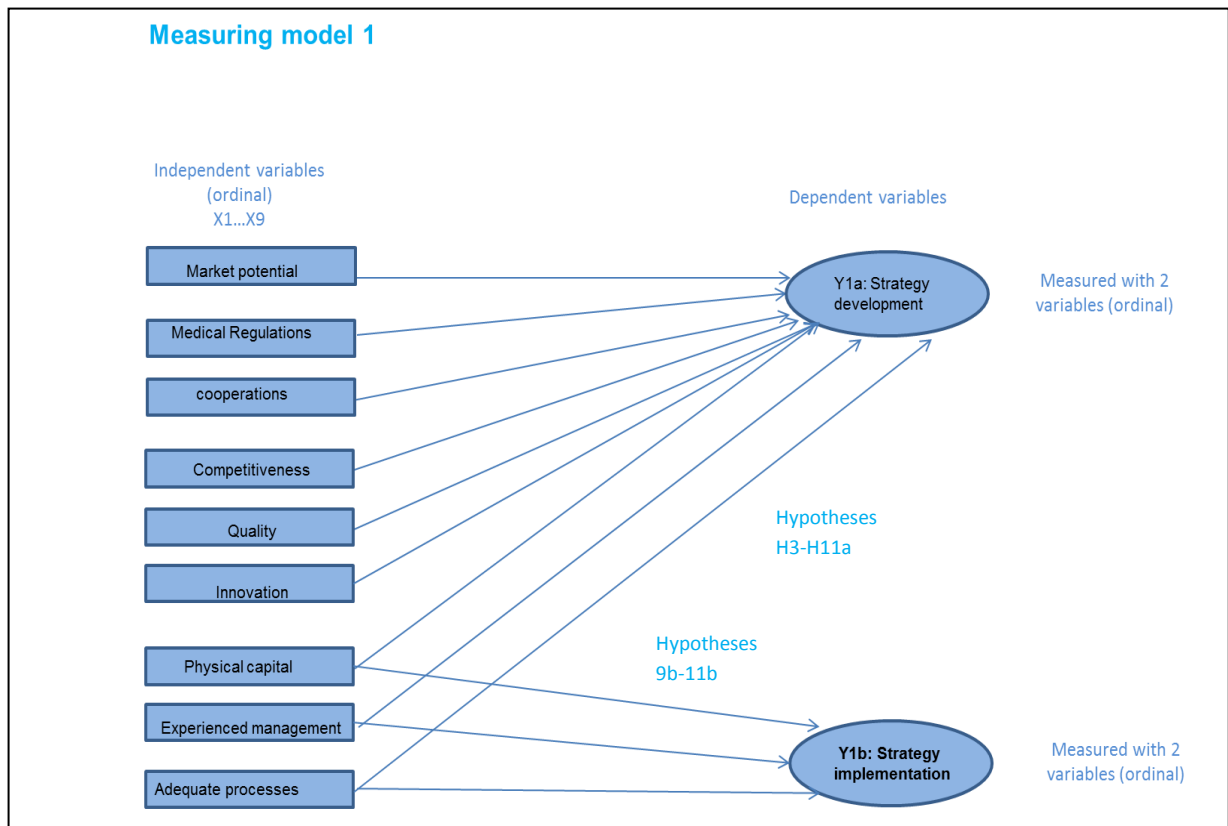


Figure 31: Measuring model 1

As shown in figure 31 each relation between variables and constructs is formulated with the help of a hypothesis, which postulates the expected effect on the relationship. Hypotheses for the measuring model 1 were developed as discussed on page 154 and shown in table 16-18:

H3: Attractiveness of foreign market potential is positively related to the development of an international strategy

H4: Similarity of medical regulations is positively related to an international strategy

H5: The degree of possible cooperations is positively related to an international strategy

H6: The degree of competitive products is positively related to an international strategy

H7: The degree of quality products is positively related to an international strategy

H8: The degree of innovative products is positively related to an international strategy

H9a: The extent of human and physical capital is positively related to the development of an international strategy

- H9b: The extent of human and physical capital is positively related to the implementation of an international strategy
- H10a: The more experienced management is available, the more likely is the development of an international strategy
- H10b: The more experienced management is available, the more likely is the implementation of an international strategy
- H11a: The degree of adequate processes is positively related to the development of an international strategy
- H11b: The degree of adequate processes is positively related to the implementation of an international strategy

An overview regarding all hypotheses is attached in the appendix. The hypotheses testing results are discussed in chapter 6.11 in detail.

To confirm theoretical hypotheses H3-H11, the relationship (precisely effect) between 9 independent variables ($x_1 \dots x_9$) and two dependent variables (Y1a and Y1b) shall be explored.

In the next step, an appropriate statistical procedure has to be selected to test the present research hypotheses. Broadly, there are two different types of statistical tests, for both of which parametric and non-parametric tests are available. The first one is the testing for group differences, which means to evaluate whether there are any differences between two or more groups; the second one is the testing for associations of variables, which intends to explore any relationships between variables (Easterby-Smith, Thorpe and Jackson, 2008).

Since the research objective of the present research deals with the associations of psychological constructs, the second type of statistical tests will be of main importance for this research project. Testing for group differences, however, will also be of relevance for assessing the influence of background variables. Figure 35 gives an overview of statistical tests and their appropriate application. Basically, there can be distinguished between parametric and nonparametric tests. The main difference between these both statistical methods is that parametric statistics require a numerical value for each individual in the sample. These values are added, squared and otherwise calculated by parametric tests using basic arithmetic. Thus, in terms of measurement scales, parametric tests require interval or ratio-scale data, while nonparametric tests are generally satisfied with ordinal data (Gravetter and Wallnau, 2008).

Many authors argue, however, that when a variable is ordinal but has sufficient levels, such as 7 or more in a Likert Scale, then as long as other parametric requirements are fulfilled, it is considered legitimate to conduct parametric tests (Clark-Carter and Howell, 2010).

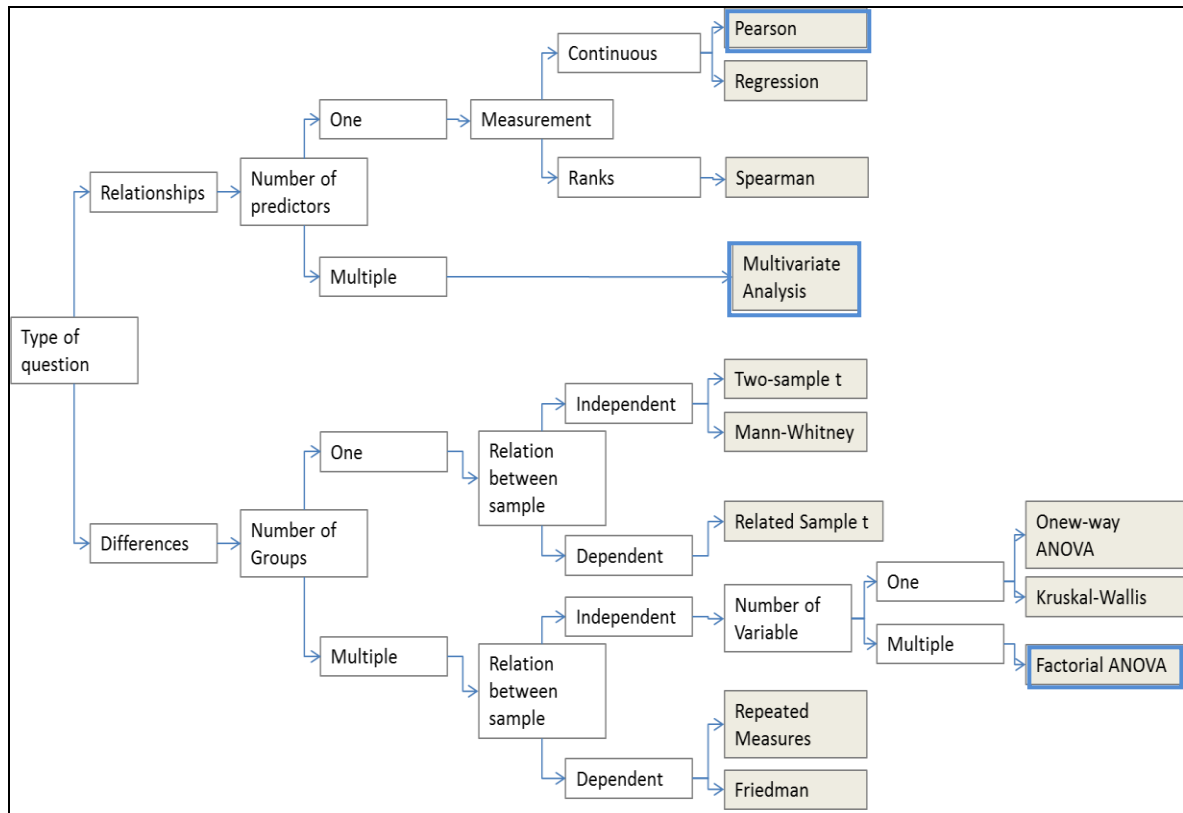


Figure 32: Statistical Tests, Source: Own drawing based on Howell (2011, p.566)

Research hypotheses are tested by estimating the structural model in form of standardized path coefficients and t-values. The bivariate relationships between variables will be examined by using Persons' r to examine association (Bryman and Bell, 2007). To assess the convergent validity in a multivariate context, an average variance is extracted (Fornell and Lacker, 1981).

In a next step, structural equation modelling (SEM) will be applied to test the conceptual model as it is widely used in social science for showing potential causal dependencies between variables and for demonstrating the relations between variables and their indicators. Therefore the measurement model and the structural model will be evaluated in different steps e.g. by factor analysis and as one of the software tools Smart-PLS 2 will be used.

The assessment of measurement model proprieties is analysed by the structural model using partial least squares as recommended by Ringle (2005) because it is

more robust also for small sample sizes. Figure 35 shows the related measuring model that is applied in order to investigate causal relationships between variables, which cannot be measured with a multiple regression model directly, due to their interference with observed variables.

Generally, a factor analysis can be described as a statistical procedure for investigating relations between sets of observed and latent variables. The basic idea behind factor analysis is that the researcher examines the covariation among a set of observed variables in order to draw conclusions on their underlying latent constructs, also called factors (Byrne, 2009).

The level of knowledge of underlying factors determines the type of factor analysis to be applied. If the researcher has no clear idea about constructs and underlying observed variables, the method of choice for analysing the measurement model is the exploratory factor analysis (EFA). This method is based on the assumption that there may be as many constructs as there are observed variables. In order to reveal how much covariation among the observed variables is contributed by each construct, the estimates of the factor loading of each construct for each observed variable are derived. It is subsequently possible to create a subset of constructs, usually retaining only the largest (Easterby-Smith, Thorpe and Jackson, 2008). The idea behind this procedure is to help the researcher to determine the minimum number of concepts that explain the co-variation among the observed variables (Byrne, 2009).

Another method of choice for analysing the measurement model is the confirmatory factor analysis (CFA). It is applied if both the number of factors and their correspondence to the observed variables are explicitly specified prior to the data gathering (Kline, 2005). Observed variables are usually assumed to load on only one factor. Thus, the method derives estimates for each of the factor loadings for the latent and the observed variables and gives an evaluation of how well the data fits with the measurement model (Easterby-Smith, Thorpe and Jackson, 2008).

Figure 33, below, gives an overview of the features of EFA and CFA.

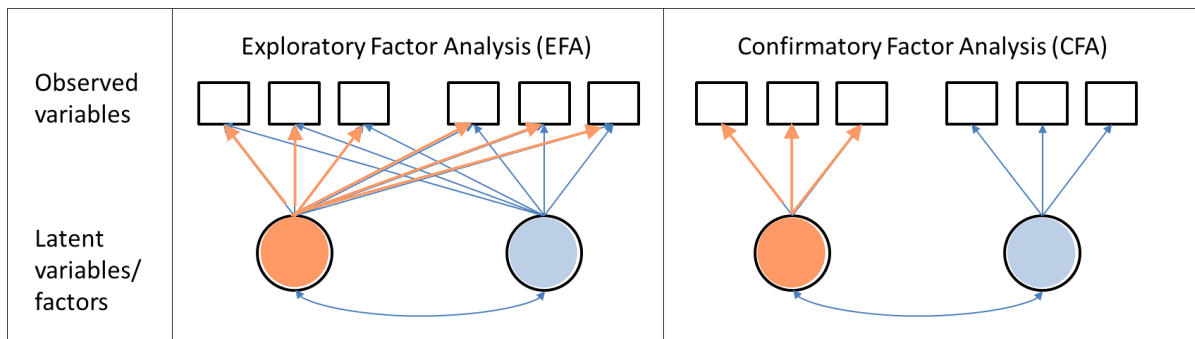


Figure 33: Exploratory factor analysis and confirmatory factor analysis, Source: Own drawing based on Byrne (2008, p.278); Easterby-Smith, Thorpe and Jackson (2005, p.71) and Kline (2009, p.5).

Even though the model and constructs in this quantitative approach build on previous research results and literature, an EFA is suggested, although previous research can help theoretically to better build the model and constructs. But it is not necessary that validity and reliability of the constructs in this sample are the same/acceptable as they were in previous research (with probably bigger sample).

The statistical approach with respect to measuring model 2 has the intention to confirm theoretical hypotheses H1 and H2. Of special interest are the causal relationships (precisely effects) with latent variables/constructs. The intention is to check 2 direct effects and a few moderating/mediating effects of 3 constructs as shown in figure 34.

The hypotheses for testing were formulated for each relationship as discussed on page 154 and shown in table 16-18:

H1a: Competitive advantage in an international venture increases with the degree of strategy development

H1b: Competitive advantage in an international venture increases with the degree of the implementation of an international strategy.

H2a: Learning capabilities strengthen the effect of strategy development

H2b: Coordination capabilities strengthen the effect of strategy development

H2c: Coordination mechanisms strengthen the effect of strategy implementation on competitive advantage

H2d: Relationship capabilities strengthen the effect of strategy implementation on competitive advantage

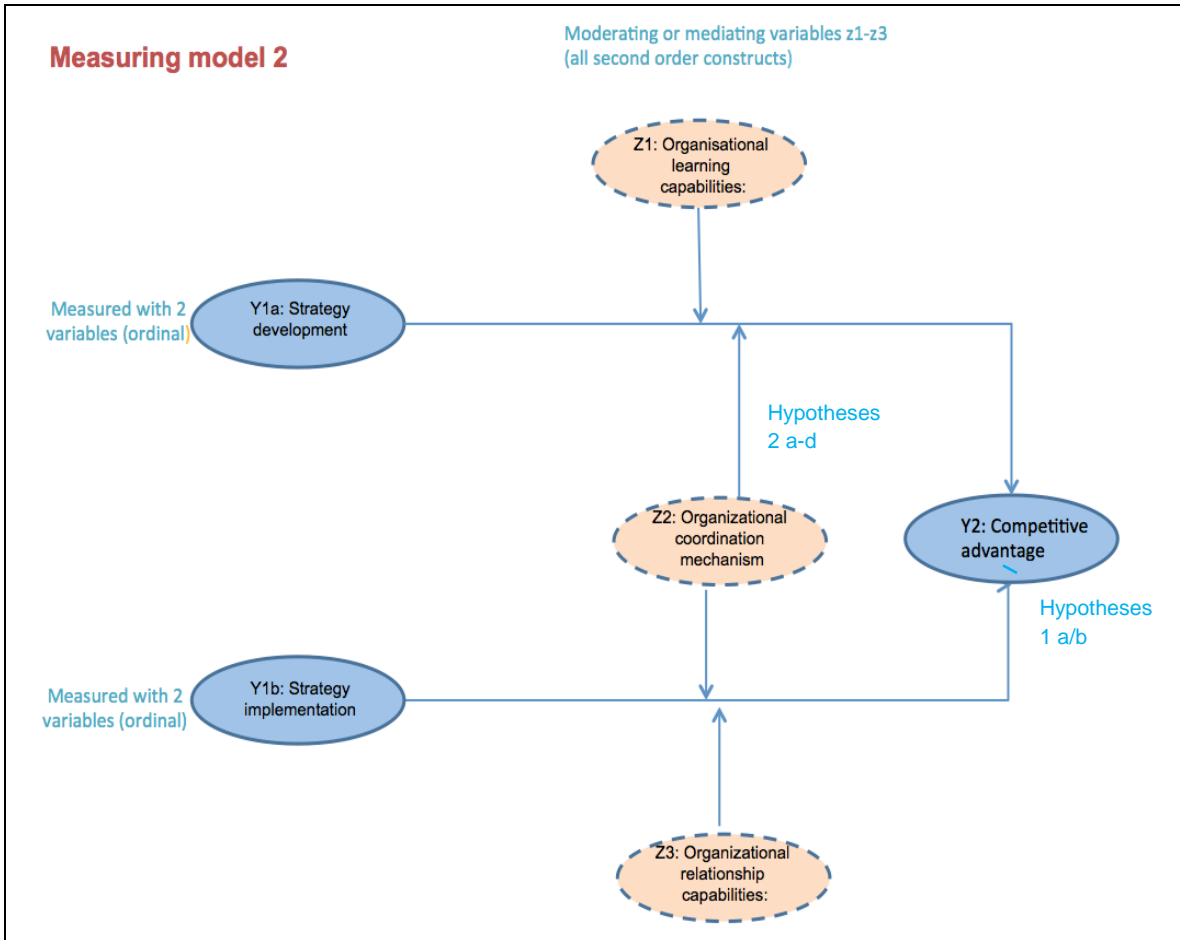


Figure 34: Measuring model 2

For the development of these hypotheses different steps, which are illustrated in figure 38 were followed. The testing these hypothesis is based upon data drawn from the samples. This process allows the researcher to make inferences about the population based on the sample data (Kumar, Aaker and Day, 2002).

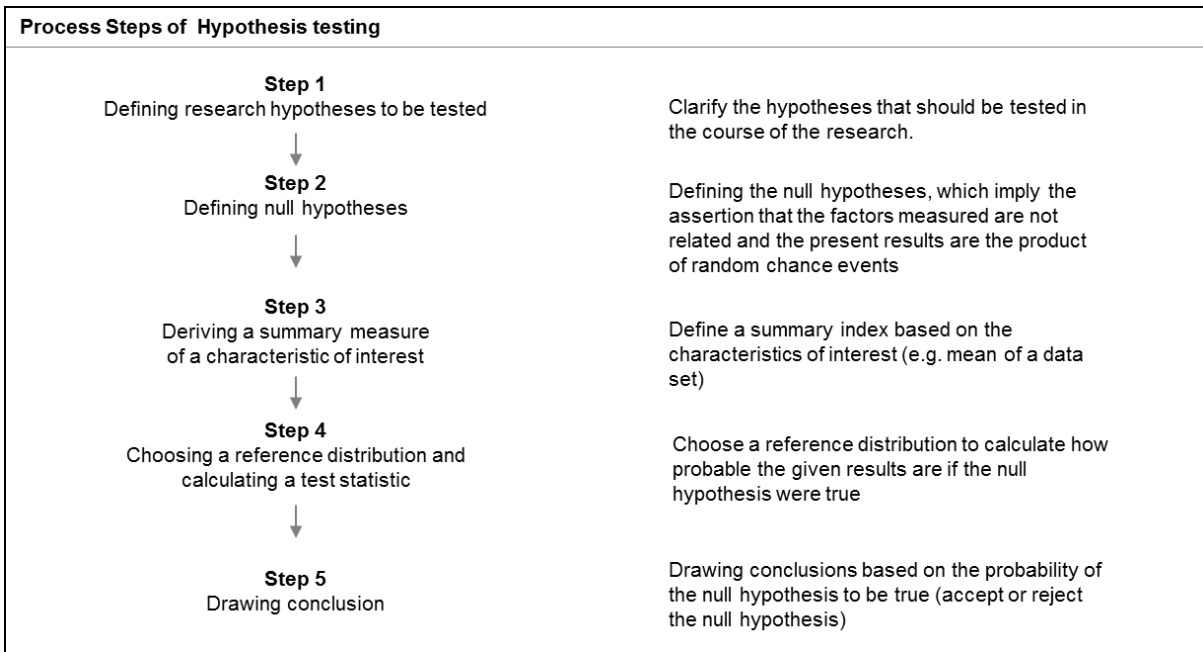


Figure 35: Development and testing of hypotheses

Generally, the aim of quantitative data analysis is to draw conclusions that are valid for the entire target population based on this data. Hence, the challenge in the process that is illustrated in figure 38, is to define the limits of generalization about study variables beyond the specific sample. The ability to generalise the conclusions decides whether or not the findings contribute to theory building. In other words, the researcher has to assess the outcome of the present study and finally to decide if the results are representative besides the limited sample or if they occur just a coincidental consequence.

Theories are statements about relationships of concepts, about the conditions when these relationships occur and about the causes and consequences that are valid in the target population (Easterby-Smith, Thorpe and Jackson, 2008). As discussed before, developing theories involves testing the underlying hypotheses and judging the generalisability of the findings. The hypotheses for the present research will consequently be tested in the next steps. In order to avoid mistakes in the testing of hypotheses so-called Type I and Type II errors have to be considered. Such errors can occur when making inferences from samples. In business and management research we would say that an error made by wrongly coming to a decision that something is true when in reality it is not, is a Type I error.

Type I errors might mislead a researcher to deduce that two variables are related when they are not, or in other words incorrectly concluding that a sample statistic

exceeds the value that would be expected by chance alone (Haenlein and Kaplan, 2004). This means the null hypothesis is rejected by the researcher, when it should not. The term 'statistical significance' discussed earlier therefore refers to the probability of making a Type I error.

A Type II error involves the opposite occurring. This means that Type II errors might involve the researcher in concluding that two variables are not related when they are, or that a sample statistic does not exceed the value that would be expected by chance alone. In other words, a researcher concludes that something is not true, when in reality it is true, and accepts the null hypothesis.

6.9.3 Descriptive statistics and related results

The analysis of quantitative data is based on the assumption that patterns can be identified and that those patterns contribute for a better understanding.

Consequently, the features of the data set that are relevant for answering the research questions have to be identified before the patterns within these features can be used to draw conclusions about the study's research questions (Easterby-Smith, Thorpe and Jackson, 2008).

With the help of descriptive statistical indexes the information presented in frequency tables can be summarized and by using just a few numerical indexes, large amounts of data can be described adequately (Howitt and Cramer, 2008). According to Kumar, Aaker & Day (2002) descriptive statistical indexes can be categorized into measures of central tendency (mean, median and mode), measures of dispersion (range, standard deviation, and coefficient of variation) and measures of shape (skewness and kurtosis). Each of these categories fulfils a different objective.

The central tendency scores indicate the most typical values in a dataset. The measurement of dispersion is an indicator of the variability within the data set and provides an indication on the spread of values around the central tendency. Finally, conclusions on the frequency distribution within a sample are based on the measurement and characteristics of shapes (Howitt and Cramer, 2008). With the help of such statistical indexes a first impression and a quick comparison of questions' item results can be conducted. They often serve as a starting point for

further analysis and provide an answer to the question of whether or not the data gathered shows a normal distribution (Robson, 2009; de Vaus, 2002).

For the first step, Kumar, Aaker & Day (2002) recommend analysing each question or measure by itself by tabulating the data. Tabulation means counting of cases that fall into various categories in order to determine the empirical distribution (frequency distribution) of the variable in question. This frequency distribution can be either visualised as a bar chart or as a histogram, which combines answer values into categories. The main advantage of such diagrams is that they allow for a graphical test of normality. The comparison of the analysed distribution with a normal distribution bell curve gives an insight into whether or not the data is normally distributed, which is a prerequisite for many statistical procedures.

For evaluating the normality of the present data set, histograms were generated for each question item and compared to the resulting charts to the normal distribution curve.

The next tables and diagrams show some selected frequency tabulations and related distribution diagrams.

q0010 Number of full time employees:

	Frequency	Percent	Cumulative Percent
Valid <10	4	6,7	6,7
10-50	11	18,3	25,0
51-100	11	18,3	43,3
101-250	13	21,7	65,0
251-500	9	15,0	80,0
>500	12	20,0	100,0
Total	60	100,0	

Table 19: Frequency table of full-time employees based on responses from question 10

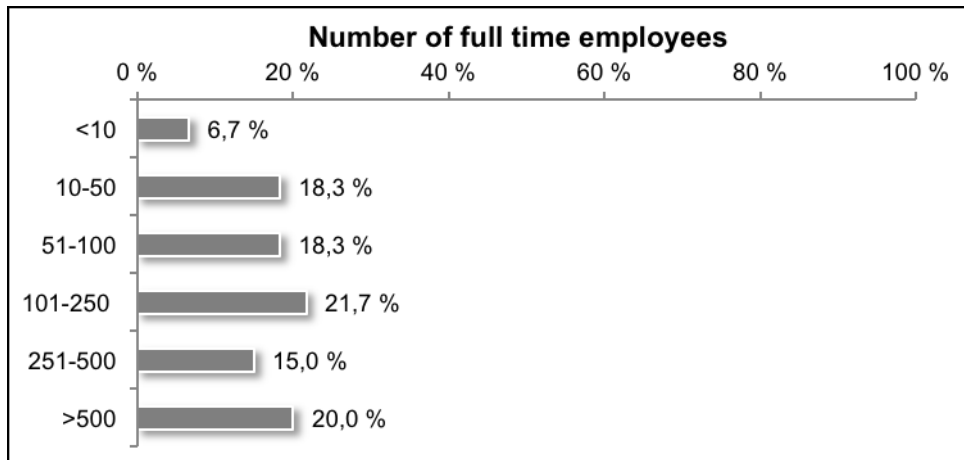


Figure 36: Distribution of full-time employees based on responses from question 10

According to the number of full-time employees the sample is pretty evenly distributed; the largest portion of sample represents the respondents with 101-250 employees (21,7 %), followed by respondents with more than 500 full-time employees (20,0 %).

q0014 Number of years firm has been involved in international business:

	Frequency	Percent	Cumulative Percent
Valid < 1	8	13,3	13,3
1-5	18	30,0	43,3
6-10	12	20,0	63,3
>10	14	23,3	86,7
Unknown	8	13,3	100,0
Total	60	100,0	

Table 20: Frequency table of firm's international experience based on responses from question 14

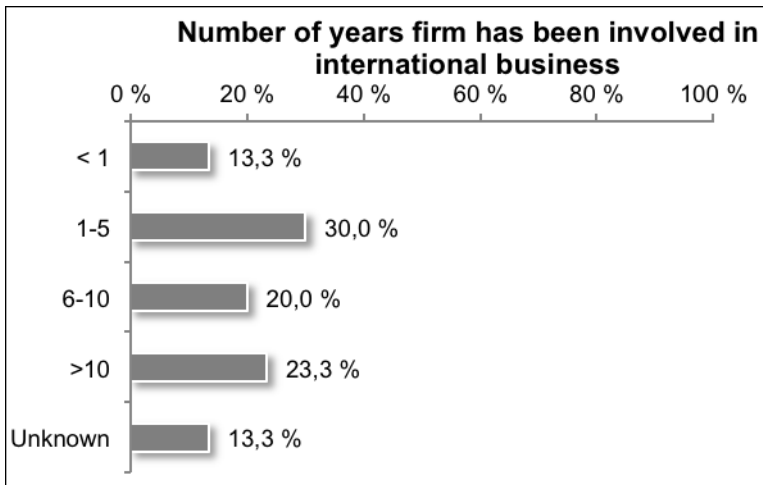


Figure 37: Distribution of firm´s international experience based on responses from question 14

The interval 1-5 years firm has been involved in international business is the category of respondents that is represented in the sample the most (30,0 %); the lowest portion represents respondents with less than a year (13,3 %). The analysis shows that nearly all question items follow a normal distribution with only slight deviations in any direction. But there are some exceptions.

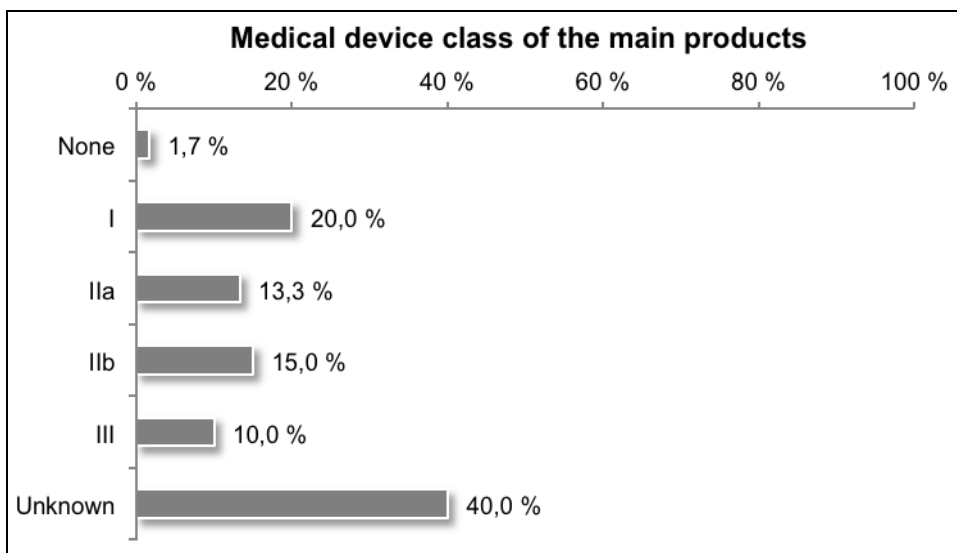


Figure 38: Responses on medical device class

Most of the respondents did not know or chose a low medical device class, which indicates that that for approx. 2/3 of the companies their products have either low complexity or the meaning of regulations in this context is rather low.

There must be highlighted that with respect to the strategic approach, the distribution is also different. The first and second questions are related to strategy development, whereas the third and fourth question reflected the concept of strategy implementation; they are formulated as shown in figure 39:

Internationalization Study of German Med Tech SMEs							
Strategy approach							
1. Please consider the role of strategy within your firm.							
With regard to your company strategic approach, to what extent do you agree or not with the following?							
	Strongly Disagree	Disagree	Partially Disagree	Undecided	Partially Agree	Agree	Strongly Agree
In our company we have a regular formal mid- or long-term planning process	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In our company there may be a strategic approach but this is the task of the top management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Business-strategy and functional strategies guide our business decisions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The measuring of strategic goals and related activities are supported by metrics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure 39: Operationalization of the variables related to strategy

The seven-point Likert scale is middle by the score 'undecided'. The figure below shows the mean to each question based on the responses. When considering the answers, it becomes obvious that there is not a normal distribution, since the majority at least partially agrees to the questions.

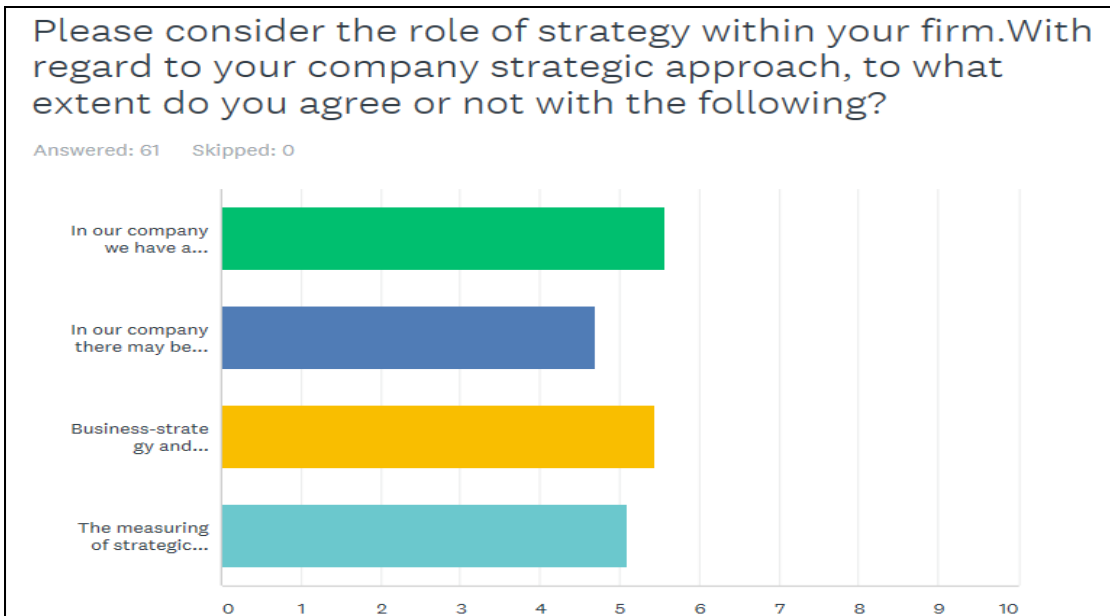


Figure 40: Mean score based on the answers related to strategy

Most of the companies state to do strategic planning, whereas they also recognize that this is mainly the task of the top management. They also agree in having implemented their strategy in a day-to-day business.

For a more detailed analysis of normality, however, it is necessary to extend the graphical analysis with descriptive statistic indexes. Next to these methods, further advanced procedures for testing normality are available in the literature. The most common ones are the Kolmogorov-Smirnov Test and Lilliefors' Test of Normality (Reinard, 2006). The literature generally suggests that examining isolated normality test values is not sufficient to judge the normality of a data set. Instead, one should integrate different contributing factors into the analysis, such as the visual representation of the data, measures of central tendency, skewness and kurtosis and the sample size (Pett, 1997).

Since in the next steps various statistical tests will be performed and discussed as well as an EFA and CFA, the calculated results of the most common descriptive statistics for each question item of the present survey will be provided as a table in the appendix.

6.9.4 Statistical analysis of measuring model 1 and related results

Theories are statements about relationships of concepts, about the conditions when these relationships occur and about the causes and consequences that are valid in the target population (Easterby-Smith, Thorpe and Jackson, 2008). According to the research question and the related measuring model (see figure 32), this research is interested in relationship variables (Y1a and Y1b). Therefore a regression-based approach (multiple regression analysis) is used. It is a common understanding that multiple regression analysis is applied in order to explore dependencies and to test hypothesis. The relation of a dependent variable y and multiple independent variables $X_1..X_n$ is tested by multiple regression. Correlation between X_j is permitted. Pearson's test for correlation and two-tail significance testing provide evidence regarding correlation. With a factor analysis it can be tested if the correlation can be traced back to few variables. In statistical testing it is crucial to test validity and reliability. Cronbach's alpha test, as a test for reliability has already been described before. An exploratory factor analysis (EFA) is performed for creating factors (single dependent variables) named 'strategy development' and 'strategy implementation'. Two separate regression models will be created (for dependent variable/factor Y1a and Y1b). For deciding whether the factor analysis should be continued or not can be supported by assessing the so-called sampling adequacy with the help of the Kaiser-Meyer-Olkin test (KMO) and by Bartlett's test of sphericity. The factor analysis of variance (ANOVA) explores if the model is good enough for prediction and finally it is examined whether variables have statistically significant effect on the concepts, so that hypotheses can be rejected or accepted. The analysis is based on the assumption that all variables can be considered as observable; and the conjecture that all variables are measured without error, which may limit their applicability in some research situations. The assessment of the quality of the operationalization takes place at both local (construct-related) and global (model-related) levels.

Before presenting the results of these tests, the theoretical foundation will be summarized and the limits regarding acceptance criteria will be discussed in the example of one of the concepts concept called 'Strategy Development':

One method of choice to analyse associations between variables is the so-called Pearson's correlation test, which can provide important insights into the

interdependencies of constructs. Since the present study has substantially more than two variables, in this first step the complexity is tried to be reduced by looking at two variables at a time. The correlation among variables will be tested based on selection criteria that refer to the hypotheses developed before. There is a common understanding that causal relationships cannot be derived on the base of correlation coefficients in any definite way. Two statistically significant correlated variables may, in fact, be both caused by a third, not regarded, variable. With the help of a correlation analysis associations and the direction of interdependencies between two variables can be tested at a time. A well-known bivariate correlation test is the so-called Pearson correlation coefficient (Howitt and Cramer, 2008).

The value of such a correlation coefficient has to be interpreted. According to Cohan (2009) a correlation coefficient above .10 indicates a small effect, a value above .30 a medium effect and a value over .50 a large effect. The significance values indicate the probability that the Null Hypothesis (no correlation between the variables) is true.

In the next step, a conclusion based on the probability of getting the present results if the null hypothesis were true, has to be evaluated with help of the significance level. Following the convention a small probability means that the observed outcome is too surprising for the null hypothesis to be true. According to Kumar, Aaker and Day (2002), in academic research the most commonly chosen minimum values for the *significance level* (p) or *alpha* (α), α are the 1-percent level, the 5-percent level and the 10-percent level. Generally, the higher the significance level used for testing a hypothesis, the greater the probability of rejecting a null hypothesis when it is true. This is called a Type I Error, as opposed to accepting a null hypothesis falsely, which is called a *Type II Error* (Easterby-Smith, Thorpe and Jackson, 2008).

It is also important to distinguish between one- and two-tailed p values. Figure 41 illustrates that the region under the normal distribution that leads to rejection of a hypothesis can be found either on both sides of the curve, which means that the non-rejection region is in between, or on either side of the curve (Beri, 2010).

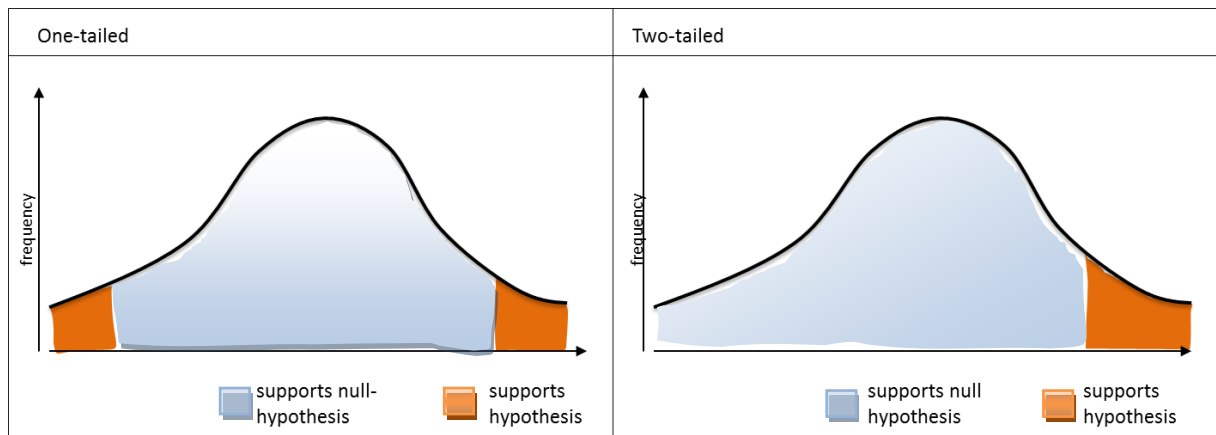


Figure 41: One-tailed and two-tailed hypothesis testing. Own drawing, based on Howitt & Cramer (2008, p.166).

One-tailed p values generally result in greater levels of significance (or smaller p-values), but are only applicable if a set of rather stringent rules can be followed. Two-tailed p-values are larger (and therefore more conservative). Thus using two-tailed values usually does not lead to flawed conclusions, while falsely using a one-tailed value might reflect a higher significance as it actually is.

According to Howitt and Cramer (2008), one-tailed p-values should only be applied if the predictions are based on strong theories, and/or if previous similar research demonstrates consistent trends in the predicted direction and/or if the predictions are well known before any data is collected.

Although it is clearly a controversial issue, the literature suggests that there is rarely sufficient justification to use one-tailed p-values (Howitt and Cramer, 2008),

Although many of the research hypotheses are directional hypotheses, it has to be considered that some survey results do not completely comply with all the assumptions on which the statistical calculations are based, especially the perfect normal distribution. Consequently, the p-values are often reported to be smaller than they ought to be. Using the larger two-tailed p-value partially corrects for this and therefore only two-tailed significance levels are used in the present research (Kumar, Aaker and Day, 2002).

Hence, all hypotheses will be tested first at a two-sided significance level of 0.05 and with respect to a non-perfect normal distribution accepted at a level of .01: thus, a value below .01 indicates a significant correlation between the variables.

Now, when testing the effect of the constructs the description will be detailed, and the underlying literature will be linked to the performed tests and achieved results, in order to provide a high level of transparency. Starting now with the results of the example of the Concept of 'Strategy development':

Effects on Strategy development, part q0001_0001:

Correlations

		q0001_0001	q0001_0002
q0001_0001 In our company we have a regular formal mid- or long-term planning process	Pearson Correlation	1	,229
	Sig. (2-tailed)		,078
	N	60	60
q0001_0002 In our company there may be a strategic approach but this is the task of the top management	Pearson Correlation	,229	1
	Sig. (2-tailed)	,078	
	N	60	60

- *Variables that are included in one factor should be statistically significant correlated on the level 0,05*
- *Two variables of strategy development are statistically significant correlated on the level of 0,10*
- *Due to small sample and only 2 available variables for factor creation, we will do the exception and accept statistical significant result on the level 0,10.*

Before performing a factor analysis, the literature suggests evaluating the sample size adequacy using the Kaiser-Meyer-Olkin test of sampling adequacy (KMO).

The Kaiser-Meyer-Olkin test of sampling adequacy (KMO) compares the magnitudes of the correlation coefficients to the magnitudes of the partial correlation coefficients. The partial correlation coefficients represent the correlations between each pair of items after removing the linear effects of all other items (Pett, Lackey and Sullivan, 2003). The standard convention when evaluating the size of the overall Kaiser-

Mayer-Olkin values, developed by Kaiser (1974), defines levels less than .50 as “mediocre” or “unacceptable”, up to .70s is just “middling”, in the .80s is “meritorious” and above .90 is “marvellous”.

Furthermore, it is necessary to assess whether the factor analysis should be continued or not by employing Bartlett’s test of sphericity (Schmidt and Hollensen, 2006). Bartlett’s test of sphericity tests the hypothesis of whether the population matrix is an identity matrix. The existence of an identity matrix puts the correctness of the factor analysis under suspicion (Bajpai, 2011).

Continuing with the results on the example of the Concept of ‘Strategy development’:

Validity

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,500
Bartlett's Test of Sphericity	Approx. Chi-Square	3,109
	df	1
	Sig.	,078

- *With Bartlett's test of sphericity, we test the variable acceptance for further factor analysis. If the test is statistically significant on the level 0,05, variables are independent and further factor analysis is meaningful.*
- *In this case, significance is 0,078, therefore factor analysis is not meaningful by this criteria. Due to small sample and only 2 available variables for factor creation, we will do the exception and accept statistical significant result on the level 0,10.*
- *With KMO measure of sampling adequacy, we check the power of correlation among variables. For good correlation the value of KMO should be 0,80 or higher, but in social science data also lower correlation (at least 0,50) is still acceptable.*

For the present case, the value of KMO is 0,500, therefore the factor analysis is still justified.

For a group of indicators, the internal consistency reliability is first checked, whereby the so-called Cronbach alpha is calculated and used for assessment (Cronbach, 1951, Peter 1979). The higher the covariances or correlations between the indicator variables, the more closely Cronbach's alpha, whose range extends from zero to

one, approaches unity. The reliability of the measurement model depends on the average correlation among the observed variables and is usually measured using the Cronbach's alpha coefficient (Craig and Douglas, 2005).

This coefficient can have a value of alpha (α) between negative infinity and 1, while generally a value greater than .70 indicates a high level of reliability (Bryman and Bell, 2007; Dewberry, 2004). Others name the range between .7 to .8 "only" as acceptable. According to Shelby (2011) α values between .65 and .70 will be judged as "adequate scales", values between .70 and .80 as "good scales" and values above .80 as "very good scales". Recent publications increasingly argue in favour of a more relaxed minimum level of .50, acknowledging that striving for high Cronbach's alpha values has increasingly led researchers to increase the number of extremely similar question items. However, values below 0.5 are described as 'poor' or 'unacceptable' (Enders, 2004; Heinecke, 2011).

For the present research, the convention based on Enders (2004) and Heinecke (2011) will be used, since the intention when formulating the questions was not to increase the similarity of question items, quite in contrary the formulations were chosen to cover a range of different understandings on respondents side.

Results on the example of the Concept of 'Strategy development':

Reliability Statistics

Cronbach's Alpha	N of Items
.362	2

- *Cronbach's alpha value shows that factor of 2 variables is not reliable (alpha value is unacceptable)*
- *Therefore it should be paid attention to the results when using this factor, since low quality or unexpected results could occur due to factor unreliability*

While the Cronbach's alpha coefficient evaluates the overall reliability of the model, other measures show how well a single indicator fits within the model. In other words, a factor analysis evaluates the correlation between a single item and the sum of all items that are supposed to represent one factor. According to Jais (2007), there are various tests to indicate a good fit and a high convergent validity of the item under investigation. While generally higher values stand for a good fit, for lucidity reasons each acceptance level is indicated in the interpretation of the results.

The reliability of the factors is now evaluated using additional reliability indices. The squared multiple correlation is the communality estimate for an indicator variable. The communality measures the percent of variance in a given indicator variable explained by its latent variable (factor) and may be interpreted as the reliability of the indicator. If a variable has low theoretic importance and a low communality, it may be targeted for removal in the model-modification. It is required in this context that at least 50% of the variance of the associated indicators are explained by the extracted factor, and the respective factor charges are at least 0.4 per indicator (or in the case of a one-factorial case the communalities are at least 0,16) (Peter, 1997).

Communalities

	Initial	Extraction
q0001_0001 In our company we have a regular formal mid- or long-term planning process	1,000	,615
q0001_0002 In our company there may be a strategic approach but this is the task of the top management	1,000	,615

Extraction Method: Principal Component Analysis.

- *Values of communalities should be higher than 0,20, which means that all variables explain enough variability of dependent variable (in other case the variables with to low communality should be excluded from analysis)*

Total Variance explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1,229	61,471	61,471	1,229	61,471	61,471
2	,771	38,529	100,000			

Extraction Method: Principal Component Analysis

- *All included variables explain in total 61,47 % of total variability*
- *With this % we satisfy the criterion of good factor (which explain at least 60 % of total variance)*

Component Matrix

	Component
	1
q0001_0001 In our company we have a regular formal mid- or long-term planning process	,784
q0001_0002 In our company there may be a strategic approach but this is the task of the top management	,784

Extraction Method: Principal Component Analysis

a. 1 component extracted.

- *Since only two variables are included in factor, both have the same factor score or in other words, both are equally important for factor (if there were more variables, higher factor score indicates higher importance of the variable for factor content)*

This procedure was executed for each of the concepts. The detailed results are shown in the appendix. Summarized it can be acknowledged, that all variables included can explain between 79% and 61% of total variability of each concept (factor), which satisfies the criterion of good factor since it explains at least 60 % of total variance. A KMO score above 500 confirms that the factor analysis is justified, which is valid for all constructs of the present research.

The constructs named 'strategy development', 'strategy implementation', external industry-specific factors' and 'market-specific product potential' have the weakest correlation among the variables. Cronbach's alpha is high for 'organizational learning' which means good reliability but it is weak at 'strategy development' as well as at 'external industry specific factors'. Unexpected results in the further analysis could refer to this factor unreliability and therefore it should be paid attention with respect to future results.

Communalities for each concept should be higher than 0.20 as a value, otherwise variables should be excluded from analysis. Consequently, this has been done for three constructs as indicated. In case that variables are equally important since they have the same factor score or if a factor (concept) is represented only by two variables, as for 'strategy planning' and 'strategy implementation', there is no exclusion possible. In other cases, e.g. for the concept of competitive advantage, the variable customer perceived benefit is not correlated to the other three variables and therefore it is excluded.

The purpose of such a confirmatory factor analysis is to test hypotheses about a factor structure. The underlying idea is that theories come first; the model is derived from the theory; the model is tested for consistency with observed data.

A summarized overview regarding the CFA results is provided in the table below.

	No. of variables		KMO	% of variance	Cronbach's Alpha	
	included	excluded				
Strategy development (a)	2	0	,500	61,471	,362	unacceptable
Strategy implementation (b)	2	0	,500	69,831	,567	acceptable
Competitive advantage - fac	3	1	,663	65,199	,661	adequate
Organisational learning capabilities - fac	3	0	,691	68,606	,770	good
Organizational coordinating mechanisms - fac	3	0	,642	62,861	,702	good
Organizational relationship capabilities - fac	3	0	,721	79,786	,873	very good
External industry specific factors - fac	2	1	,500	64,422	,446	unacceptable
Market specific product potential - fac	2	1	,500	76,584	,693	adequate
Firm specific internal resources - fac	3	0	,695	70,704	,793	good

Table 21: Results of the (exploratory) factor analysis and reliability testing

Conclusion for the further statistical testing: Even though for each measuring topic validity and reliability have been checked, the results cause several implications

- *In external industry-specific factors validity is good, but reliability is unacceptable, even when only two variables are used that are correlated -> so these three variables are together not measuring external industry-specific factors good enough, but they can be used as a single variable.*
- *In market specific product potential validity is good and reliability is adequate, but only when two variables that are correlated are used -> so these two variables could be used as a factor, since together they measure market specific product potential good enough*
- *In firm-specific internal resources validity is good and reliability is good -> so these three variables could be used as a factor, since together they measure firm-specific internal resources good enough*

Consequently, the factor analysis is justified, the base for the measuring model 1 and 2 is verified. In a following step, the measuring model 1 is now analysed on base of the results of the EFA by using multiple regression in order to test the hypotheses.

The regression analysis is performed in order to evaluate the effects of the independent variables on the constructs of 'strategy development' (a) and 'strategy implementation' (b). As a result of the CFA the regression analysis is performed by testing each of the two single variables of the constructs 'strategy development' and 'strategy implementation' (q0001_0001 - q0001_0004).

a) Regression analysis – effect on strategy development (detailed example)

Since the EFA and reliability results showed that factor strategy development is not of acceptable quality for further use, strategy development is measured with two single variables – these were dependent variables in regression:

- q0001_0001 In our company we have a regular formal mid- or long-term planning process (a1)
- q0001_0002 In our company there may be a strategic approach but this is the task of the top management (a2)

The single regression model includes 9 independent variables, which measure three areas: External industry-specific factors, Market-specific product potential and Firm specific internal resources.

a1) Effect on strategy development, part q0001_0001

In multiple linear regression the quality of regression model is checked first and if the model is of good quality, it is continued with checking of effects

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,610	,373	,260	1,00656

b. Dependent Variable: q0001_0001 In our company we have a regular formal mid- or long-term planning process

- *the value of Adjusted R Square is 0,260 which means that all independent variables can explain 26,0 % of variability independent variable – strategy development (in part of q1_1)*

ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	30,075	9	3,342	3,298	,003 ^b
Residual	50,658	50	1,013		
Total	80,733	59			

a. Dependent Variable: q0001_0001 In our company we have a regular formal mid- or long-term planning process

- *Result of ANOVA for regression model: the quality of model is good enough for effects prediction, since the significance of F statistics is lower than 0,0*

Coefficients^a

Model		Unstandardized	Standardized	t	Sig.
		Coefficients	Coefficients		
		B	Beta		
1	(Constant)	,769		,677	,502
	q0002_0001 The market potential in our foreign markets is very attractive	,438	,404	2,969	,005
	q0002_0002 Medical device regulations in foreign countries are sometimes a real challenge	,113	,109	,893	,376
	q0002_0003 Without cooperating with our network-partners foreign ventures would be difficult for us	,060	,060	,466	,644
	q0003_0001 Anything that we can offer in foreign markets our competitors can match easily	-,043	-,058	-,502	,618
	q0004_0001 The quality of our products and services is better than that of our major competitors	,065	,064	,443	,660
	q0004_0002 Compared to similar products developed by our competitors, our product will offer unique beneficial attributes to the customers ...	-,018	-,017	-,102	,919
	q0005_0001 The headcount and the financial commitment, which our firm provides for international ventures is ...	,354	,387	2,560	,014
	q0005_0002 The amount of skilled managers with international experience in our firm can be considered as ...	,035	,040	,265	,792
	q0005_0003 The extent of established processes and routines with respect to international ventures is ...	-,106	-,121	-,733	,467

a. Dependent Variable: q0001_0001 In our company we have a regular formal mid- or long-term planning

- from 9 independent variables the 2 of them have statistically significant effect on strategy development (in part of q1_1), which are Market potential and Physical capital
 - the effect of market potential is statistically significant (sig=0,005), positive and of moderate intensity (Beta=0,404) -> so better attractiveness of foreign market potential, better the strategy development (in part of q1_1)
 - the effect of physical capital is statistically significant (sig=0,014), positive and of weak intensity (Beta=0,387) -> so the higher the extent of physical capital, the more likely is the strategy development (in part of q1_1)
- 7 other independent variables do not have statistically significant effect on strategy development (in part of q1_1)

a2) Effect on strategy development, part q0001_0002

In multiple linear regression, the first check is about the quality of the regression model, then if the model is of good quality. If both tests meet the acceptance criteria the check of effects can be continued.

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,472	,223	,083	1,48142

b. Dependent Variable: q0001_0002 In our company there may be a strategic approach but this is the task of the top management

- the value of Adjusted R Square is 0,083 which means that all independent variables can explain 8,3 % of variability in dependent variable – strategy development (in part of q1_2)

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	31,520	9	3,502	1,596	,142 ^b
	Residual	109,730	50	2,195		
	Total	141,250	59			

a. Dependent Variable: q0001_0002 In our company there may be a strategic approach but this is the task of the top management

- *result of ANOVA for regression model shows that the quality of model is not good enough for effects prediction, since the significance of F statistics is (much) higher than 0,05*
- *therefore, the results of regression coefficients can be considered only as informative results without great importance for research conclusions.*

Coefficients^a

Model		Unstandardized	Standardized	t	Sig.
		Coefficients	Coefficients		
		B	Beta		
1	(Constant)	,102		,061	,952
	q0002_0001 The market potential in our foreign markets is very attractive	-,033	-,023	-,154	,879
	q0002_0002 Medical device regulations in foreign countries are sometimes a real challenge	,468	,341	2,511	,015
	q0002_0003 Without cooperating with our network-partners foreign ventures would be difficult for us	,056	,043	,297	,768
	q0003_0001 Anything that we can offer in foreign markets our competitors can match easily	,280	,284	2,202	,032
	q0004_0001 The quality of our products and services is better than that of our major competitors	,161	,119	,742	,462
	q0004_0002 Compared to similar products developed by our competitors, our product will offer unique beneficial attributes to the customers ...	-,145	-,102	-,561	,578
	q0005_0001 The headcount and the financial commitment, which our firm provides for international ventures is ...	,000	,000	,002	,998
	q0005_0002 The amount of skilled managers with international experience in our firm can be considered as ...	,196	,168	1,003	,321
	q0005_0003 The extent of established processes and routines with respect to international ventures is ...	-,082	-,071	-,384	,702

a. Dependent Variable: q0001_0002 In our company there may be a strategic approach but this is the task of the top management

- *just for quick informative check – it can be seen that from 9 independent variables the 2 of them have statistically significant effect on strategy development (in part of q1_2), which are Medical regulations and Competitiveness*

- *the effect of medical regulations is statistically significant (sig=0,015), positive and of weak intensity (Beta=0,341) -> so the similar the medical regulations, the better the international strategy development (in part of q1_2) or the bigger the medical regulation challenges, the worse is the development towards an international strategy*
- *the effect of competitiveness is statistically significant (sig=0,032), positive and of weak intensity (Beta=0,284) -> so greater degree of competitive products, better the development of an internationalisation strategy*
- *further conclusions for hypotheses and regression model presentation is made only on regression model with q1_1 dependent variable, which was of good quality for effects measurement*

b) Regression analysis – effect on strategy implementation

Now, the regression analysis continues to investigate the effect on strategy implementation. Since the EFA and reliability results showed that factor 'strategy implementation is not of acceptable quality for further use it was decided to measure 'strategy implementation with two single variables – these were dependent variables in regression:

- *q0001_0003 Business-strategy and functional strategies guide our business decisions (b1)*
- *q0001_0004 The measuring of strategic goals and related activities are supported by metrics (b2)*

This single regression model includes 3 independent variables which measure the area of Firm-specific internal resources

b1) Effect on strategy implementation, part q0001_0003

In multiple linear regression the quality of regression model is checked first and secondly, if the model is of good quality, we continue with checking of effects

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,153	,023	-,029	1,17271

b. Dependent Variable: q0001_0003 Business-strategy and functional strategies guide our business decisions

- *the value of Adjusted R Square is -0,029 which means that all independent variables can't explain variability in dependent variable (negative result treated as zero) – strategy implementation (in part of q1_3)*

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1,836	3	,612	,445	,722 ^b
	Residual	77,014	56	1,375		
	Total	78,850	59			

a. Dependent Variable: q0001_0003 Business-strategy and functional strategies guide our business decisions

- *result of ANOVA for regression model shows that the quality of model is not good enough for effects prediction, since the significance of F statistics is (much) higher than 0,05*
- *therefore the results of regression coefficients is only considered as informative results without the great importance for research conclusions*

Coefficients^a

Model		Unstandardized Coefficients	Standardized Coefficients	t	Sig.
		B	Beta		
1	(Constant)	4,981		7,492	,000
	q0005_0001 The headcount and the financial commitment, which our firm provides for international ventures is ...	-,074	-,082	-,486	,629
	q0005_0002 The amount of skilled managers with international experience in our firm can be considered as ...	,123	,142	,841	,404
	q0005_0003 The extent of established processes and routines with respect to international ventures is	,052	,061	,334	,740

a. Dependent Variable: q0001_0003 Business-strategy and functional strategies guide our business decisions

- *just for quick informative check – it is obvious that from 3 independent variables none of them have statistically significant effect on strategy implementation (in part of q1_3)*

b2) Regression analysis- effect on strategy implementation, part q0001_0004

As done before, first the quality of the regression model is checked and if the model is of good quality, the effects are checked.

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,399	,159	,114	1,15840

b. Dependent Variable: q0001_0004 The measuring of strategic goals and related activities are supported by metrics

- *the value of Adjusted R Square is 0,114 which means that all independent variables can explain 11,4 % of variability in dependent variable – strategy implementation (in part of q1_4)*

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14,255	3	4,752	3,541	,020 ^b
	Residual	75,145	56	1,342		
	Total	89,400	59			

a. Dependent Variable: q0001_0004 The measuring of strategic goals and related activities are supported by metrics

- *the result of ANOVA for regression model shows that the quality of model is good enough for effects prediction, since the significance of F statistics is lower than 0,05*

Coefficients^a

Model		Unstandardized Coefficients	Standardized Coefficients	t	Sig.
		B	Beta		
1	(Constant)	3,181		4,844	,000
	q0005_0001 The headcount and the financial commitment, which our firm provides for international ventures is ...	,261	,271	1,742	,087
	q0005_0002 The amount of skilled managers with international experience in our firm can be considered as ...	,006	,007	,044	,965
	q0005_0003 The extent of established processes and routines with respect to international ventures is ...	,155	,169	1,001	,321

a. Dependent Variable: q0001_0004 The measuring of strategic goals and related activities are supported by metrics

- *from 3 independent variables, none of them have statistically significant effect on strategy development (in part of q1_4)*
- *further conclusions for hypotheses are made only on regression model with q1_4 dependent variable, which was of good quality for effects measurement*

In a next step the hypotheses can be tested based on the results of the presented statistical tests. In order to test hypotheses, the researcher has to develop a null hypothesis, which basically states that there are “no changes, no effects, no differences” (Gravetter and Wallnau, 2011) between measured variables.

Generally, the null hypothesis thus represents the proposition that there is no difference between the variables of the original hypothesis (also called alternative hypothesis) (Kumar, Aaker and Day, 2002).

For the present research that means according to the in section 6.9.2 presented hypotheses on hand of an example:

Hypothesis H₃: *Attractiveness of foreign market potential is positively related to the development of an international strategy*

Corresponding null hypothesis H₀: *There is no relationship between the attractiveness of the potential of a foreign market and the attitude towards the development of an international strategy (to realize this potential).*

It is important to acknowledge that the null hypothesis can never be proven. A set of data can only help to reject the null hypothesis if there is strong evidence in favour of the alternative research hypothesis H₃ (Easterby-Smith, Thorpe and Jackson, 2008). The results and the meaning of this outcome will be discussed in section 9.10 in detail.

6.9.5 SEM analysis of measuring model 2 and related results

There are two different kinds of variables used in the present research, those that are measured directly by the researcher (called observed variables) and those that are not measured directly but are inferred from observed variables (called latent variables) (Meyers, Gamst and Guarino, 2006). So far, only the measured variables have been considered in this analysis. The used regression-based approaches (e.g.

multiple regression analysis, analysis of variance) and the factor analysis, belong to the core set of statistical instruments called ‘first-generation techniques’, which can be used to confirm theoretical hypothesis based on the analysis of empirical data (Gefen, Straub, & Boudreau, 2000). Many researchers in various disciplines have applied one of these methods to generate findings that have significantly shaped the way we see the world today.

However, a common factor for all these methods is that they share three limitations, which are according to Haenlein and Kaplan (2004, p. 284) namely:

- “(a) the postulation of a simple model structure;
- (b) the assumption that all variables can be considered as observable; and
- (c) the conjecture that all variables are measured without error, which may limit their applicability in some research situations”.

Where the first assumption, the postulation of a simple model structure (i.e., one dependent and several independent variables) is concerned, Jacoby (1978) stated that “we live in a complex, multivariate world [and that] studying the impact of one or two variables in isolation, would seem...relatively artificial and inconsequential” (p.91). This becomes, for example, especially obvious when a researcher has the intention to investigate the potential effect of mediating or moderating variables on the relationship between one or more dependent and independent variables. This will lead to the fact that dependent variables influence other dependent variables (Baron and Kenny, 1986).

The second assumption, that all variables can be considered as observable is meanwhile seen as questionable by some researchers. McDonald (1996) stressed that a variable can be called observable “if and only if its value can be obtained by means of a real-world sampling experiment” (p. 239). Therefore, any variable that does not correspond directly to anything observable must be considered as unobservable (Dijkstra, 1983).

Regarding the conjecture of variables measured without error, Haenlein and Kaplan (2004) highlight that each observation of the real world is accompanied by a certain measurement error, which may comprise two parts:

A random error (e.g., caused by the order of items in a questionnaire or respondent fatigue; Heeler & Ray, 1972) and a systematic error, such as method variance (i.e., variance attributable to the measurement method rather than the construct of interest; Bagozzi and Philipps, 1991).

According to Churchill (1979), the observed score of an item is always the sum of three parts, namely, the true score of the variable, random error, and systematic error. Hence according to Haenlein and Kaplan (2004), first-generation techniques are only applicable when there is neither a systematic nor a random error component—which is considered as a rare situation in reality.

To overcome these limitations of first-generation techniques structural equation modeling (SEM) has been used as an alternative. Because the measuring model 2 particularly builds on a supposed moderating or mediating effect of the construct 'organizational capabilities', the entire model is rather complex and the possibility of errors has to be acknowledged. Compared to regression-based approaches, which analyze only one layer of linkages between independent and dependent variables at the same time, second-generation techniques such as SEM, allow the simultaneous modeling of relationships among multiple independent and dependent constructs (Gefen, Straub and Boudreau, 2000).

SEM can be traced mainly to Jöreskog and Sörbom (1989), who developed a software application named LISREL [Linear Structural Relationships] based on the initial definition: "A structural equation model is used to specify the phenomenon under study in terms of putative cause-and-effect variables and their indicators. Because each equation in the model represents a causal link rather than a mere empirical association, the structural parameters do not, in general, coincide with coefficients of regressions among observed variables. Instead, the structural parameters represent relatively unmixed, invariant and autonomous features of the mechanism that generates the observed variables." (Jöreskog and Sörbom, 1989 ; p. 1). Meanwhile, other software applications have been established, such as EQS [EquationS], AMOS [Analysis of Moment Structures based on SPSS) and PLS [Partial Least Squares analysis]. Under the umbrella of SEM also other names and techniques, such as covariance structure analysis (or covariance structure modeling or analysis of covariance structure), causal modeling or path analysis (with latent variables) can be subsumed.

Before starting a causal analysis it has already been addressed that to check the data on aspects such as scaling, outliers and the present distribution is recommended or even necessary (Baumgartner and Homburg, 1996). Information regards means and distribution has already been provided in section 6.9.3; in particular, the interval scaling is a prerequisite for the estimation of structural equation models (Bagozzi, 1981). According to the opinion of pragmatists, the scores often used in the economic and social science empiricism may, if equidistant, be regarded as quasi-metric (Bortz, 1999, Jaccard and Wan, 1996). In order not to violate the causal-analytic assumptions of continuous variables despite discreet measurement, however, at least or rather seven scales are recommended (see Bagozzi, 1981). In the present research only scales, which meet these prerequisites, have been applied.

Furthermore, it is necessary to consider whether a formative or reflective measurement model should be specified (Homburg, 2000, Diamantopoulos and Winklhofer, 2001). In principle, the two model specifications can be distinguished as follows: A reflective measurement model is based on the assumption that the associated, directly observable indicators are causally influenced by the latent variables (Bollen, 1989; Edwards and Bagozzi, 2000). If the indicators are able to measure the latent variable without errors, they are completely correlated and can thus be exchanged in virtually any way (Jarvis et al., 2003). For this reason, the indicators should always be highly correlated in a reflective measurement model.

In contrast, a formative measurement model is based on a reversal of the relation between directly observable indicators and the latent variables. The indicators thus create the latent variables (MacCallum and Browne, 1993). However, the indicators need not necessarily be correlated with one another, but there must be a causal relationship between each formative indicator and the latent variables. Therefore, changing each indicator leads to a change in the causal of all relevant manifest indicators. Since a formal construct is defined by the totality of its indicators, the elimination of slightly correlated indicators from model-theoretical considerations is "not necessarily permissible, especially from conceptual considerations" (Eggert and Fassott, 2003, p. 6). The traditional procedures for the assessment of the quality should, therefore, be limited exclusively to reflectively operationalized constructs (Diamantopoulos, 1999). Hence, a reflective approach has been chosen and operationalized; details have been described when explaining the EFA procedure.

The next step in theoretical reasoning before starting with the SEM analysis concerns the reliability and validity of the measuring model. Since the indicators are only in a hypothetical context with the reflective constructs behind, it is necessary to empirically check whether the indicators also suitably measure the corresponding constructs (Schnell et al., 1999). To investigate the underlying factor structure, Backhaus et al. (2003) recommend performing an EFA.

The details regarding the EFA and its results have been provided in section 9.6.2. as well as in section 6.9.4. On the base of these results the number of factors and their correspondence to the observed variables could be explicitly specified. Now, according to Kline (2005) the method of choice for analysing the measurement model is a CFA, which was applied next.

The remaining, identified indicators of a factor are then examined with the help of the confirmatory factor analysis, whereby the corresponding model posits a one-factorial structure (Aaker and Bagozzi 1979). The local adaptation measures for indicator and factor reliability refer to the measurement model and mainly assess the reliability and validity aspects of the hypothetical constructs by the respective indicator variables (Homburg and Baumgartner, 1995).

By conducting the CFA according to the measurement model 2 (figure 35) in sum 4 factors have been tested: 'Competitive advantage' and 3 factors of 'Specific organizational capabilities'. There has been to acknowledge that:

- 'Strategy development' and 'Strategy implementation' have not been tested with CFA, since they are measured with only 2 variables and for CFA, it might become already problematic having factors with only 3 variables (as mentioned when performing the EFA).
- Since all factors are measured with only 3 variables, the problems with probability level of models occur (this kind of models have zero degrees of freedom and are therefore untestable, only estimates for variables can be computed)
- For this reason, single CFA method for 'the model of 'Competitive advantage' was used and for 3 factors of 'Specific organizational capabilities' pooled CFA (PCFA) method was used

In the next step, the summary statistics of the regression model are examined. The overall reliability and validity of the model has already been evaluated with the help of various test e.g. Cronbach's alpha coefficient, KMO etc. and details regarding these tests have been described in section 9.6.4. Correlation measures have shown how well the single indicators fit within the model; details are provided in in the appendix.

The reliability of an indicator describes how well this item measures the latent variable (Bagozzi, 1982). The squared multiple correlation is the communality estimate for an indicator variable, which has been described in section 9.6.4. and this is why communalities are sometimes defined as the squared factor loadings, where loadings are defined as the standardized regression weights. The communality measures the percent of variance in a given indicator variable explained by its latent variable (factor) and may be interpreted as the reliability of the indicator. For a linear regression model it is common understanding to use standardized regression weights in order to evaluate indicator variables. By convention, the indicator variables should have standardized regression weights of .5 or higher on the latent variable they represent.

For a linear regression model, a further important summary statistic is the R square statistics, which refers to the variance in the dependent variable, explained by the predictors (Weinberg and Abramowitz, 2002). Factor reliability and the average variance (AVE) indicate how well a latent variable is measured by all the indicators assigned to it. Path significance is tested according to Backhaus et al. (2003), who suggest a path is significant at the .05 level or better (that is, its estimated path parameter is significant), when the critical ratio is > 1.96 for a regression weight. For the following tables in the p-value column, three asterisks (***) indicate significance smaller than .001.

Construct reliability is evaluated by measuring the critical ratio (CR) in addition to the AVE. By comparing the critical ratio (CR) and significance of path coefficients with the AVE, the convergent validity can be assessed by using the criterion of Fornell / Larcker. This requires that the average variance of a factor is always greater than any squared correlation of this factor with another factor (Fornell and Larcker, 1981).

Based on this theoretical foundation the factors Z1-Z3 have been tested. Summarized, construct reliability and convergent validity for the three constructs representing 'organizational capabilities' have been evaluated and meet the criteria of good and reliable factors. Details are provided below.

Z1: Organizational learning capabilities

Critical values →	Stand. Regression Weights	t	p	R square	Construct reliability		Convergent validity
					AVE	CR	
	>0,5	>1,96	<0,05	>0,5	>0,5	>0,7	CR > AVE
q0006_0001	0,705	4,663	***	0,497	0,52	0,76	ok
q0006_0002	0,664	x	x	0,442			
q0006_0003	0,784	5,074	***	0,614			

x: t value is not computed, since parameter was set to value 1

- parameter of the value with the higher factor score in EFA was set to 1, in case of factor Y2; this is the variable q6_2
- The CFA results for 'Organizational learning capabilities' shows, that:
 - all standard regression weights are high enough and also statistically significant at level 0,001
 - the R square values are high enough only in variable q6_3 and therefore the other 2 variables with lower R square should be excluded from the factor, but since there are only 3 variables, this rule is not followed– even though the value of AVE is acceptable and the construct can be accepted as reliable and of good convergent validity

Z2: Organizational coordination mechanism

Critical values →	Stand. Regression Weights	t	p	R square	Construct reliability		Convergent validity
					AVE	CR	
	>0,5	>1,96	<0,05	>0,5	>0,5	>0,7	CR > AVE
q0008_0001	0,678	x	x	0,460	0,45	0,71	ok
q0008_0002	0,591	3,745	***	0,349			
q0008_0003	0,740	4,401	***	0,548			

x: t value is not computed, since we set parameter to value 1

- We set parameter of the value with the higher factor score in EFA to 1, in case of factor Y2 this is the variable q8_1
- The CFA results for Organizational coordination mechanism shows, that:
 - all standard regression weights are high enough and also statistically significant at level 0,001
 - the R square values are high enough only in variable q8_3 and we should exclude the other 2 variables with lower R square from the factor, but since we only have 3 variables, we did not follow this rule – consequently the value of AVE is a bit low, but still close enough to critical value that we accepted construct as reliable and of good convergent validity.

Z3: Organizational relationship capabilities

	Stand. Regression Weights	t	p	R square	Construct reliability		Convergent validity
					AVE	CR	
Critical values →	>0,5	>1,96	<0,05	>0,5	>0,5	>0,7	CR > AVE
q0007_0001	0,851	x	x	0,724	0,82	0,82	ok
q0007_0002	0,742	6,53	***	0,550			
q0007_0003	0,906	8,559	***	0,821			

x: t value is not computed, since we set parameter to value 1

- We set parameter of the value with the higher factor score in EFA to 1, in case of factor Y2 this is the variable q7_2
- The CFA results for Organizational relationship capabilities shows, that:
 - all standard regression weights are high enough and also statistically significant at level 0,001
 - also the R square values are high enough of all the variables, therefore the value of AVE is high and we can accept construct as reliable and of good convergent validity

Since it does not exist only one single indicator to indicate if the model is adequate or not, literature suggests various fit measures, such as Chi-square test (χ^2), CFI (Comparative Fit Index), RMSE (Root Mean Square Error), TLI (Tucker Lewis

Index), GFI (Goodness of Fit Index) and depending on the possibilities offered by the applied software many more. Inferential statistical quality criteria assess the adaptive quality of a model by means of statistical tests. The two best-known statistics are the χ^2 adaptation test and the RMSEA. The critical value for χ^2/df is defined as ≤ 3.0 (Homburg and Baumgartner, 1995). However, the χ^2 adaptation test is subject to a number of weaknesses. Harsh distribution assumptions and rigid prerequisites are usually a problem for the practical application of the inference (Jöreskog / Sörbom, 1982). In addition, the quality function of the χ^2 - Statistics and thus the error of the second type are not given (Förster et al., 1984). In order to circumvent the problems of the χ^2 -measure, Browne and Cudeck (1993) recommend the use of the RMSEA with an acceptance criteria of ≤ 0.08 , which was therefore followed in the present research. Acceptance criteria GFI and CFI are defined as ≥ 0.9 based on the work of Homburg and Baumgartner (1990).

For the model fit this means summarized in detail:

Model Fit Summary (Z1+Z2+Z3)

	Chi-square (p)	Chi-square/df	GFI	CFI	RMSEA
Critical values →	$p > 0,05$	$\leq 3,0$	$\geq 0,90$	$\geq 0,90$	$< 0,08$
Specific organizational capabilities	30,399 (,172)	1,267	0,912	0,973	0,067

- compliance of the model was tested with a few most commonly used measures
- all of them are of good values which shows that model is of appropriate compliance
- so all tested factors are suitable for use in further analysis

Now, in accordance with the previous section measurement model 2 will be presented step by step and the underlying theory is presented and linked to the results.

In measuring model 2 the research is focusing on causal relationship/effect with latent constructs. With 6 hypotheses 2 direct effects and furthermore a few mediating effects with 3 constructs have been checked. As already described all used constructs in models were checked with EFA, Cronbach's alpha and CFA (only constructs regarding strategy were not checked with CFA, since they are measured with only 2 latent variables). Different operations have been performed during this linear regression: Four different effects and models were checked:

- Strategy development effect on competitive advantage model
- Strategy implementation effect on competitive advantage model
- Strategy development with learning capabilities mediation effect on competitive advantage model
- Strategy development with coordination capabilities mediation effect on competitive advantage model
- Strategy implementation with coordination capabilities mediation effect on competitive advantage model
- Strategy implementation with relationship capabilities mediation effect on competitive advantage model

In the following tests, composite reliability was tested for all constructs targeting a value above 0.6 according to Bagazoni and YI (1988). Convergent validity for all constructs was tested with the AVE criterion and discriminant validity accordingly with the Fornell / Larcker criterion. All models were accepted as valid and reliable. Details are shown in the appendix.

All models were tested with SmartPLS 2 software with PLS algorithm and Boothstrapping with 200 samples with 60 cases (in this method usually the number of cases from original sample is used due to smaller bias of sampling method)

- With PLS algorithm path coefficients and quality of model was calculated
 - For discriminant validity test Fornell-Lacker Criterion was used (square-root of AVE must be higher than all other latent variable correlation of the construct)
- With Boothstrapping method means, standard errors, t-values were calculated and effects were tested for statistical significance (t-values lower than 1,96 are not statistically significant, for higher t-values exact significance was calculated)
 - Significance of the mediator variable was tested with Sobel test statistic

The results of this test and their meaning for the hypotheses are presented and explained in the next section.

6.10 Discussion of the results of the quantitative survey

Theories are statements about relationships of concepts and developing theories involves testing the underlying hypotheses and judging the generalisability of the findings (Easterby-Smith, Thorpe and Jackson, 2008, p.249). The hypotheses for the present research have been mapped in section 6.6, the related tests have been described in the sections before and the results will consequently be discussed in this next step. The result is basically whether a hypothesis is accepted or rejected.

For testing hypotheses, the researcher has to develop a null hypothesis, which basically states that there are “no changes, no effects, no differences” (Gravetter and Wallnau, 2011) between measured variables. Generally, the null hypothesis thus represents the proposition that there is no difference between the variables of the original hypothesis (also called alternative hypothesis) (Kumar, Aaker and Day, 2002). Regarding hypothesis H₃ of the present research (see section 6.9.2), the corresponding null hypothesis H₀ is: There is no relationship between the attractiveness of the potential of a foreign market and the attitude towards the development of an international strategy (to realize this potential). It is important to acknowledge that the null hypothesis can never be proven. A set of data can only help to reject the null hypothesis if there is strong evidence in favour of the alternative research hypothesis e.g. H₃ in this example (Easterby-Smith, Thorpe and Jackson, 2008).

Now, the results will be discussed beginning with measuring model 1, which was for investigating the role of influencing factors on strategy development. Next, the impact of specific factors on strategy implementation follows accordingly and the hypotheses H₃-H₁₁ are revisited.

In a following step the results of measuring model 2 investigating the role of specific organizational capabilities are considered as well as the conclusion drawn from related hypotheses.

Results for the measuring model 1 - Regression model for strategy development:

For the dependent Variable q0001_0001 (In our company we have a regular formal mid- or long-term planning process) the multiple linear regression shows good quality of the model for prediction. Two factors (‘market potential’ and ‘physical capital’) show significant effects (sign. of F-Statistics is lower than 0.05).

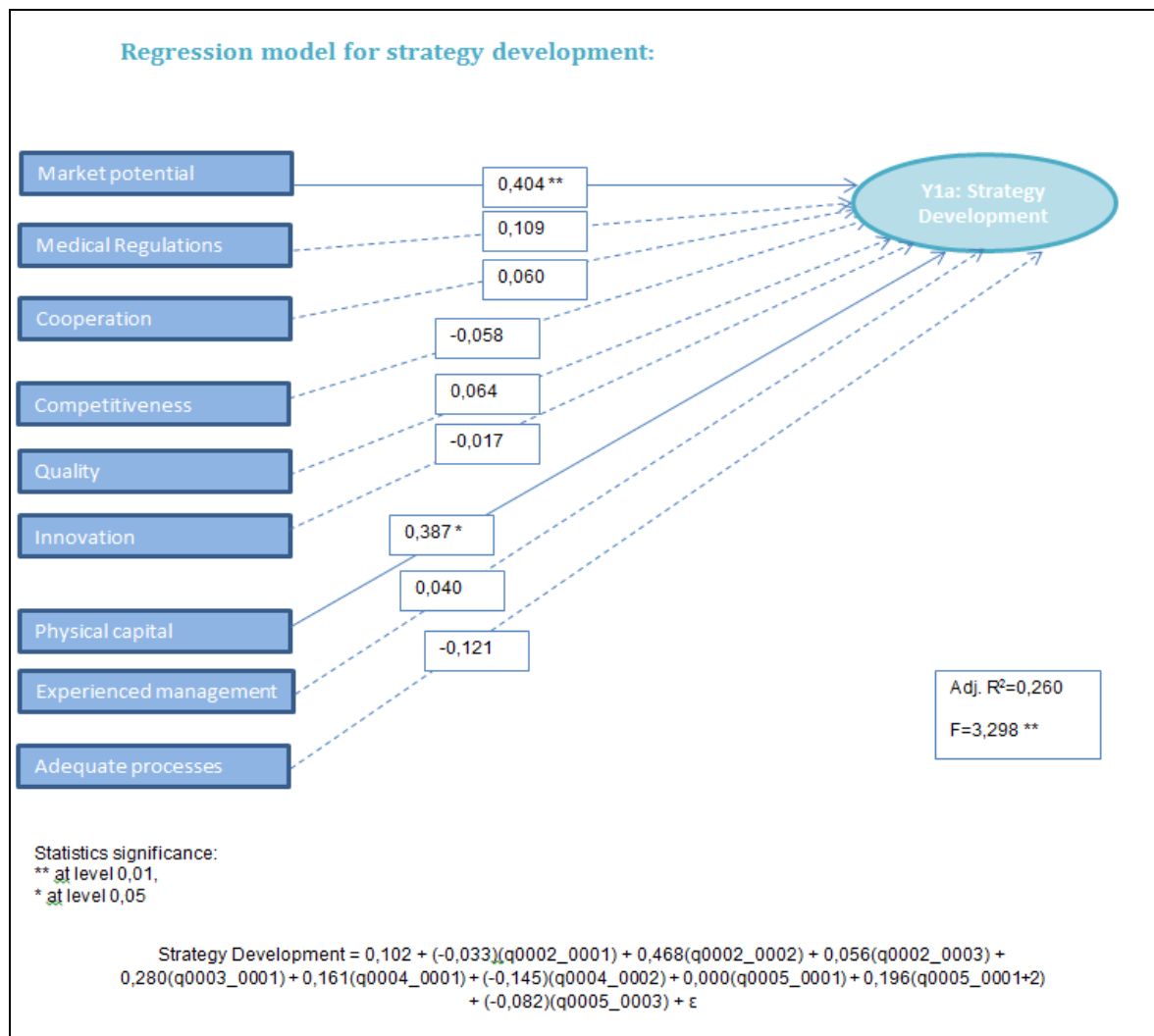


Figure 42: Regression model for strategy development (own diagram)

The results of the regression model show that regarding the factor Y1a (Strategy development) the following hypotheses were accepted:

H3: Attractiveness of foreign market potential is positively related to the development of an international strategy – H3 ACCEPTED

H9a: The extent of physical capital is positively related to an international strategy – H9a ACCEPTED

This means that the effect of market potential is statistically significant (sig=0,005), positive and of moderate intensity (Beta=0,404) -> so the more attractive the foreign market potential, the better is the strategy development.

The effect of physical capital is statistically significant (sig=0,014), positive and of weak intensity (Beta=0,387) -> so the higher the extent of physical capital, the more likely is the strategy development.

Other factors have a lower intensity or they have been identified as significant, but the quality of regression was evaluated as not good enough for reliability reasons. Hence, they have been omitted from these statistical results and it will be investigated in the next section whether this is based on group differences. Finally, it will be discussed in chapter 7 if and how these factors can contribute to knowledge in the context of this research.

Results for the measuring model 1 – Regression model for strategy implementation:

For the dependent Variable q0001_0004 (‘the measuring of strategic goals and related activities are supported by metrics’) the factor analysis for the regression model shows that the quality of the model is good enough the prediction of effects. The factors (‘physical capital’ shows the highest beta score, but none of the factors have significant effects).

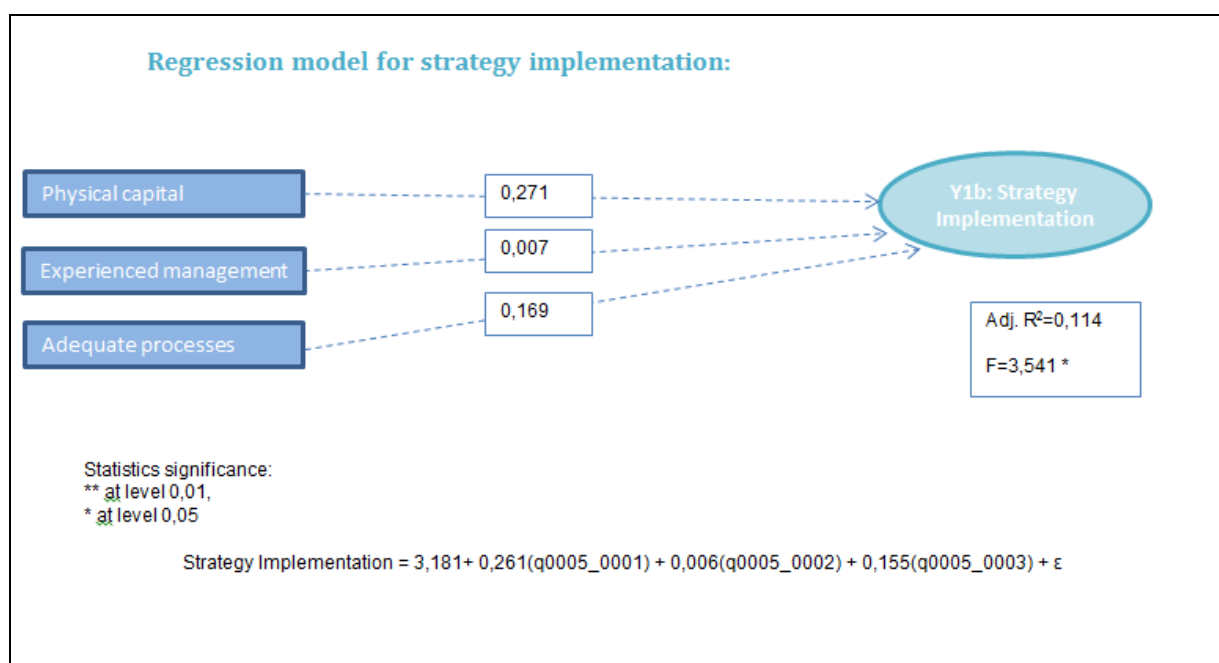


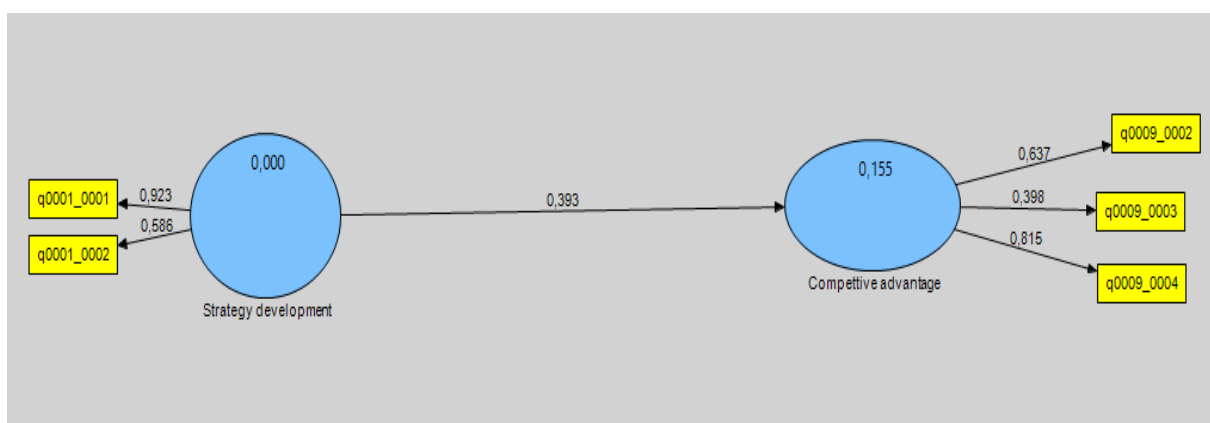
Figure 43: Regression model for strategy implementation

The results of the regression model show that regarding the factor Y1b (Strategy implementation), none of the hypotheses (H9b-H11b) were accepted.

Results for the measuring model 2 – SEM analysis:

The CFA showed that factor ‘Competitive advantage’ is reliable and of good convergent validity. In this concept the highest factor score has the item, which compares own production cost with those of the main competitors (q0009_0001). This indicates the importance of the variable ‘production cost’ for the factor construct ‘competitive advantage’.

H1a: Strategy development effect on competitive advantage model:

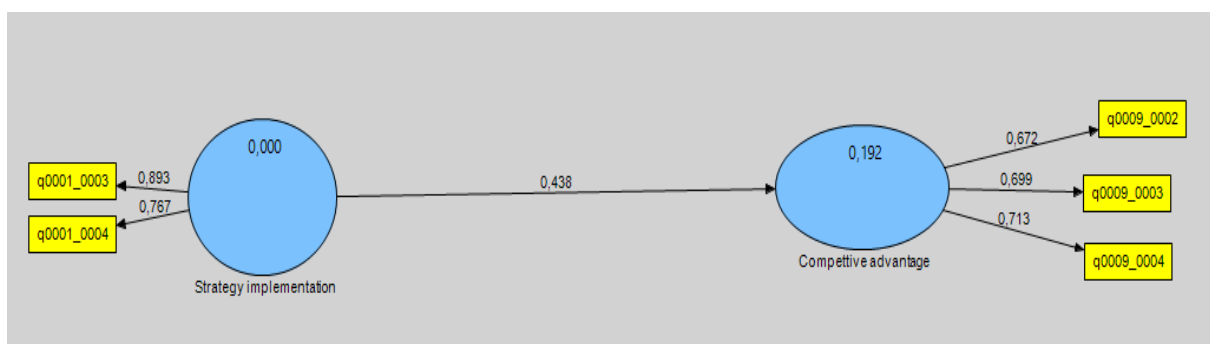


Results summary for H1a

	Path coefficients	t	sig	R Square	H supported?
SD -> CA	0,393	1,573	not significant	0,155	no

- R square result shows that SD explains 15,5 % of CA variation, which means weak effect or explanation strength
- Value of path coefficient shows the positive direction of SD to CA effect and its weak strength, but the effect is not statistically significant
- On the basis of these results H1a is rejected

H1b: Strategy implementation effect on competitive advantage model



Results summary for H1b

	Path coefficients	t	sig	R Square	H supported?
SI -> CA	0,438	3,902	0,000	0,192	yes

- R square result shows that SI explains 19,2 % of CA variation, which means weak effect or explanation strength
- Value of path coefficient shows the positive direction of SI to CA effect and its medium strength and statistically significant (sig=0,000) -> CA increases with the degree of the SI
- On the basis of these results, H1b is accepted

Direct effect hypotheses conclusions:

H1a: competitive advantage in an international venture increases with the degree of strategy development – H1a rejected

H1b: competitive advantage in an international venture increases, with the degree of the implementation of an international strategy – H1b ACCEPTED

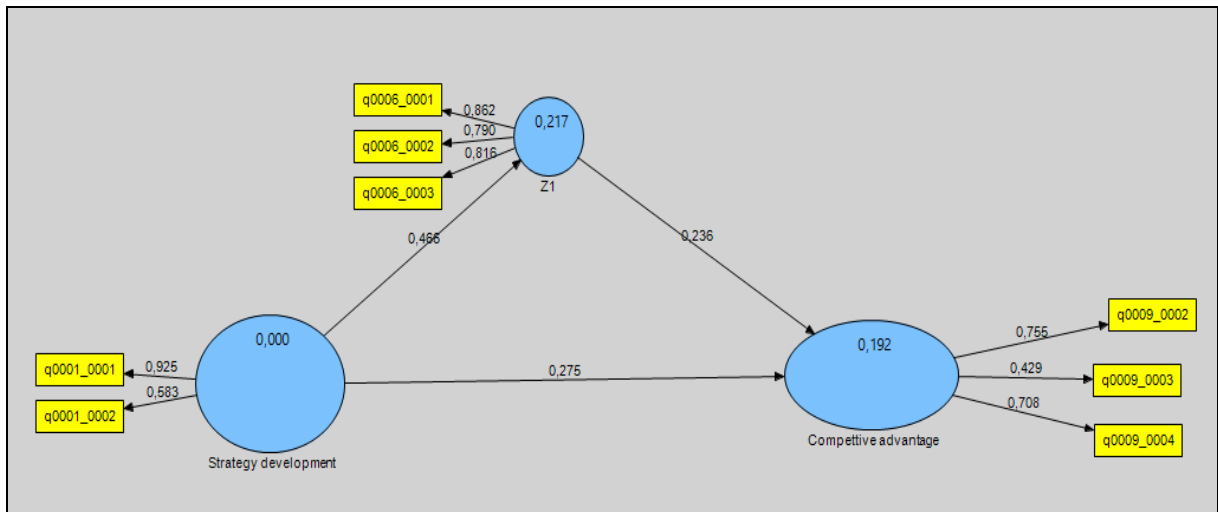
For the concepts of 'Organizational learning', as well as for 'Organizational coordination mechanism' and 'Organizational relationship' capabilities all standard regression weights are high enough and also statistically significant at level 0,001 and all factors are statistically significant correlated, and the constructs were accepted as reliable and of good convergent validity.

The component matrix shows that for the concept 'Organizational learning' the item 'total agreement on business unit's vision and values across all levels and functions' (q0006_0002) has the highest factor score. For the concept 'Organizational coordination mechanism' the item 'Functional areas in this company work together in pursuing a common goal (q0008_0001) has the highest score, which indicates the importance of being aligned and having directions based on an overall strategy. For the concept 'Organizational relationship capabilities' the item 'Our firm pays close attention in establishing and maintaining strong business ties with other organizations in foreign markets' (q0007_0001) has the highest score, which indicates that cooperation plays an important role as soon as foreign business has been established, whereas the item 'Our firm places a high value on open-mindedness towards our foreign partners' culture' (q0007_0002) seems to have the

lowest factor score, which is surprising since the cultural aspect was highlighted in the focus-group discussion.

Results for mediating effects

H2a: Strategy development with learning capabilities mediation effect on competitive advantage model



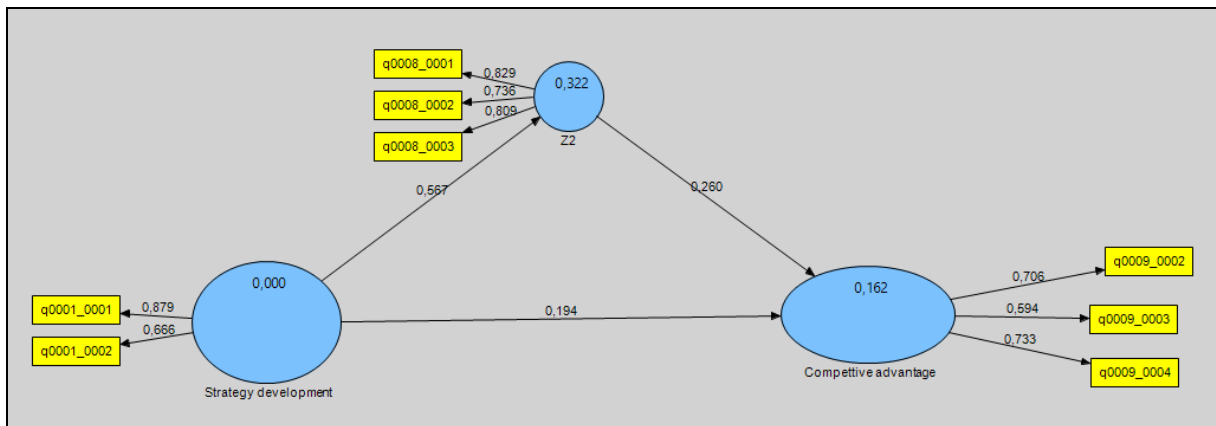
Results summary for H2a

	Path coefficients	t	sig	R Square	Mediator effect	H supported?
SD -> CA	0,275	1,282	not significant	0,192		no
SD -> Z1	0,466	5,388	0,000		0,249	
Z1 -> CA	0,236	1,178	not significant	0,217		

.No R square is shown for exogenous factor.

- R square result shows that mediating construct Z1 explains 21,7 % of CA variation, which mean weak effect or explanation strength
- Value of path coefficients shows:
 - the positive direction of SD to Z1 effect and its medium strength and statistically significant (sig=0,000) -> Z1 increases with the degree of the SD
 - the positive direction of Z1 to CA effect and its weak strength with no statistical significance
- significance test with Sobel statistics for mediator effect shows non-significant effects of mediator construct
- On the basis of these results H2a is rejected

H2b: Strategy development with coordination capabilities mediation effect on competitive advantage model



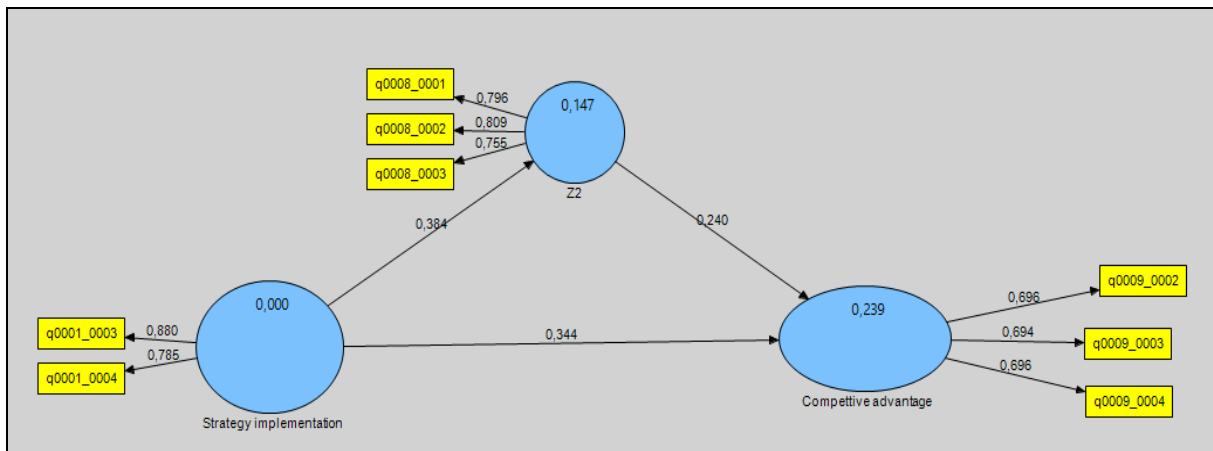
Results summary for H2b

	Path coefficients	t	sig	R Square	Mediator effect	H supported?
SD -> CA	0,194	0,915	not significant	0,162		no
SD -> Z2	0,568	5,933	0,000	.	0,200	
Z2 -> CA	0,260	1,314	not significant	0,322		

.No R square is shown for exogenous factor.

- R square result shows that mediating construct Z2 explains 32,2 % of CA variation, which means weak effect or explanation strength
- Value of path coefficients shows:
 - the positive direction of SD to Z2 effect and its medium strength and statistical significance (sig=0,000) -> Z2 increases with the degree of the SD
 - the positive direction of Z2 to CA effect and its weak strength with no statistical significance
- significance test with Sobel statistics for mediator effect shows non-significant effect of mediator construct
- On the basis of these results H2b is rejected

H2c: Strategy implementation with coordination capabilities mediation effect on competitive advantage model



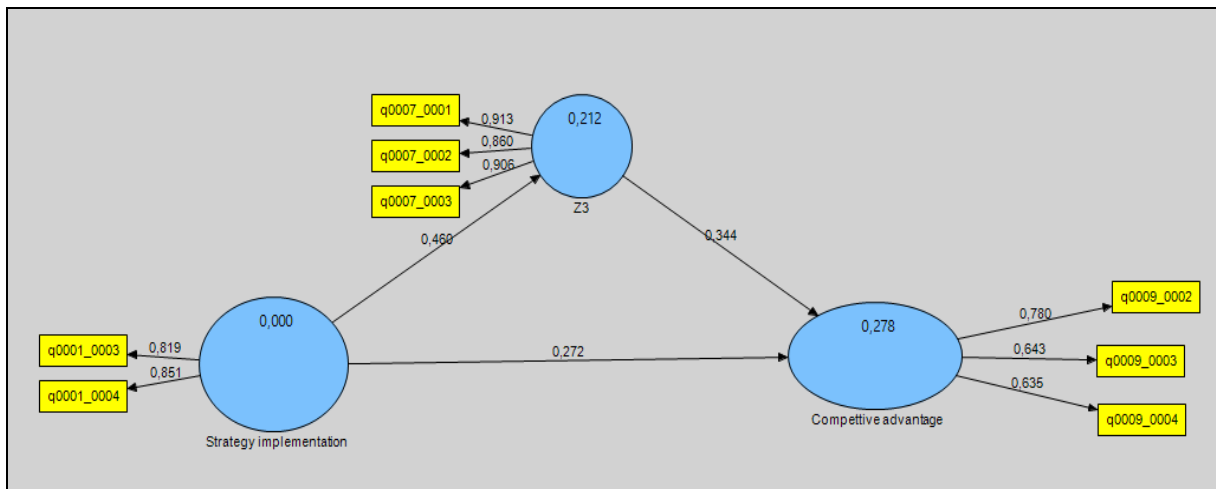
Results summary for H2c

	Path coefficients	t	sig	R Square	Mediator effect	H supported?
SI -> CA	0,344	2,431	0,016	0,239	0,107	no
SI -> Z2	0,384	3,150	0,002	.		
Z2 -> CA	0,240	1,882	not significant	0,147		

.No R square is shown for exogenous factor.

- R square result shows that mediating construct Z2 explains 14,7 % of CA variation, which mean weak effect or explanation strength
- Value of path coefficients shows:
 - the positive direction of SD to Z2 effect and its weak strength and statistically significant (sig=0,002) -> Z2 increases with the degree of the SI
 - the positive direction of Z2 to CA effect and its weak strength with no statistical significance
- significance test with Sobel statistics for mediator effect shows non-significant effect of mediator construct
- On the basis of these results, H2c is rejected

H2d: Strategy implementation with relationship capabilities mediation effect on competitive advantage model



Results summary for H2d

	Path coefficients	t	sig	R Square	Mediator effect	H supported?
SI -> CA	0,272	1,763	not significant	0,278		yes
SI -> Z3	0,460	4,811	0,000	.	0,029	
Z3 -> CA	0,344	2,453	0,015	0,212		

.No R square is shown for exogenous factor.

- R square result shows that mediating construct Z3 explains 21,2 % of CA variation, which means weak effect or explanation strength
- Value of path coefficients shows:
 - the positive direction of SI to Z3 effect and its medium strength and statistically significant (sig=0,000) -> Z3 increases with the degree of the SI
 - the positive direction of Z3 to CA effect and its weak strength and statistical significance (sig=0,015)
- significance test with Sobel statistics for mediator effect shows significant effects of the mediator construct (sig=0,029)
- On the basis of these results H2d is ACCEPTED

Mediating effect hypotheses conclusions:

H2d: relationship capabilities strengthen the effect of strategy implementation on competitive advantage – H2d ACCEPTED

6.11 Testing for group influences

In the next step, the present dataset will be analysed regarding group differences in order to understand the influence of background variables, such as firm size as well as firm's level of international engagement in terms of turnover from international ventures. According to some results of the statistical tests, discussed in the section before, it is important for the following discussion and conclusion to understand whether e.g. firms with large international experience tend to respond in a different way, than firms with no or only little international experience. Cross-tabulations are used to evaluate whether group differences may or may not have had influence on the results shown in the section before.

H5 is rejected although cooperations have been highlighted as important factor during the focus group discussion. One assumption could be that for those organizations with less international business, the experienced importance of international cooperations is lower compared to those who are deeply involved in international business.

q0012 Percentage of sales derived from international ventures: * q0002_0003 Without cooperating with our network-partners foreign ventures would be difficult for us:

cross-tabulation		q0002_0003 Without cooperating with our network-partners foreign ventures would be difficult for us					Total	
		Disagree	Partially Disagree	Undecided	Partially Agree	Agree		Strongly Agree
q0012 Percentage of sales derived from international ventures:	< 10%	0	3	2	3	3	0	11
	10-25%	1	1	4	8	7	2	23
	26-50%	0	0	2	2	4	1	9
	51-70%	0	0	4	3	1	1	9
	>70%	0	1	0	1	1	0	3
	Unknown	0	2	1	1	1	0	5
Total		1	7	13	18	17	4	60

The cross-tabulation shows, that 15% of the group of companies with a low percentage of sales derived from international ventures ($\leq 25\%$) consider co-operations as minor important, whereas from companies with a high percentage of sales derived from international ventures ($\geq 50\%$) only 7% would follow this statement. However, this explanation could not be confirmed by the statistical hypothesis testing.

According to the literature innovation and quality are drivers for product's success in international markets. Surprisingly, this is not highlighted by the respondents of the present research. H7 has been rejected although recent research (Lages et al. 2009; Leonidou and Katsikeas, 2010) gave evidence of quality and innovation as determinants of performance in international ventures.

q0004_0001 The quality of our products and services is better than that of our major competitors * q0012 Percentage of sales derived from international ventures:

Cross-tabulation		q0012 Percentage of sales derived from international ventures:					Total	
		< 10%	10-25%	26-50%	51-70%	>70%		Unknown
q0004_0001 The quality of our products and services is better than that of our major competitors	Disagree	2	1	0	0	0	1	4
	Undecided	3	8	3	4	0	1	19
	Partially Agree	3	6	2	1	0	0	12
	Agree	2	7	3	2	2	3	19
	Strongly Agree	1	1	1	2	1	0	6
Total		11	23	9	9	3	5	60

41% of the companies with a low percentage of sales derived from international ventures ($\leq 25\%$) consider their products as not better than that of their competitors in their local market, whereas from companies with a high percentage of sales derived from international ventures ($\geq 50\%$) 72% of them would consider their products as better.

Hence, there might be a different perception in both groups, since those firms concentrating on the German market compare their products with other competitors than those firms acting internationally. However, hypotheses 7 could not be accepted by the statistical tests.

q0004_0002 Compared to similar products developed by our competitors, our product will offer unique beneficial attributes to the customers ... * q0012 Percentage of sales derived from international ventures:

Cross-tabulation		q0012 Percentage of sales derived from international ventures:						Total
		< 10%	10-25%	26-50%	51-70%	>70%	Unknown	
q0004_0002	Disagree	1	4	1	0	0	1	7
Compared to similar	Undecided	2	4	1	1	0	0	8
products developed by	Partially	5	9	6	3	1	3	27
our competitors, our	Agree							
product will offer	Agree	2	5	1	3	1	1	13
unique beneficial	Strongly	1	1	0	2	1	0	5
attributes to the	Agree							
customers ...								
Total		11	23	9	9	3	5	60

H8 has been rejected, although according to literature quality is a perceived customer benefit and 75% of the respondents would consider their products to offer unique beneficial attributes to their customers. Companies with a lower percentage of sales derived from international ventures ($\leq 25\%$) rate their products significantly lower, which might be again caused by different perspectives regarding international versus local competition.

The degree of firm's international experience based on the percentage of sales derived from international ventures seems to have an impact on the responses. Hence, the influence of factors such as cooperation, innovation and quality on strategy development depends on firm's experience in international ventures.

Also, firm size has an influence on responses regarding some constructs. The construct of 'Competitive advantage' is reflected by firm's perceived cost and price position. An investigation on the responses regarding prices and costs reflect that responses depend on firm size.

q0009_0002 Selling price to end-users overseas * q0010 Number of full time employees:

Cross-tabulation

		q0010 Number of full-time employees:						Total
		<10	10-50	51-100	101-250	251-500	>500	
q0009_0002 Selling price to end-users overseas	Lower	0	0	0	2	0	0	2
	Slightly lower	1	1	1	2	1	0	6
	Comparable	1	5	3	4	3	2	18
	Slightly higher	1	1	4	2	2	4	14
	Higher	1	3	1	2	3	4	14
	Much higher	0	1	2	1	0	2	6
Total		4	11	11	13	9	12	60

Whereas approx. 50% of the firms see their production cost comparable or lower compared to those of their competitors, 71% of the larger firms (>250 employees) can enforce higher prices versus 38% of the SMEs. Consequently, with comparable results regarding distribution cost SMEs seemed to have a disadvantage with respect to lower margins.

On the other hand, firm size has not an impact on all factors, although the unexpected rejection of some hypotheses can be explained. Regarding 'physical resources' 80% of the larger companies consider their physical commitment regarding international ventures as at least fair; 81 % of those companies with less than 250 employees that are according to the definition of the EU Commission grouped as SMEs would also agree with this statement. Hence, regarding H9 there are no differences regarding firm size, which is also true for H10 and H11.

Summarized, background variables such as firm size and the degree of involvement in international ventures have an impact on some of the responses regarding some constructs and can provide a rationale with respect to some unexpected results.

6.12 Chapter summary

In the present chapter, a survey instrument was developed based on the combined results from the qualitative focus group discussion and the literature review.

At the beginning, the decision for an internet-mediated questionnaire approach was justified. It has been described in detail how the design of the questionnaire has been conducted. Several iteration loops were necessary since content, layout and operationalization had to be harmonized in order to meet the quality criteria. In sum, based on the qualitative research from the literature review and from the focus group discussion, 26 items had been derived and grouped in 10 main question sections, and reflected by the psychological constructs. Alongside these, 5 further items were developed to measure background variables such firm size and international involvement. Special attention was devoted to the questionnaire layout, the cover letter and the question sequence, which certainly contributed to achieve the targeted response rate.

Particularly a sufficiently large and representative sample of the target group combined with a high response rate lead to a specific sampling and operationalization approach of the survey. With help of the medical cluster organization 'Life Science NORD' the survey was conducted between May and June 2017. Reviewing the chapter objectives, the proposed requirements for the conceptual model were revisited and measuring models have been developed accordingly.

Each item of the psychological construct was measured on a seven-point Likert scale and the resulting scales were consequently used in an explorative factor analysis. A reliability analysis of the five resulting factors confirmed a sufficient reliability of the measurement models. The resulting data was interpreted by applying appropriate statistical tests and procedures. The interpretation of the resulting data, using a regression model based on a factor analysis, resulted in a final conceptual model for the internationalisation of German MedTech SMEs.

Finally, in this chapter the survey findings based on the quantitative methods were introduced and interpreted and consequently the theoretical framework presented.

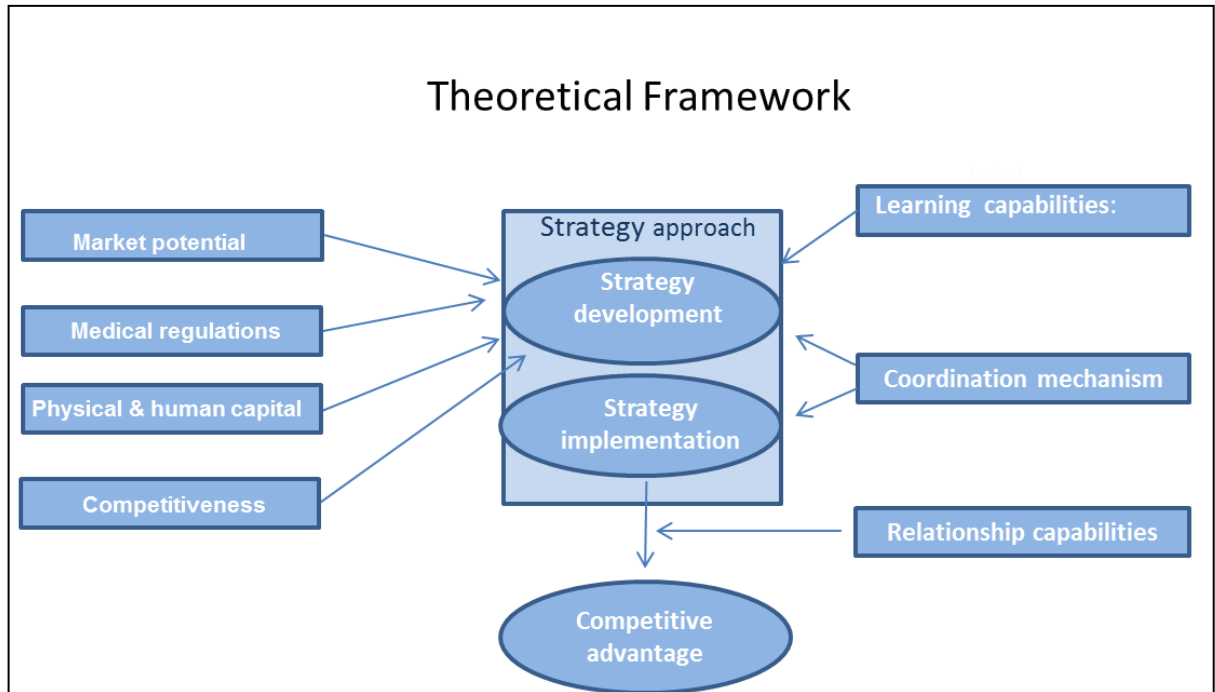


Figure 44: Theoretical framework

Figure 44 shows the finalised theoretical framework, which is based on the results from the quantitative research and the hypothesis testing as described in the sections before. The mixed method approach led to the finding that factors such as 'market potential', 'physical and human capital', 'medical regulations' and 'product competitiveness' have the highest influence on the firm's strategic approach. 'Organizational learning' and 'coordination mechanism' have particularly an impact on strategy development, whereas relationship capabilities mediating effect on the strategy-competitive advantage relationship.

Furthermore, the survey provided an opportunity to test the potential influence of various descriptive variables on predictor and dependent variables and consequently on firm's strategic approach towards internationalisation.

In sum, the qualitative research stage has resulted in a comprehensive model for the SMEs internationalisation, which fulfils the requirements of the chapter objectives. The implications of the findings will be discussed in more detail in the next chapter.

CHAPTER 7: DISCUSSION OF THE FINDINGS AND RECOMMENDATIONS

7.1 Chapter introduction

The aim of the previous chapter was to empirically examine the influencing factors and the role of organizational capabilities on the internationalisation of German MedTech SMEs. The present chapter is aimed at consolidating the findings from the previous chapters and to provide justification for the development of a conceptual model. Specifically, the discussion will focus on the role of the predictors in this model as well as on the influence of background variables. In the next step, the implications of the findings for the different stakeholder groups (academic, economic and governmental) will be discussed in detail.

Based on these implications and the individual aims of each stakeholder group, the author will derive recommendations for further action. Finally, the contributions to knowledge of the present research will be summarized and presented, together with the limitations of the present study and the outlook for further research in the field. In conclusion, the objectives of this chapter tend to consolidate the findings from the previous chapters, to justify the conceptual model towards the Internationalisation of German MedTech SMEs, to summarize the implications of the results and develop recommendations for the different stakeholder groups, discuss potential limitations of this study, describe in detail the contributions to knowledge of this study, and provide an outlook on further research.

7.2 Discussion of the results: Influencing factors

In this chapter, the role of the predictors derived from the quantitative data analysis will be discussed based on the overall research results. This means that results from the literature review and the qualitative interviews will be employed together with the quantitative results in order to arrive at a comprehensive and detailed picture of the proposed predictor structure.

The strong positive impact of the factor 'market potential' (reflected by the hypothesis H3) is not particularly surprising and was already postulated as an

outcome of the literature review. The quantitative results confirm also the qualitative results from the focus group discussion, where this factor was also ranked as important by 40% of the participating experts. According to Aaker and McLoughlin (2010), market potential can be analyzed in dimensions such as market size (current and future), market trends, market growth rate, market profitability and various other key success factors. Prominent analytical tools, such as the so-called 'BCG-matrix' or 'Boston Consulting Group analysis created by Bruce D. Henderson for the Boston Consulting Group in 1970, are based on this key figure and help corporations to analyze their business in a strategic context. Hence, from a theoretical, practical and statistical point of view this influencing factor can be confirmed for the specific research context.

The impact of human and physical capital was reflected by the hypothesis (H9), which has been accepted. Particularly in the context of SME's internationalisation the positive relation is not surprising either since it was already postulated in the theoretical work of Pfeffer and Salancik (1978) and in the resource-based view as a theory, which has been formalised by Barney (1991). The lack of resources and financial resources were also identified as barriers based on a survey among German SMEs as well as among MedTech firms in the UK and has already been discussed in detail during the literature review (Geyer and Uriep, 2012; Barnes et al.2007). Also, the qualitative results from the focus group discussion are confirmed by this quantitative survey, since this factor was ranked as highly important by 60% of the participating experts. Therefore, it can be identified as a major influencing factor in this research context, confirmed by qualitative and quantitative methods.

In a more general context, these two basic patterns and theories in the context of internationalisation strategies are confirmed. The potential of a foreign business market and the possibilities to explore such targeted markets are essential antecedents for developing a related strategy.

The statistical test in chapter 6 proposed, that product related-factors such as quality or innovation have no significant impact on the development of firm's strategy. The supposed underlying mechanism that good products, which allow a differentiation from competitors, facilitate international ventures could not be confirmed, although at least innovation was ranked high in the qualitative focus group discussion.

However, for other product-specific and industry-specific factors such as 'medical regulations' and 'competitiveness', which are represented by the hypotheses (H4, H6) the evaluation is inconsistent.

The effect of medical regulations e.g. was evaluated as statistically significant. This means, the bigger the medical regulation challenges, the worse is the development towards an international strategy; in other words, medical regulations can be a barrier, particularly for SMEs in the MedTech industry when willing to internationalize their business in foreign markets in a challenging regulatory environment. But the quality of regression was considered as not good enough for prediction. Thus, the specific role of regulations is supported by the literature (Chatterji, 2009), and also by 40% of the experts from the focus group discussion, but finally it could not be confirmed as a reliable predictor by the statistical tests. Nevertheless, the specific role of medical regulations in this context can't be neglected.

The effect of the factor 'competitiveness' (H6) is also statistically significant. This means, the lower the competitiveness of a product, the lower is the development of a strategy (to market the product internationally). But H6 is rejected contrary to expectations due to the quality of model with respect to the significance of F statistics. Cross-tabulations have shown that more than 80% of all respondents at least partially agree to follow a strategy, but only half of them see their products as competitive. Consequently only half of the respondents would have the base for developing a strategy for their international ventures due to the lack of product competitiveness. This is in line with Lages et al. (2009) who see competitive products as an antecedent to act successfully in international markets. But again, statistically the quality of regression was considered as not good enough for prediction due to factor unreliability. Nevertheless, recent empirical research identified competitive products as a success factor in a similar research context, i. e. in the internationalisation of MedTech SMEs in the UK (Barnes. et al., 2007). Consequently, the impact of product competitiveness in this specific research context has been identified during the literature review; the qualitative research showed that 50% of the experts from the focus group discussion ranked this factor as highly important and therefore it can't be neglected in this research context, either.

Although the reliability of these two factors was considered as low and the ability to generalise this conclusion on a statistical base is limited, the decision whether or not these findings contribute to theory building has to be considered in a broader context. It has to be kept in mind that the low quality and unexpected results indicate statistical problems, which can occur due to factor unreliability. According to the cross-tabulation in section 6.9.3 the size distribution is not a perfect normal distribution (mean 5.68; median 6) and a failure II phenomenon can't be expulsed. Nevertheless, statistical tests provided at least an indication and the qualitative research clearly identified the impact of medical regulations and product competitiveness in the specific research context. Therefore they are considered to play a specific role and consequently highlighted as research findings.

Summarized, it can be highlighted that internal (firm-specific), external (market-specific) and product-related factors influence firm's strategic approach. Particularly market potential, physical resources have a particular impact on international ventures of German MedTech SMEs. Furthermore, Medical regulations and product competitiveness play a specific role in this context.

7.3 Discussion of the results: the role of organizational capabilities

The role of organizational capabilities in the context of strategy and competitive advantage has been investigated. For the concepts of 'Organizational learning', as well as for 'Organizational coordination mechanism' and 'Organizational relationship capabilities' all standard regression weights were high enough and significant; furthermore all factors were statistically significant correlated, and consequently the constructs were accepted as reliable and of good convergent validity. The component matrix showed that for the concept 'Organizational learning' the item 'total agreement on business unit's vision and values across all levels and functions' (see question q0006_0002 in the questionnaire) had the highest factor score of the three items. For the concept 'Organizational coordination mechanism' the item 'Functional areas in this company work together in pursuing a common goal (q0008_0001) had the highest score, which indicates the importance of being aligned and having directions based on an overall strategy. For the concept 'Organizational relationship capabilities' the item 'Our firm pays close attention in establishing and maintaining strong business ties with other organizations in foreign

markets' (q0007_0001) had the highest score, which indicates that cooperation plays an important role as soon as foreign business has been established, whereas the item 'Our firm places a high value on open-mindedness towards our foreign partners' culture' (q0007_0002) seems to have the lowest factor score. This is surprising since the cultural aspect was highlighted in the focus-group discussion.

Furthermore the concept of 'competitive advantage' was also confirmed and the model accepted. Consequently, the relation of competitive advantage to the concepts of strategy and organizational capabilities were investigated and various effects have been revealed.

The effect of strategy on competitive advantage (H1b) was confirmed regarding strategy implantation and the moderating role of relationship capabilities (H2d) became evident. This means, that competitive advantage in an international venture increases with the degree of the implementation of an international strategy, while relationship capabilities strengthen the effect of strategy implementation on competitive advantage.

Furthermore, the effect of organizational learning and coordination mechanism on strategy became evident, although their moderating effect on the relationship strategy-competitive advantage could not be confirmed.

Although the reviewed literature suggests that performance in international ventures is related to strategy, H1b has been accepted, whereas H1a has been rejected. Hence, the causal relationship between strategy development and competitive advantage was not confirmed. This was unexpected since other empirical research (Lages 2009; Aaby and Slater 1989) provides evidence of the link between strategy and competitive advantage. But in those models, the concept of strategy is not distinguished between planning and implementation, so that there is basically no contradiction.

Furthermore, it has already been addressed that there is still a significant amount of SMEs in Germany that do not have implemented a formal strategy planning (Martin, 2005). It also has been noticed that those, who base their decision on formal processes and tend to more rationale and objective based decision modes come to different prioritizations regarding decision factors towards internationalisation.

Cross-tabulations have shown that more than 80% of all respondents at least partially agree to follow a strategy, but the majority of these firms being involved in international business only for 1-5 years. Consequently, more than one-half of the respondents answer to have a low percentage of sales derived from international ventures ($\leq 25\%$).

The majority of them would, according to the definition of the EU, count as an SME (< 250 employees) and consider their products not as better than that of their competitors. More than 50% of the firms see their production cost as comparable or higher in comparison to their competitors and assume that they can't enforce higher prices. Hence, these SMEs have a perceived barrier to increase their involvement in foreign markets.

Consequently, it is not surprising that based on these responses the concept strategy development is not directly linked with competitive advantage in the context of internationalisation. Many of the respondents develop a strategy, but due to different prioritizations this does not foster firm's internationalisation. This is confirmed by the findings from Martin (2005), who did a survey on several hundreds of SMEs in Germany and revealed that the ratio regarding those SMEs that follow strictly a growth strategy (41%) and those that concentrate on existing markets (46%) is quite heterogeneous.

It can be summarized that, although the effect of strategy towards competitive advantage could be statistically confirmed only partially, there is no basic contradiction and there is an explanation for the statistical result. Hence, the model and overall effect can be basically seen as confirmed.

The effects of organizational capabilities have partially been confirmed. Particularly the positive direction of this construct to the construct of 'competitive advantage' was only from weak effect and with no statistical significance. Hence, the mediator construct was not confirmed.

7.4 Discussion of the Results: Background variables

In the next step, the influence of background variables on the conceptual model will be discussed in more detail. Again, the discussion will be based not only on the

findings from the quantitative data analysis but also on the results from the qualitative interviews and the literature review.

According to Leonidou et al. (2011) small firms have less competent management and fewer skills to support foreign ventures effectively, compared to with large firms.

Furthermore, firms with limited business experience have fewer resources and capabilities to advance their strategies. (Ventkatraman et al., 1990). Consequently, by studying the interrelation of specific background factors, such as firm size and international involvement, their impact on the survey results can be evaluated. Some of these variables have been discussed in section 6.9.1, where it has been shown that with respect to these variables the sample population is representative to the target population. Based on the results of section 6.11, nearly 70% of the responding firms can be grouped as SMEs according to the definition of the EU (<250 employees), but only 20% of them state to have a percentage of international sales higher than 25%. Consequently, most of the firms with a significant international involvement belong to firms with 250 employees and more. This means, that both, SMEs and larger firms are represented in this survey according to the target population, but that firm size and international experience might have had an impact on respondent's evaluation regarding influencing factors.

In the previous chapter, all factors that did not significantly influence the development of strategy were omitted from further discussion. Yet, examining these omitted factors can be almost as insightful as looking at the significant predictors. Since each item in the questionnaire was developed from literature and thus was found to be important in certain contexts in other empirical work, it could be fruitful to understand why these particular factors have no significance in the present context.

The following 5 factors were omitted during the analysis of the questionnaire data: Cooperations, innovation, quality, management experience and adequate processes. This was at least partially surprising for different reasons.

First, during the focus group discussion cooperations have been highlighted as an important factor. Based on the already discussed cross-tabulations involving underlying descriptive data, firm size and experience in international ventures seem to matter. Those organizations with less international business experience the importance of international cooperations as lower compared to those who are deeply

involved in international business. Hence, cooperations might have an impact, but finally could not be confirmed by this research due to statistical reasons that are finally based on sample size and distribution of responses.

Next, quality and innovation as determinants of strategy and performance in international ventures could not be confirmed, although Leonidou and Katsikeas (2010) gave evidence regards the importance of these factors in the context of international ventures. It is supposed that again firm's international experience is the reason for a different perception of the respondents, since those firms concentrating on the German market compare their products with other competitors than those firms acting internationally. But based on statistical significance, the impact of these factors could not be confirmed.

Finally, the regression analysis, however, showed that the influence of the factors 'management experience' and 'adequate processes', on the dependent variables were non-significant. It can be safely concluded, contrary to the initial hypothesis, that nor strategy development, neither strategy implementation is influenced by these factors and that background variables such as firm size does not play a role in this context.

7.5 Discussion: Summary of main findings

So far in this chapter, it has been discussed which result has been consolidated from all parts of this research and why they have been evaluated as a finding. Next, a summary of the main findings will be given. It has to be acknowledged that summaries generally neglect the rich and often important details of findings. On the other hand, however, they allow for an overview of the resulting core ideas and thus provide an important benefit for the reader. Summarized, the following statements can be derived from this research project. The study data revealed as key aspects that:

- Resources with respect to employees and management as well as provisions for a sufficient amount of capital are the most important determinants for the development of an adequate strategy for international ventures.

- Market potential in foreign countries is an antecedent for the development of an internationalisation strategy.
- Medical regulations and product competitiveness have an influence on international ventures of German MedTech SMEs in a specific context. Firms, who perceive barriers regarding the competitiveness of their products in or the related medical regulations of foreign countries, are significantly less likely to adapt an internationalisation strategy.
- Organizational learning and coordination mechanism have a positive effect on strategy development in the context of internationalisation.
- Competitive advantage in international ventures increases with the degree of the implementation of an international strategy
- Relationship capabilities strengthen the effect of strategy implementation on competitive advantage with respect to international ventures.
- Firm size and firm´s experience in international ventures have an influence on firm´s internationalisation. Those organizations with less international business, which are mainly SMEs, experience the barriers as higher compared to those who are significantly involved in international business.

7.6 Recommendations proposed on the basis of the results

As outlined in section 1.7 there are three main target groups of the present thesis, namely academics, practitioners and managers in the MedTech industry and economic or governmental institutions. The results from this thesis have implications for each of these groups. Consequently, recommendations based on these results will be discussed from each perspective separately. The academic view will be divided into the theoretical implications and the methodological implications. This differentiation is necessary because the theoretical implications are mainly restricted to the rather narrow research field of the internationalisation of MedTech SMEs, while the methodological implications can be transferred to many fields of academic interest.

7.6.1 Theoretical implications

The primary objective of this study was to develop a conceptual model that can predict firm's strategic approach in the context of internationalisation based on the most important influencing factors and explains the role of organizational capabilities in the context of strategy and competitive advantage. To achieve these research objectives and develop the theoretical background, a systematic literature review was conducted.

Since the scientific discussion is still far from reaching a common understanding between the different theories explaining firm's internationalisation, consequently there is no agreement on the importance of different influencing factors. Hence, a comprehensive overview of different theories and concepts was provided.

Discussing the major differences and similarities in the field of internationalisation research, a contribution towards a synopsis was added. For the purpose of ascertaining the strengths and weaknesses of the reviewed theories, they were critically reviewed based on theoretical grounds as well as on their contemporary application in research. Finally in several iterations, a new model was synthesized (see figure 44). While each model claims to be universally applicable, there is no common agreement as to which model is the most appropriate and thus most efficient in predicting firm's strategic approach in the context of internationalisation. The present research contributes to this discussion.

By developing the predictors in the present study not only based on previous theoretical and empirical work, but also on extensive qualitative research, a new and unique model has been developed. Although the specific predictors of this model can be grouped under exogenous and endogenous factors, they differ significantly from every other model developed so far since they are specific to SMEs in a MedTech context. This model not only provides a sufficient degree of reliability and satisfies the fit indices, but is also empirically proven to be successful in explaining the mediator effect of relationship capabilities on the strategy (implementation) – competitive advantage interrelation. While some scholars see a direct association between resources and capabilities towards competitive advantage (Leonidou et al. 2011), in other words, conceive them as sources for achieving competitive advantage, others highlight the role of strategy in this context (Morgan et al., 2004).

This survey supports the view that strategy has a positive effect on competitive advantage, and that specific organizational capabilities play a mediating role.

The analysis, however, provided justification for the claim that none of the models in its original formulation provides universal applicability and sufficient explanatory power to be generally accepted as a standard model for the internationalisation of SMEs in any context. Thus, in order to explain antecedents, influencing factors and the role of organizational capabilities in a context-specific case, empirical research that goes beyond standardised models remains imperative for researchers.

Further research is certainly needed to clarify whether or not this model can be applied in other contexts than the investigated industry sector and if it is applicable in other countries. The results, however, can partially confirm recent empirical work from other countries or industries and the predictor structure, provides a fruitful contribution to further research in this direction.

7.6.2 Methodological implications

Furthermore, contributions In terms of methodology were offered by this study, too. Applying qualitative and quantitative methodologies in the same study is a relatively unique methodological approach in the field of strategy and internationalisation. Of the 59 empirical studies reviewed in Chapter 3, only few followed a pure qualitative research approach and none conducted a methods triangulation of combining a focus group discussion and questionnaire techniques. The qualitative research stage was found to be particularly useful for assessing salient beliefs and selecting the most important impacts, which otherwise could not have been integrated into the questionnaire. Applying a qualitative focus group approach has proven to be a successful methodology to assess the context-specific salient beliefs of respondents prior to a quantitative study. Thus, based on the results of the present study, there is a clear justification for continuing to apply methods triangulation in a field of strategy and innovation, which is highly multifaceted and heterogeneous.

7.6.3 Managerial and practical implications

The implications of the present study are of particular importance for the MedTech industry and SMEs operating in a similar context that faces the challenge to internationalize their business in a highly regulated environment. As discussed in Chapter 2, the current growth rates in European MedTech markets are rather low and margins suffer due to budget restrictions in most of the European Healthcare systems. In order to generate return on the development costs of the resource-intensive medical devices, the industry needs to continue to defend their position in the national market, while at the same time there is a severe need to increase their international sales rates in order to participate from the dynamic growth in other parts of the world. Consequently, the industry needs to prepare for the most important antecedents and to develop and implement their specific strategy for internationalizing their business.

The results of the present thesis contribute to this problem by offering an understanding of which factors are decisive for such a specific strategy within the target group of German MedTech SMEs. Based on this understanding, implications can be derived that can help the industry to better prepare and adjust their activities.

Since the study revealed that the factors 'market potential' and 'competitive products' are the most decisive factors, the industry should focus its attention on the communication of market developments, growth rates and other key figures of the global healthcare market. Hence, both managers and economic or governmental organizations should work on strengthening firm's capabilities in the context of international ventures. Managers e.g. should consider internationalisation as a way to support their overall strategy. Therefore they should adopt specific export promotion programs, which in turn are instrumental in developing a sound strategy.

Physical resources were named as a main antecedent in the context of internationalisation. There are various ways to overcome such resource limitations and governmental support can help to support firm's internationalisation barriers. Financial assistance is one solution, but also know how is a key aspect in this context According to Leonidou et al. (2011) government assistance can act as an 'external resource', which if properly used helps firms to foster international development. Therefore, managers should evaluate specific resources and

capabilities needed for their international ventures and identify their firm- specific gap that should be filled.

Particularly medical regulations in terms of product approval procedures, related regulations and certification requirements appeared as a field of interest and therefore should gain adequate management attention. Manager´s knowledge about this subject matter should be deepened by information and education, which can be supported by country-specific governmental programs or institutions.

However, the association between the use of such programs and firm´s performance is not direct but rather achieved through an enhancement of firms resources and capabilities required to operate internationally. Hence, managers must be aware and appreciate their usefulness.

More difficult to achieve is the development of organizational capabilities, which enable an organization to agree on a common vision across all levels in the company. To achieve alignment in working together towards such a common goal, e.g. to enable a foreign venture in an overseas market, is crucial and spans from the identification of business potentials, over the achievement of approvals, towards fostering marketing activities and collaboration with business partners originated in foreign cultures. Of specific importance in this context is the ability to implement and maintain strong business ties between international partners and therefore organizational capabilities are required.

Again, national export promotion programs can initiate this process, but the education of firm´s employees in e.g. international marketing, strategy, cultural aspects etc. are a task, which is assigned to the management. Often it is supported by HR coordinating education and training provided by specialized external consultants.

7.6.4 Economical and governmental implications

The impact of national programs in order to support international ventures has already been highlighted. The ultimate aim of such programs is to improve strategic conduct and performance of individual firms in overseas markets, which helps to exploit countries full export potential (Lages et al., 2005).

Governmental authorities should, if possible, avoid implementing inefficient financial or fiscal support systems. Instead, they should focus on generating awareness-knowledge by supporting local-level initiatives and regional cluster organizations. Thus government has to act as a change agent, whose assistance facilitates firm's adoption of a more systematic, proactive and planned approach.

To establish International ventures with foreign partners needs cooperation. When such international business ties are implemented, the capability in building relationships with foreign intermediaries and customers is crucial. However, the establishment of such relationships is cumbersome, because of communication problems resulting from cultural aspects as discussed in the literature review.

Physical resources were named to have a main impact on firm's internationalisation. Instead of direct financial incentives, governmental institutions should focus more on indirect support e.g. in form of local cluster organizations, which inform about national, European or foreign country initiatives or export programs. They can help the individual firm to evaluate the potential benefits and risks in the context of a specific international venture and provide consultancy in the ramp-up phase. The success of such regional institutes or local cluster organizations depends widely on their compatibility with client needs and beliefs and their empathy with the clients. Government policymakers and organizations need to continue and adopt their promotion policies. They have to verify these policies that must be flexible, attractive and effectively in order to accommodate the need of increasing requirements of international markets. If necessary, resources and capabilities at organizational level need to be enhanced.

The primary role of governments in strengthening the capability of firms to internationalize their business by the provision of education- and relation related programs. They can help firms to locate overseas partners such as distributors and agents and link them together with the customer abroad. By involving more firms that need assistance, with the help of such organizations the government could maximize country's export potential.

Hence, collaboration within a firm and within an industry is crucial. Managers and government should facilitate a close collaboration, enabled by regional networks. High-quality experts supporting know-how transfer and providing consultancy need

to commit their engagement in such roles. A near understanding between public and academia can furthermore have a positive spirit on the international education of managers in order to prepare for the future.

7.7 Potential limitations of the methodology chosen

Even though the methodology for this particular research was carefully chosen, it has some limitations that have to be acknowledged.

7.7.1 Limitations on sampling

Regarding the overall sample size, a sufficient number of valid responses was achieved in the present research. Regarding representativeness, the comparison of the sample distribution with the target group using the sampling frame based on one cluster organization (Life science NORDE), the overall-characteristics showed generally a good match. But large firms with more than 500 employees are slightly overrepresented in the sample. The analysis of other background variables revealed that international experience and export rates vary among the respondents and that firm size has an influence, too. The possible root causes for this sampling bias is related to the sampling approach. To overcome such limitations the survey would have to address different cluster organizations and to execute several regressions distinguishing between firm size and international experience avoiding to result in small sub-sample sizes, which have to be clearly acknowledged as a weakness throughout this thesis.

7.7.2 Limitations regarding context- and external validity

It has to be acknowledged that the subject of the present study was unique (influencing factors and the role of organizational capabilities), the strategic approach examined was homogenous (internationalisation) and the social-economic context was fixed (German MedTech SMEs). Therefore, it is quite likely that any other than the current context of study would have delivered different findings, because it has its own idiosyncratic set. The literature review of empirical work in different strategic and social-economic contexts (see Chapter 3) revealed that generally findings in this field couldn't be transferred from one context to another

without some modifications. In particular, since the context of the present study features some unique characteristics (see section 2.2 and 2.4), it is quite unlikely that many of the findings can directly be transferred to other industry sectors. However, the findings can be linked to recent research in other countries or SMEs in related industries. Hence, as a general theoretical framework the results of the present research are generalisable on a much broader scale. Concerning the culture and location focus of the present research, it remains unclear whether or not the results are transferable to other geographical areas, since multiple authors have reported a significant effect of cultural differences.

Certainly, further research is needed in other regions represented by different cluster organizations in Germany and in other European countries and consequently in other areas of cultural influence, to answer the question of regional and cultural generalisability of the findings.

7.7.3 Limitations based on interviewer bias

One potential bias in most qualitative studies is that the answers given in the interviews might be biased by the interviewer. Interviewee responses might reveal beliefs generated in the course of the interview rather than beliefs that were pre-existing. Furthermore, it is almost inevitable that an interviewer transfers his or her existing attitudes and beliefs to the interviewee to some degree (Keeling, 1999). To avoid this bias as far as possible, the author employed an external moderator for the focus group discussion, who conducted the moderation independently based on a story board (see section 5.6). By employing a moderator, the author considerably increased the objectivity of the collected data. Yet, the question of whether the results would differ if another moderator had been employed cannot be answered with definitive certainty. Generally, the results were supported by the more objective questionnaire data and are thus expected to be a sufficiently objective interpretation of reality. However, due to the fact that some of the factors had to be operationalized into questions based on an initial development and construction and without extensive support from recent research, interviewer bias cannot be excluded completely.

7.7.4 Limitations regarding normality of data and construct reliability

The descriptive analysis of the questionnaire data, conducted in section 6.9 revealed some concerns about the normality of data distributions. While the median-to-mean difference generally shows that the data approximately follows a normal distribution, further testing has revealed that a perfect normal distribution cannot be formally accepted at a reasonable level of confidence for all of the items. Hence, throughout this research, a potential bias of non-normal distributions cannot be completely avoided.

Regarding the construct reliability, evaluated in section 6.10, it has to be acknowledged that there are different conventions for minimum acceptable values of Cronbach's alpha. Generally, most authors agree that values above .7 can be regarded as sufficiently reliable. Recent publications, however, increasingly argue in favour of a more relaxed minimum level of .50 or .60 (see Enders, 2004 ; Heinecke, 2011 ; Shelby, 2011).

This would question the reliability of the construct 'strategy development', also the constructs of 'strategy implantation' and 'external industry-specific factors', with a Cronbach's alpha value around .50 could be questioned. Consequently, correlations, validity, and reliability were tested on the base of the single factors. Constructs Factors, which were not significant or conceptual models, which were accepted for prediction, were excluded from the final conceptual model and hypotheses testing followed according to rigour statistical rules. Nevertheless, also the results from the qualitative research have been incorporated in the interpretation of the final results of the present study. But no segregated finding from each method has been evaluated as decisive on its own.

Summarized, bias in terms of the normality and reliability has been avoided as far as possible, but cannot be excluded completely.

7.7.5 Limitations regarding causal relationships

Considering the quantitative stage, it must be acknowledged that any form of quantitative model cannot confirm any causal logical reasoning in a definite way (Ogden, 2003). This critique can usually be avoided by defining a valid and

reasonable logical chain. Definite certainty about the underlying causal relationships, however, will never be achieved by empirical research (Popper, 1972). However, the questionnaire contents are based on a strong conceptual model, developed on the results from experts during a focus group discussion and an extensive literature review. Statistical tests were performed with SEM modeling based on complex second generation SW tools, as described in section 6.9.5 in order to avoid this potential bias.

7.7.6 Summary on limitations

The previous sections have outlined the limitations of the present study in detail. Most of these limitations, such as the potential interviewer bias or the inability of quantitative models to prove causal relationships, are characteristics of empirical research in general.

Other limitations, especially the subject and location focus of the present research, should invite further research to explore the influences of internationalisation of SMEs in other fields of study or in different geographical locations. Summarized, the present research has, despite the outlined limitations, provided a strong and manifold contribution to knowledge, which will be discussed in more detail in the next section.

7.8 Contribution to knowledge

The original contribution to knowledge of this thesis is an explanative and predictive model of German MedTech SMEs in the context of international ventures. The influencing factors that stimulate German MedTech SMEs to internationalize their business and the role of specific organizational capabilities in this context, and their influence on the strategy-competitive advantage relation are the elements of this model.

Furthermore, the present study has provided a number of additional, if only incremental, contributions to knowledge, which will be acknowledged in more detail in the following table.

Research Question 1: Which specific factors influence the strategic approach to international ventures of German SMEs in the MedTech industry?

<u>Gaps in Knowledge</u>	<u>Contribution to Knowledge</u>	<u>References</u>
A clear and distinct categorisation of influencing factors	1st Minor Contribution: Developing a new categorisation for influencing factors on strategy development in the context of SMEs' internationalisation	section 3.6 table 5 figure 7
An applicable model for influencing factors on strategy development of international ventures	2nd Minor Contribution: A comprehensive overview and critical evaluation of available internationalisation models, with focus on influencing factors towards strategy development. Discussion of contemporary empirical literature. Compilation of a detailed list of predictors. Evaluation of the applicability of the predictors in the research context.	section 3.11
<u>Research objectives</u>	1st Major Contribution: Providing a digest of determinants regarding internationalisation strategy based on qualitative research results in comparison with the results from previous empirical research.	section 5.10 figure 18
Accepted selection of factors influencing the strategy development of German MedTech SMEs in international ventures	2nd Major Contribution: Identification of the key factors based on a factor analysis of questionnaire items. Based on theoretical considerations as well as on empirical evidence the following findings have been revealed # Resources with respect to employees and management as well as provisions for a sufficient amount of capital are the most important determinants for the development of an adequate strategy for international ventures, # Market potential in foreign countries is an antecedent for the development of an internationalisation strategy, # Medical regulations and product competitiveness have a particular impact on international ventures of German MedTech SMEs.	section 6.11 figure 42
Evidence of the most important factors on strategy development of German MedTech SMEs in international ventures		

Research Question 2: What is the impact of strategy development on the internationalisation of German MedTech SMEs?

<u>Gaps in Knowledge</u>	<u>Contribution to Knowledge</u>	<u>References</u>
A conclusion on contemporary empirical research results in the field of strategy, the role organizational capabilities and their impact on international ventures	3rd Minor Contribution: Providing a comprehensive summary of contemporary theoretical and empirical literature in the field of strategy and organizational capabilities. Compilation of a detailed list of specific capabilities and evaluation of the applicability of these factors in the research context .	section 3.8 figure 8

<p>A full understanding of SMEs' strategic approach with respect to international ventures in the MedTech industry</p>	<p>4th Minor Contribution: Overview and critical evaluation of available models, with focus on organizational capabilities and their impact on strategy and international ventures. Providing a comprehensive overview of contemporary empirical literature. Compilation of a detailed list of factors and evaluation of the applicability of the factors in the research context.</p>	<p>section 3.9</p>
<p><u>Research objective:</u> An applicable model for the strategy-competitive advantage relation and the impact of organizational capabilities in the context of international ventures and Medtech SMEs</p>	<p>3rd Major Contribution: Empirical evidence of the causal relationship of strategy on competitive advantage based on a factor analysis of questionnaire items. # Competitive advantage in international ventures increases with the degree of the implementation of an international strategy</p>	<p>section 6.11</p>
<p>Research Question 3: How do organizational capabilities affect the internationalisation strategy execution of German SMEs in the MedTech industry?</p>		
<p><u>Gaps in Knowledge</u></p>	<p><u>Contribution to Knowledge</u></p>	<p><u>References</u></p>
<p>Evidence of the role of organizational capabilities on strategy and international ventures in the context of German MedTech SMEs</p>	<p>4th Major Contribution: Identification of the key factors and relationships based on a factor analysis of questionnaire items. Based on theoretical considerations as well as on empirical evidence the following findings have been revealed # Organizational learning and coordination mechanism have a positive effect on strategy development in the context of internationalisation, # Relationship capabilities strengthen the effect of strategy implementation on competitive advantage with respect to international ventures.</p>	<p>section 6.11</p>
<p><u>Research Objective</u> Assessment of the effects of specific capabilities</p>		
<p>Research question 1-3: How can these factors be arranged in a conceptual model, explaining the internationalisation of German MedTech SMEs?</p>		
<p><u>Gaps in Knowledge</u></p>	<p><u>Contribution to Knowledge</u></p>	<p><u>References</u></p>
<p>An appropriate research process for SME's internationalisation</p>	<p>5th Minor Contribution: Demonstrating that combined methods from the field of qualitative and quantitative research deliver more meaningful insights than applying only quantitative methodologies.</p>	<p>chapter 5 and 6</p>
	<p>6th Minor Contribution: Providing guidelines for the application of qualitative instruments, particularly for the operationalisation of a focus group discussion in the context of SMEs internationalisation</p>	<p>section 5.2 - 5.7</p>
	<p>7th Minor Contribution: Providing guidelines for the</p>	<p>section 6.3 - 6.6</p>

	<p>application of quantitative instruments, particularly the operationalisation of constructs, and the development of appropriate scales. Providing a general map of the most appropriate statistical tests for analysing quantitative questionnaire data by using second-generation SEM modelling.</p>	
<p><u>Research Objective</u></p> <p>A full understanding and a predictive model towards the internationalisation of German MedTech SMEs</p>	<p>5th Major Contribution: Providing a predictive model for the internationalisation of German MedTech SMEs..</p> <p>Based on theoretical considerations as well as on empirical evidence a predictive model has been elaborated and tested based on a regression analysis with the help of second-generation SEM modeling. Factors and causal relationships have been revealed. Furthermore, relevant background factors have been identified by factor scores and a group difference analysis:</p> <ul style="list-style-type: none"> # Firms, who perceive barriers regarding the competitiveness of their products in or the related medical regulations of foreign countries, are significantly less likely to adapt an internationalisation strategy. # Firm size and firm's experience in international ventures have an influence on firm's internationalisation. Those organizations with less international business, which are mainly SMEs, experience the barriers as higher compared to those who are significantly involved in international business. 	<p>section 6.12 - 6.13</p>
<p>The research aim</p>	<p>to assess the relationship of influencing factors on strategy and the role of organizational capabilities as part of a theoretical model of SME's internationalisation in the German MedTech industry</p>	<p>is achieved</p>

Table 22: Contribution to knowledge

In sum, the present research has provided a contribution to knowledge that is highly relevant from an academic as well as from an economic point of view. The study contributed to the theoretical discussion in the field of strategy and internationalisation, as well as to the methodological discussions in the broader field of social sciences. By developing a framework for SMEs internationalisation in the MedTech industry the study provides guidelines for further research in this field. Most importantly, however, the resulting conceptual model will support the industry as well as the governmental institutions and policymakers with an interpretive understanding of the decisive determinants for increasing international ventures in the context of German MedTech SMEs

7.9 Propositions for further research

Throughout the course of this research, potential gaps in knowledge were identified and, if possible, filled with new insights based on reading or empirical data. Due to the clearly defined focus of the present thesis, a substantial number of gaps in knowledge in related fields were identified and should be addressed by further research.

As a result of the focus-group discussion, many interesting insights in the context of management and firm's success have been discovered. Besides the research related topics concerned with influencing factors on firm's strategy, particularly findings related to firm's competitive advantage, have been identified.

As one example of such a finding, the importance of service as a business in general, and specifically in the context of healthcare budgets, might be relevant for future research. From further managerial importance, the importance of the evaluations with respect to the different possibilities and approaches related to SMEs and MNEs might be of particular interest. Another finding is linked to firm's organizational development. Managing the challenge of internationalisation mainly based on experience and deduced patterns from the past could be a risk, since the retro-perspective view neglects the organizational development of a firm. Particularly, the influence of culture and firm size on different capabilities such as innovation or integration of new employees might be from managerial and scholarly interest, when the growth of sales figures is depending on the further development of organizational structures.

But also future research in a similar context in the MedTech industry could be fruitful. Since the scope of the present research are MedTech SMEs on the German market, the application of the derived predictor structure in related fields of similar industries could provide an insight into the generalisability of the findings and the universality of the developed conceptual model. Furthermore, the application of the model in different geographical or cultural environments could provide an important contribution to the question of whether and how SMEs internationalisation is affected by cultural factors.

The analysis of group differences revealed that firm size and experience in international ventures have an influence on the perceived base of operations. Due to

the limited sample size and conceptual limitations, the question of how these factors influence the results could not be answered with absolute certainty. Further research should conduct different regression models based on firm size and experience in international ventures. Another fruitful avenue for research could be the research on the influence of firm size and international experience to add deeper insights.

Furthermore, the evidence of potential moderating or mediating effects of the factors 'organizational learning' and 'steering mechanism' could deliver a substantial contribution to knowledge.

Based on the methodological approach of this thesis, the author clearly advocates the increased application of a mixed-methods approach in operational research. The application of a more explorative qualitative stage could enable further research to obtain a more comprehensive understanding of the concepts involved in decisions in the field of strategy, SMEs and internationalisation.

7.10 Conclusion

The final chapter of this thesis was aimed at consolidating the findings and providing justification for a conceptual model of SMEs internationalisation in the MedTech industry.

An objective of this research was to find out which specific factors influence the strategic approach and the development of international ventures of German MedTech SMEs. Several factors have been identified and those that appear to be most prevalent could be ranked. Another objective of the research was to assess the role of organizational capabilities on strategy. It has been demonstrated that specific organizational capabilities influence the strategic approach and finally the success of German MedTech SMEs' internationalisation.

According to a further research objective, as set out in Chapter 1, a conceptual model was elaborated, based on theoretical justification and on empirical investigation. The model was intended to explain the factors and the underlying mechanism of an international expansion in this industry. The final conceptual model

achieved this objective considering the overall explanatory power and reliability of the underlying measurement instruments.

Hence, the aim of understanding the behaviour of such SMEs and an evaluation of important ingredients of success in such a process could be achieved. The existing relevant limitations of the model were acknowledged in detail.

Based on this model, the author developed recommendations for each stakeholder group, considering their individual aims and objectives. Finally, the incremental and major contributions to knowledge of this study were summarised and recommendations for further research were proposed.

In sum, the present research has met all relevant research objectives and has provided a contribution to knowledge that is relevant from an academic as well as from an economic point of view. This research's findings should help academics, MedTech SMEs and governmental institutions to understand the decisive factors for internationalisation and the importance to develop specific organizational capabilities in this context. This understanding contributes towards a sound development of German MedTech SMEs in their future internationalisation and will thus help to sustain their presence in the markets for the benefit of the German economy and society, as well customers and patients worldwide.

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APPENDIX

A Literature Review

Table 1: Scoping study

Database/engine	Search term	Date	Hits
Google Scholar	Medical tech company AND Strategy	18.08.2012	18.900
Google Scholar	Medical tech company AND SME	18.08.2012	16.900
Google Scholar	Strategy AND SME	18.08.2012	22.100
Google Scholar	SME AND Regulatory	18.08.2012	29.200
Google Scholar	Regulatory AND medical tech company	18.08.2012	14.500
Google Scholar	Healthcare AND medical tech company	18.08.2012	15.500
Google Scholar	SME AND Healthcare	18.08.2012	6.900
Google Scholar	Regulatory AND strategy	18.08.2012	101.000
Google Scholar	healthcare AND strategy	18.08.2012	82.100
Google Scholar	Medical Tech company AND strategy	18.08.2012	15.200
Google Scholar	Regulatory AND strategy AND SME AND Healthcare AND medical tech company	18.08.2012	2.330

Table 2: Inclusion / exclusion criteria

criteria	inclusion	exclusion
relevance	meets combined search term criteria: Regulatory AND strategy AND SME AND Healthcare AND medical tech company	Meets terms only partially
relevance	Articles belonging to the TOP 10%	all articles ranking in terms of citations after number 233 (not belonging to the top ten 10%)
date	Material within the last ten years	Material published before 2002
language	Material written in English or German	Material written in other languages
Historical retrospective		Describing historical phenomenon e.g. economical struggles in the period from 1940-1948
Reduced to and focused only on special cultural aspect		e.g. cultural differences in leadership in India
Reduced to and focused only on special social aspect		e.g. role of labour union in the U.K.
Reduced to and focused only on special technical aspect		e.g. special applications and procedures for cancer treatment
Reduced to and focused only on special industry or products		e.g. generic medicaments in pharmaceutical industry
Reduced to and focused only on special financial aspect		e.g. financing strategy

Table 3a: research articles meeting quality criteria, part I

TITLE	AUTOR	ARTICLE	TOPIC
British Journal of Management	Research articles via Wiley citation library -> journals	Search key words „SME“	Hits: 34
Governance Mechanisms of Small and Medium Enterprise International Partner Management	Pavlos Dimitris's , Spyros Lioukas , Kevin I. N. Ibeh and Colin Wheeler	Volume 21, Issue 3, September 2010, Pages: 754–771,	We examine how small and medium enterprises manage their international partners across different market servicing modes, namely exporting, joint ventures and wholly owned subsidiaries. The international drawn from agency theory. In-depth case studies were carried out in 14 Greek small firms that employed different modes to incentives/performance monitoring schemes, whereas low performers pursue centralized decision-making with behaviour-oriented incentives/performance monitoring schemes.
Cooperation, Trust and Performance – Empirical Results from Three Countries	Matthias Fink , Alexander Kessler	Article first published online: 22 JUN 2009 DOI: 10.1111/j.1467-8551.2009.00647.x © 2009 British Academy of Management	Reverting to the resource-based view of strategic management and cooperation theory, we provide argumentation for the value of two critical resources to cooperating firms: cooperation experience and maxim-based trust. The results of a large-scale survey in three European countries (Austria, Slovenia and the Czech Republic) reveal an important fact: although cooperation experience contributes to business performance, the contribution of maxim-based trust to success is significantly higher. As characterization as utopian and out of touch with reality.
The Influence of Top Management Teams in the Strategic Orientation and Performance of Small and Medium-sized Enterprises	Alejandro Escriba-Esteve , Luz Sánchez-Peinado , Esther Sánchez-Peinado	Article first published online: 30 OCT 2008 DOI: 10.1111/j.1467-8551.2008.00606	Identifying which factors affect firms' performance is a critical issue in strategic management research. This paper addresses the influence of managerial team over the behaviour and performance of small and medium-sized enterprises (SMEs). By treating top management team (TMT) characteristics as predictors of a firm's strategic orientation, we seek to provide a more complete understanding of how the characteristics of managerial teams shape decision-making processes and SMEs'

TITLE	AUTOR	ARTICLE	TOPIC
British Journal of Management	Research articles via Wiley citation library -> journals	Search key words „SME“	Hits: 34
Matching Modes of Export Strategy Development to Different Environmental Conditions	George Balabanis, Stavroula Pyropoulou	British Journal of Management Volume 18, Issue 1, March 2007, Pages: 45–62, Article first published online: 8 AUG 2006, DOI: 10.1111/j.1467-8551.2006.00505.x Abstract Full Article (Despite its increasing importance on current literature, prior research on export strategy development is limited to the examination of the effectiveness of only two strategy-making modes (formal planning and the entrepreneurial mode) in a non-comparative of the environment dynamism, hostility and diversity. Empirical research on a sample of British exporters confirmed that the choice of the strategy development mode is an important element in the determination of export performance and that environmental conditions moderate this relationship. Of the export strategy-making modes examined, the entrepreneurial, which are most successful
British Journal of Management	Research articles via Wiley citation library	Search key words „medical device manufacturer“	Hits: 3
Medical Innovation as a Process of Translation: a Case from the Field of Telemedicine	Davide Nicolini	British Journal of Management Volume 21, Issue 4, pages 1011–1026, December 2010	The paper makes a case for the use of sociology of translation as a way of integrating the classical rational and stepwise way of studying and narrating innovation is particularly capable of bringing back time, effort and politics into the account of the innovation process.
British Journal of Management	Research articles via Wiley citation library	Search key words „internationalization“	Hits: 99
The Influence of Top Management Teams in the Strategic Orientation and Performance of Small and Medium-sized Enterprises	Alejandro Escobar-Esteyne, Luz Sánchez-Reinado and Esther Sánchez-Reinado	British Journal of Management Volume 20, Issue 4, December 2009, Pages: 581–597	Already searched under different search term
The Implementation of an International Market Servicing Strategy in UK Manufacturing Firms	Peter J Buckley, C. L. Pass and Kate Prescott	British Journal of Management Volume 1, Issue 3, September 1990, Pages: 127–136	Competitiveness is defined by performance, competitive potential and management process. Although the choice of foreign market servicing mode is highly constrained, there is a range of choice available to firms, although this choice is, although it is not always positive. Moreover, these effects may be in different directions on the three components of competitiveness. Attention to foreign market servicing policies is crucial for achieving international competitiveness

The Influence of Top Management Teams in the Strategic Orientation and Performance of Small and Medium-sized Enterprises	Alejandro Escriba-Esteve , Luz Sánchez- Peinado and Esther Sánchez- Peinado	British Journal of Management Volume 20, Issue 4, December 2009, Pages: 581–597	Already searched under different search term
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Top Management Team Heterogeneity, Strategic Change and Operational Performance	David Naranjo-Gil, Frank Hartmann and Victor S. Maas	British Journal of Management Volume 19, Issue 3, September 2008, Pages: 222–234,	Heterogeneity in facilitating strategic change. Based on the upper echelons literature, we argue that heterogeneous management teams are better able to handle the simultaneous and conflicting demands of refocusing the organization strategically and keeping up operational performance. We expect this to be true only for teams that are heterogeneous with respect to factors directly related to job moderates the relation between strategic change and operational performance. No moderating effect is found for non-job-related TMT heterogeneity.
The importance of managers "formative years" the importance of international experience for the international orientation and foreign acquisition decisions	Dorothea Pjaskowski	British Journal of Management Volume, , 2012	2122 empirical test provide primary research data which confirms that the experience of the managers which they gathered in the beginning their career has strong influence on their international orientation
Implementation of an international market servicing strategy	Peter j. Buckley	British Journal of Management Volume 2005	Competitiveness is defined by performance, competition potential and management processes, they crucial but mostly reactive

Strategic Management journal	Research articles via Wiley citation library	Search key words „SME“	Hits: 14
<p>Innovation practice and its performance implications in small and medium enterprises (SMEs) in the manufacturing sector: a resource-based view</p>	<p>Mile Terziovski</p>	<p>Strategic Management Journal, Volume 31, Issue 8, August 2010, Pages: 892–902</p>	<p>Small and medium enterprises (SMEs) in the manufacturing sector make a significant contribution to economic growth, yet most of the research into innovation management in the manufacturing sector has focused on large organizations. This article, however, identifies innovation drivers and their performance implications in manufacturing SMEs. Its study gathered survey data from a sample of 600 Australian SMEs and found that SMEs are similar to large firms with respect to the way that innovation strategy and formal structure are the key drivers of their performance, but do not appear to utilize innovation culture in a strategic and structured manner. This study therefore concludes that SMEs' performance is likely to improve as they increase the degree to which they mirror large manufacturing firms with respect to formal strategy and structure, and to which they recognize that innovation culture and strategy are closely aligned throughout the innovation process</p>
<p>The internationalization and performance of SMEs</p>	<p>Jane W. Lu,* Paul W. Beamish</p>	<p>Strategic Management Journal, Special Issue: Strategic Entrepreneurship: Entrepreneurial Strategies for Wealth Creation Volume 22, Issue 6-7, pages 565–586, June - July 2001</p>	<p>entrepreneurship literatures, we develop four hypotheses that relate the extent of foreign direct investment (FDI) and exporting activity, and the relative use of alliances, to the corporate performance of internationalizing SMEs. Using a sample of 164 Japanese SMEs to test these hypotheses, we find that the positive impact of internationalization on performance extends primarily from the extent of a firm's FDI activity. We also find evidence consistent with the perspective that firms face a liability of foreignness. When firms first begin FDI activity, profitability declines, but greater levels of FDI are associated with higher performance. Exporting moderates the relationship FDI has with performance, as pursuing a strategy of high exporting concurrent with high FDI is less profitable than one that involves lower levels of exports when FDI levels are high. Finally, we find that alliances with partners with local knowledge can be an effective strategy to overcome the deficiencies SMEs face in resources and capabilities, when they expand into international markets</p>

Profitability of small- and medium-sized enterprises in high-tech industries: the case of the biotechnology industry	Gongming Qian1,*, Lee Li2	Strategic Management Journal Volume 24, Issue 9, September 2003, Pages: 881–887,	This paper investigates the profitability determinants of small- and medium-sized enterprises in high-tech industries. Literature review suggests that innovator position, market awareness, niche operation, and internationalization should have positive impacts on SMTEs' profitability. However, the empirical results partially agree with, and partially dissent from, the propositions
Strategic Management journal	Research articles via Wiley citation library	Search key words „healthcare“	Hits: 45
When is more better? The impact of business scale and scope on long-term business survival, while controlling for profitability	Janet Bercovitz1,*, Will Mitchell2	Strategic Management Journal Volume 28, Issue 1, pages 61–79, January 2007	Little research, though, shows whether size confers survival advantages in addition to the survival benefits of baseline profitability. Moreover, no prior research attempts to where we conceptualize scale in terms of annual sales revenue and scope in terms of product line breadth and sub-sector participation within a related business context. We first argue that greater business scale and business scope each enhance long-term survival, independent of baseline profitability, owing to greater availability of financial resources, organizational routines, and externalities. We then argue that the benefits of scale are greatest for multi-product businesses, stemming from positive interactive effects of breadth and depth. We find support for these hypotheses with data from 618 firms that operated in the U.S. medical sector between 1978 and 1995.
Getting there in a global industry: Impacts on performance of changing international presence	Will Mitchell, J. Myles Shaver and Bernard Yeung	Strategic Management Journal Volume 13, Issue 6, September 1992, Pages: 419–432	We investigate the effects of increasing and decreasing international presence on market share and survival in the American medical diagnostic imaging equipment industry. Imaging equipment manufacturers possessing international medical operations tend to achieve superior market share and longer survival, but we find that attempting to become an international medical player is risky. Both increasing and decreasing international presence have negative associations with survival, while decreased internationalization is associated with decreased American market share. Brief case studies suggest that the ingredients for success in internationalization may include preparedness, focused management, and learning from international experience

Performance effects of imitative entry	Sendil K. Ethiraj and David H. Zhu	Strategic Management Journal Volume 29, Issue 8, August 2008, Pages: 797–817	This article examines how waiting to imitate a product affects the performance of the imitator compared to the innovator. Specifically, we address two research questions. Under what conditions does imitation erode the advantage of the innovator? What strategies of imitators help overcome the innovator's advantage? Our main argument is that the increasing availability of information on the innovator's product increases the imitator's returns to waiting. . products transition from those that are horizontally differentiated (products are similar in quality but differ in their attributes) to those that are vertically differentiated (products differ in quality). Thus, we hypothesize that shifts in the nature of competition over time from horizontal differentiation to vertical differentiation account for why the innovator's.
Is performance driven by industry-or firm-specific factors? A new look at the evidence	Gabriel Hawawini , Venkat Subramanian and Paul Verdin	Strategic Management Journal Volume 24, Issue 1, January 2003, Pages: 1–16	In this study we revisit the question of whether firms' performance is driven primarily by industry or firm factors, extending past studies in two major ways. Secondly, we examine whether the findings of past research can be generalized across all firms in an industry or whether they apply to a particular class of firms within the same industry. We find that a significant proportion of the absolute estimates of the variance of firm factors is due to the presence of a few exceptional firms in any given industry. In other words, only for a few dominant value creators (leaders) and destroyers (losers) do firm-specific assets seem to matter significantly more than industry factors. For most other firms, however, the industry effect turns out to be more important for performance than firm-specific factors.
Survival of business using collaborating relationships	Will Mitchell *, Kulwant Singh	Strategic Management Journal Volume 17, Issue 3, pages 169–195, March 1996	Authors with many theoretical and managerial perspectives argue that businesses to achieve the close configuration of components required for complex goods. We predict that collaborative relationships often assist businesses to produce complex goods, but that the relationships might also cause problems for the collaborating businesses. We find that firms using development-oriented and marketing-oriented collaborative to shut down, while businesses with collaborative relationships for activities outside the focus of the shock became more likely to survive. The study critically evaluates and tests the widely stated but little-tested argument that interfirm collaboration is usually beneficial.

Getting there in a global industry: Impacts on performance of changing international presence	Will Mitchell, J. Myles Shaver, Bernard Yeung	Strategic Management Journal Volume 13, Issue 6, pages 419–432, September 1992	We investigate the effects of increasing and decreasing international presence on market share and survival in the American medical diagnostic imaging equipment industry. Possessing international medical operations tend to achieve superior market share and longer with decreased American market share. Brief case studies suggest that the ingredients for success in internationalization may include preparedness, focused management, and learning from international experience.
Spawned with a silver spoon? Entrepreneurial performance and innovation in the medical device industry	Aaron K. Chatterji*	Strategic Management Journal Volume 30, Issue 2, pages 185–206, February 2009	Entrepreneurs in high-technology industries often have prior experience at incumbent firms, but we know little about how knowledge obtained at the prior employer impacts entrepreneurial performance. Drawing on previous work from strategy, suggest that this superior performance is not driven by technological spill-overs from parent to spawn, but rather by nontechnical knowledge related to regulatory strategy and marketing
Internationalization as a strategy process	Leif Melin	Strategic Management Journal Special Issue: Special Issue Volume 13, Issue S2, pages 99–118, Winter 1992	This paper critically reviews the field of international business research. The field is characterized by considerable intellectual diversity, where theoretical focus is blurred by the multidisciplinary nature of the field. The review focuses on three themes; stage models, studies of the link between strategy and structure in MNCs, and studies of administrative processes and recent organizational models for MNCs. Sequential stages models are too deterministic and stress suggested. These themes, dealing with dynamic processes in MNCs, and the study of internationalization processes in their outer contexts
British Journal of Management	Research articles via Wiley citation library	Search key word: export strategy	Hits: 94
Winning the Export War: British, Japanese and West German Exporters' Strategy Compared	Peter J. Williamson	British Journal of Management Volume 1, Issue 4, pages 215–230, November 1990	A comparison of pricing policies, price and volume volatility, and investment in distribution, sales and marketing systems across 462 product categories identifies important differences in the strategies of British, Japanese and West German exporters towards the US market. The impact of these distribution support is less important. Japanese exporters have invested heavily in US distribution and channel support, combined supplied from Germany to a limited number of customers.

British Journal of Management	Research articles via Wiley citation library	Search key word: Innovation and SME	Hits: 24
Strategic Influences of Technological Innovation in Greece	Vangelis Soutaris	British Journal of Management Volume 12, Issue 2, pages 131–147, June 2001	This exploratory paper analyses the 'importance' and 'awareness' of a set of established 'strategic' influences of technological innovation in the context of a European newly-industrialized country. The author interviewed 105 Greek manufacturing firms (mainly SMEs) and measured their perceived innovation rate as well as 17 'strategic' factors regarding top-management practices and characteristics. Using correlation and regression analysis the initial group of factors was reduced to a subset of five 'major importance' influences of innovation, namely: incorporation of technology plans in the business strategy, managerial attitude towards risk, perceived intensity of competition and rate of change of customer needs, and finally status of the CEO (owner-CEOs were associated with higher innovation rate than appointed CEOs). The 'statistical' results are exploratory and have to be treated with caution, as they are highly influences of innovation were generally scarce in the Greek institutional context. The highly innovative companies were the ones to overcome country-specific innovation barriers such as the low supply of technology, the low level of competition and the risk-averse national culture.
Journal of medical device	Research articles via Wiley citation library	Search key words „medical regulations“	Hits :21
Journal of Medical Device Regulation in der Ausgabe August 2012	Kanwal Jit Singh		European regulatory intentions do not always match implementation. Ensuring that a company fulfils its requirements under the European medical device regulations can be a difficult process, especially when to fit with the legislation and recommended implementation practices. This article focuses on four main areas where confusion exists and action is needed to clarify and resolve the issues: the definition of a medical device; the sub-division of Class I devices; the classification of active devices and devices incorporating a medicinal substance; and 'placing on the market' and 'state-of-the-art' in the third edition of EN 60601-..

Journal of Medical Device Regulation in der Ausgabe August 2012	Christina Söholm		With the fast growing medical device market in China, an increasing number of foreign manufacturers are keeping a watchful eye on the industry. As compared to Western countries, China takes the application and approval process for imported medical devices to a whole new level of complexity. Language barriers and cultural differences present further obstacles for device manufacturers.
Die Themen des Journal of Medical Device Regulation in der Ausgabe August 2012	Bijayata Upadhyay		Comparison of the medical device regulatory requirements in the European Union and India. Different countries have different regulations for approving a medical device and providing authority to the manufacturer to market the product. In this article, Bijayata Upadhyay examines the similarities and differences between the regulations to be fulfilled by medical devices in the market in India reveals several differences, particularly with respect to the technical documentation requirements

Table 3b: research articles meeting quality criteria Part II

TITLE	AUTOR	ARTICLE	TOPIC
An industrial organization economic supply chain approach for the construction industry: a review	KERRY A. LONDON* AND RUSSELL KENLEY Faculty of Architecture, Construction and Design, UNITEC, Auckland, New Zealand Received 7 January 2000; accepted 11 July 2001	Research paper Article demonstrating literature net	Literature net General theory regards SCM , production, distribution related to the specific situation of the construction industry
Producing and socializing relevant management knowledge: return to pragmatism	Jacqueline Fendt Renata Kaminska-Labbe Wladimir M. Sachs		Gap academia and management practitioners. Action research
Strategien der Internationalisierung von	Geyer, Gunnar; Uriep, Amrisha HWWI policy paper, No. 65	KMU Internationalisierung	Übersicht mittelstand-globalisierung Pros-cons Strategien wie wo, mit was

KMU	Provided in		
Messung von Wettbewerbsvorteilen und Marktattraktivität für die strategische Planung	Roland Helm1 , Werner Gleißner2 und Susanne Kreiter3 21. Juni 2012 Nr. 468 JEL	Working paper Diskussionsbeitrag 468	Erfolgsfaktoren Zusammenfassende Studie von vielen Primärerhebungen Wettbewerbsvorteil-Marktattraktivität, Indikatoren Messung und Modellbildung
Competence understanding and use in SMEs: a UK manufacturing perspective	R Bhamra, S Dani, T Bhamra - International Journal of Production research ..., 2011		The paper seeks to address the neglected area of competency research that is the understanding and application of core competency concepts within small and medium sized enterprises (SMEs). There is little doubt that SME manufacturing organisations can possess core research findings are important for both practitioners and academics, indicating an apparent lack of connectedness between research into competence and its 'real world' understanding and practical use within manufacturing SMEs.
The reference model of competitiveness factors for SME medical sector	Katarzyna Rostek	Economic Modelling Volume 29, Issue 5, September 2012, Pages 2039–2048	The paper presents the issue of SME competitiveness in terms of determining their competitive position on the market. The proposed reference model, focused on the , whose utilization directs the company's business to improving its market performance, organizational and economic conditions.
Quality and continuous improvement in medical device manufacturing	Alan Brown, Julie Eatock, Dorian Dixon, Brian J. Meenan, John Anderson, (2008) "Quality and continuous improvement in medical device manufacturing", The TQM Journal, Vol. 20 Iss: 6, pp.541 - 555		The purpose of this paper is to compare a range of quality and continuous improvement strategies and to investigate whether there is a best choice of strategy for use within the medical devices sector. Design/methodology/approach – A brief literature-based review of a number of continuous improvement strategies. Comparison of these strategies and a subsequent discussion of the rationale that guides the choice of strategy based on the prevailing conditions. An overview of this process in the context of the medical devices sector is provided. Findings – Quality and continuous improvement strategies can be differentiated in terms of their cultural or process focus. Moreover, the favored leadership style of an organization may play a part in determining which strategies are likely to be most appropriate. From the medical device and healthcare product perspective, regulatory and purchasing considerations will have a role in determining the strategy adopted.
The development of a theoretical framework for the internationalisation process of fast growth medium-sized firms in Europe	Perks, Keith J. Awarding Institution: Current Institution: Awarded:	Ethos in internationalisation 223 Loughborough University Loughborough University 2003	The experience of the author and a review of the literature identify a number of possible limitations in current theories of internationalisation. Existing theories can be broadly classified under the headings of either "stage school" or contingency theories. There appears to have been little research on the interface between the two theoretical approaches, nor on the dynamism of the internationalisation process within an individual firm. While scholars challenge the of the entrepreneur decision-maker(s); the nature of the product, the market demographics, and the mindset and nature of the seller and buying organization. The results indicate that the theoretical framework is

			<p>rigorous enough to demonstrate the variety in the internationalisation processes of the firms in the study. The findings are that whilst there are some common processes and patterns among the firms in the study, there are variations, explained by the contingency theory and contexts in which the firms operate. Previous research has neglected specific contexts as important factors in the internationalisation process. The thesis addresses this gap in the research by developing the theory in the context of specific sectors (electronics, software and metal-mechanical) countries (UK, Germany, France and Italy), firm size (medium-sized) and fast growth.</p>
<p>Internationalisation strategies for small and medium-sized enterprises: a study of UK and German joint ventures in the People's Republic of China</p>	<p>Kaiser, Stefan H.</p> <p>Awarding Institution:</p> <p>Current Institution:</p> <p>Awarded:</p>	<p>Durham University</p> <p>Durham University</p> <p>1998</p>	<p>Only a few SMEs are involved in foreign direct investment. However, growing pressure from globalization increasingly means that SMEs must extend their business activities beyond sole export strategies. Internationalisation imposes an above-the-average financial and managerial resource burden upon SMEs. This is particularly true in the case of foreign direct investment, which requires the highest resource commitment of all market entry strategies. Frequently, thus, SMEs cannot commit the resources necessary for success in international markets. Not without reason internationalisation, in the form of foreign direct investment, is a necessary condition for SMEs to establish a market presence in the Chinese market and so better reap the benefits of the impressive economic development of the country. The UK and German joint venture entrepreneurs studied expressed overall satisfaction with their joint investment projects in China. However, the study has also detected various size-related resource scarcities, which restrict the SMEs in their joint venturing efforts. Short cut planning procedures and partner selection processes are resultant from that, as well as a weak bargaining position in negotiations and less influence in the control and management of the investment project</p>
<p>Results from an exploratory study to identify the factors that contribute to success for UK medical device small- and medium-sized enterprises</p>	<p>P C Hourd¹</p> <p>D J Williams¹</p>	<p>Journal of engineering medicine</p>	<p>This paper reports the results from an exploratory study that sets out to identify and compare the strategic approaches and patterns of business practice employed by 14 UK small- and medium-sized enterprises to achieve success in the medical device sector of the health-care industry. An interview-based survey was used to construct individual case studies of the medical device technology (MDT) companies. A cross-case analysis was performed to search for patterns and themes that cut across these individual cases. Exploratory results revealed the heterogeneity of MDT companies and the distinctive features of the MDT innovation process that emphasize the importance of a strategic approach for achieving milestones in the product development and exploitation process and for creating value for the company and its stakeholders. Recognizing the heterogeneity of MDT companies, these exploratory findings call for further investigation to understand better the influence of components of the MDT innovation process on the commercialization life cycle and value trajectory. This is required to assist start-up or spin-out MDT companies in the UK and worldwide to navigate the critical transitions that determine access to financial and consumer markets and enhance the potential to build a successful business. This will be important not only for bioscience-based companies but also for engineering-based companies aiming to convert their activities into medical devices and the health- and social-care market.</p>
<p>Investigating the Export Marketing Activity of SMEs Operating in International Healthcare Markets</p>	<p>Bradley R. Barnes</p> <p>Ronika Chakrabarti</p> <p>Dayananda Palihawadana</p> <p>¹Leeds University Business School, Maurice Keyworth</p>	<p>Journal of medical marketing</p>	<p>The paper reports on an investigation of the characteristics associated with small and medium-sized enterprise (SME) exporters that operate in international healthcare markets. A framework is initially developed to analyze (a) the factors that stimulate such firms to venture overseas, (b) the key barriers to export, (c) the international market coverage where the firms do business, and (d) their success factors associated with trading internationally.</p>

	Building, Leeds LS2 9JT, UK Tel: +44 113 343 7017 Fax: + 44 113 343 1807 e-mail: brb@lubs.leeds.ac.uk		Based on a sample of 112 SMEs, our findings reveal that although business growth, profits and a large market size were seen to motivate firms to venture overseas, finding an appropriate partner was a key barrier. Cultural issues were not found to prevent the sample of firms from doing business internationally, but having high-quality products and competitive prices were considered important ingredients of success. Several managerial implications are also extracted from the study that business support providers and governmental sources can use to assist firms operating within the sector.
The internationalisation challenge - Enabling and constraining factors in the medical-technology sector	St. GallenFörlag:KMU Verlag HSG 2010	H Laurell, L Achtenhagen	SMEs in high-technology industries, such as life-sciences, face a fundamental challenge. On the one hand, high product development costs push companies into early internationalisation to increase turnover and recover investments. On the other hand, internationalisation is constrained, e.g. by financial and managerial resource limitations or the demand to follow local regulations. To date, little is known about how high-tech SMEs actually manage this challenge. This paper presents an in-depth case study of the internationalisation process of a Swedish high-tech SME, to develop a better understanding of how the trade-offs related to internationalisation are handled in practice. Combining insights from the process theory of internationalisation with international new venture theory, our findings outline factors affecting the internationalisation process specific to the medical-technology industry, the company and the founding team.

**Table 4: Summary of Literature Review on specific journals :
Journal of International Marketing and Academy of Management Journal**

2013-2003			
TITLE	AUTOR	SOURCE	TOPIC
Competitive implication of certification	Francesco Polidore	AoMJ VOL 56, no 2	<p>Extant literature highlights the benefits accruing to a firm that obtains third-party certifications. Certifications provide reputational benefits that increase stakeholders' confidence in a firm's prospects, thereby increasing the firm's ability to garner critical resources. Yet the influences that certifications have on rivals remain underexamined.</p> <p>This study Investigates how the scientific and regulatory certifications that a firm receives affect rivals' entries into a new technical field it pioneers. I demonstrate that certifications have a dual role in shaping an emerging competitive landscape: Whereas a pioneer's scientific and regulatory certifications attract competition by indicating value creation prospects, its certification advantage over rivals deflects competitive entries by indicating bleaker value capture prospects. This study also shows that the influences stemming from a pioneer's certifications diminish as the innovation it</p> <p>Pioneers receive certifications, thus providing rivals with more direct cues about a new field's prospects. In contrast with prior research showing that the emergence of a new technical field carries drastic implications for rivals, this study highlights how social context guides rivals' responses to an otherwise disruptive change, thereby</p> <p>Pdf download, description of variables: rival mechanism (dependent variable) measured as entry or follower</p> <p>Pioneers regulatory approvals, its scientific publications and pioneers advantage in regulatory approvals (independent variable)</p>

			Patents, invents, new products as control variable
Choice, chance and unintended consequences in strategic change	A. Bradley Mackay	AoMJ VOL 56, no 1	only longitudinal example regards long term strategy making of one company (Magna ?), no model, no variables
Move to the best: rhythm of chance and firm performance	Patricia Karen	AoMJ VOL 56, no 1	<p>Managers are often confronted with the conflicting needs of implementing quick strategic changes on the one hand and ensuring stability within their firms on the other hand. If taken to an extreme level, both a high pace of change and a low pace of change can be detrimental to firm performance. This chapter suggests the rhythm of change as a means of balancing the conflicting forces of change and stability, presenting results from a longitudinal study of the European Insurance Industry between 1995 and 2004.</p> <p>Pdf download in eBooks, description of model and variables :</p> <p>Firm performance (dependent variable) measured in return on equity strategic change (independent variable) measured as new country/business segment or withdraw from.</p> <p>Control variables: age , firm size, initial performance and others</p>
How does HR mgmt.. organize outcomes: investigation of mediating mechanisms	Kaifeng jiang	AoMJ VOL 55, no 4	<p>Drawing on the ability-motivation-opportunity model, this meta-analysis examined the effects of three dimensions of HR systems—skills-enhancing, motivation-enhancing, and opportunity-enhancing—on proximal organizational outcomes (human capital and motivation) and distal organizational outcomes (voluntary turnover, operational outcomes, and financial outcomes). The results indicate that skill-enhancing practices were more positively related to human capital and less positively related to employee motivation than motivation-enhancing practices and opportunity-enhancing practices. Moreover, the three dimensions of HR systems were related to financial outcomes both directly and indirectly by influencing human capital and employee motivation as well as voluntary turnover and operational outcomes in sequence.</p> <p>Will not be analysed further because of</p>

			weak coverage of strategy themes
Modelling how to grow: an inductive examination of xx, behaviour, contingencies and outcomes	Bradley D. Owen	AoMJ VOL 55, no 3	<p>Although a growing number of leadership writers argue leader humility is important to organizational effectiveness, little is known about the construct, why some leaders behave more humbly than others, what these behaviours lead to, or what factors moderate the effectiveness of these behaviours. Drawing from 55 in-depth interviews with leaders from a wide variety of contexts, we develop a model of the behaviours, outcomes, and contingencies of humble leadership. We uncover that leader humility involves leaders modelling to followers how to grow and produces positive organizational outcomes by leading followers to believe that their own developmental journeys and feelings of uncertainty are legitimate in the workplace. We discuss how the emergent humility in leadership model informs a broad range of leadership issues, including organizational development and change, the evolution of leader-follower relationships, new pathways for engaging followers, and integrating top-down and bottom-up organizing.</p> <p>Qualitative interviews focusing on humility and leadership</p>
Catalysing strategies and efficient tie formation	Benjamin C. Hallen	AoMJ VOL 55, no 1	<p>Although network ties are crucial for firm performance, the strategies by which executives actually form ties are relatively unexplored. In this study, we introduce a new construct, tie formation efficiency, and clarify its importance for superior network outcomes. Building on fieldwork in nine Internet security ventures seeking investment ties, we unexpectedly identify two “equifinal” paths for how executives form ties efficiently. One relies on existing strong direct ties and is only available to privileged firms. The other relies on a second new concept, catalysing strategies, a means by which executives advantageously shape opportunities and inducements to form ties that is available to many firms. Overall, we add insights to the network and signalling literatures and to the nascent literature on how strategic action, especially by low-power actors such as entrepreneurs, shapes critical network outcomes</p> <p>Only focusing on ties and behaviour with small coverage on strategy .</p>
Business group affiliation: performance context and strategies	Michael Carney	AoMJ VOL 54, no 3	formal and informal ways—is accelerating. Through meta-analytical techniques employed on a database of 141 studies covering 28 different

			<p>countries, we synthesize this research and extend it by testing several new hypotheses. We find that affiliation diminishes firm performance in general, but also that affiliates are comparatively better off in contexts with underdeveloped financial and labour market institutions. We also trace reduced affiliate performance to specific strategic actions taken at the firm and group levels. Overall, our results indicate that affiliate performance reflects complex processes and motivations.</p> <p>Featuring Business Group in the context of performance</p>
Firm specific assets, multinationalism and financial performance: theoretical integration		AoMJ VOL 54, no 1	<p>Through a meta-analysis of 120 independent samples reported in 111 studies, we test the predictions of internalization theory in the context of the multinationalism-performance relationship. Findings indicate that multinationalism provides an efficient organizational form that enables firms to transfer their firm-specific assets to generate higher returns in international markets. In addition, the results delineate the conditions under which firm-specific assets have the strongest impact on the multinationality-performance relationship. Meta-analytic evidence also suggests that multinationalism has intrinsic value above and beyond the intangible assets that firms possess, given analyses controlling for firms' international experience, age, size, and product diversification.</p> <p>Only interesting when using performance outcomes in the context of multinationalism</p>
The follower dilemma: Innovation and imitation in the professional service industry	Matthew Semaderi	AoMJ VOL 53, no 5	<p>Firm decision makers contemplating imitation of a competitor's innovation face a dilemma: Imitate a new, unproven offering, or forgo imitation and perhaps miss out on the "next big thing"? Approaching this underexplored area of research, we apply information-based imitation theory to evaluate organization- and offering-level characteristics influencing imitation under conditions of high environmental uncertainty and high information asymmetry. In analysing the service mark filings of the 50 largest management consulting firms over 11 years, we find that although an innovator's organization-level characteristics increase imitation, offering-level characteristics decrease imitation. Furthermore, organization- and offering-level characteristics interact, resulting in different imitation outcomes.</p>

<p>From common to uncommon knowledge: foundations of firm specific use of knowledge</p>	<p>Rajev Nag</p>	<p>AoMJ VOL 53, no 2</p>	<p>Although the knowledge-based view of strategy has significantly advanced understanding of the foundations of competitive advantage, less is known about how knowledge becomes a strategic resource. In this study, we develop an inductive, process model of the relationships among (1) top managers' beliefs about knowledge as a resource (termed executive knowledge schemes), (2) the ways that executives search or scan for knowledge, and (3) how they use that knowledge in practice to transform common knowledge into distinctive, uncommon knowledge as a way of achieving competitive advantage. In the course of generating the grounded model, we also uncovered a new concept, scanning proactiveness, and identified two distinct forms of knowledge use in practice: knowledge adaptation and knowledge augmentation</p>
<p>Does patent strategy shape the long term supply of public knowledge</p>	<p>Kerneth G. Huang</p>	<p>AoMJ VOL 52, no 6, 2009</p>	<p>Knowledge-based firms seeking competitive advantage often draw on the public knowledge stream (ideas embedded in public commons institutions) as the foundation for private knowledge (ideas firms protect through private intellectual property [IP] institutions). However, understanding of the converse relationship—the impact of private knowledge strategies on public knowledge production—is limited. We examine this question in human genetics, where policy makers debate expanding IP ownership over the human genome. Our difference-in-differences estimates show that gene patents decrease public genetic knowledge, with broader patent scope, private sector ownership, patent thickets, fragmented patent ownership, and a gene's commercial relevance exacerbating their effect.</p> <p>Not sure whether example of 'genetic patents can be used, in general interesting approach to strategy and knowledge management</p>
<p>MNC: Subsidiaries and country risk: Internationalisation as a safeguard against weak external institutions</p>	<p>Susanne. Feinberg</p>	<p>AoMJ VOL 52, no 2, 2009</p>	<p>Country risk and foreign direct investment (FDI) are negatively associated, yet considerations such as rapid economic growth and lower factor costs are driving multinational corporations (MNCs) to significantly increase FDI into high-risk countries. How do MNCs deal with country risk on an ongoing basis after establishing majority or wholly owned operations? Analyses of 1983–96 data on a large sample of subsidiaries support our prediction that, under uncertainty, MNCs increase the extent of their within-firm</p>

			sales. Trade internalization as a response to country risk is weaker for MNCs having greater experience deploying political strategies.
Rivalry deterrence in int. markets	Y. Tieying	AoMJ VOL 52, no 1, 2009	The mutual forbearance hypothesis states that when the same competitors meet in multiple markets, rivalry is deterred. Our study highlights how pressures for local responsiveness impact the veracity of this hypothesis for multinational corporations (MNCs) in host countries. We develop theory to explain how subsidiary ownership, home-host cultural distance, host country regulatory restrictions on MNC activities, and the presence of local competitors affect the rivalry-dampening impact of multi-market contact. We tested our hypotheses with a sample of 13 global automobile companies operating in 27 countries and report strong support for our hypotheses.
Resource mgmt. in dynamic competitive rivalry	David C. Simon	AoMJ VOL 51, no 5, 2008	We address current criticisms of the RBV (oversight of dynamism, environmental contingencies, and managers' role) by linking value creation in dynamic environmental contexts to the management of firm resources. Components of the resource management model include structuring the resource portfolio; bundling resources to build capabilities; and leveraging capabilities to provide value to customers, gain a competitive advantage, and create wealth for owners. Propositions linking resource management and value creation are offered to shape future research.
Shaping strategies as an structuration process	Paula Jarzebkowski	AoMJ VOL 51, no 4, 2008	Research on top managers' strategizing behavior has addressed how they shape either the structural context or the interpretations of organization members. I offer a structuration theory framework integrating these two partial explanations and treating strategy shaping as socially dynamic. A qualitative seven-year analysis of top managers in three universities shows a sequential pattern of shaping strategy first in the action and then in the institutional realm, and also a simultaneous pattern of shaping strategy in both realms at once. Both patterns are successful in weakly institutionalized strategy contexts, whereas the simultaneous pattern is more successful

			in strongly institutionalized strategy contexts.
The red queen effect.competitive actions and firm performance	Pamela Derfas	AoMJ VOL 51, no 1, 2008	We investigate the Red Queen effect as a contest of competitive moves or actions among rivalrous firms. The results from a multi-industry study of over 4,700 actions confirms the existence of Red Queen competition, whereby a firm's actions increase performance but also increase the number and speed of rivals' actions, which, in turn, negatively affect the initial firm's performance. We further show that this Red Queen effect depends on industry context and a focal firm's market position.
Economic distance and the survival of foreign direct investments	Eric w. Tsang	AoMJ VOL 50, no 5, 2007	Taking a theoretical perspective contrasting resource exploitation with resource exploration, we argue that foreign direct investments' (FDIs) hazard rates are lower in countries that are either more or less developed than a home country than are FDIs' hazard rates in countries of similar economic development. We obtained strong supporting evidence in a sample of FDIs made by Singapore firms. Further, using the reasoning of strategic coalignment, we argue that acquisitions have lower hazard rates than greenfield investments in more developed countries and vice versa in less developed countries. We found supporting evidence for the former argument but not for the latter. Very specific for analyzing deeper regards entry modes in detail
The importance of resources in the internationalisation of professional service firms	Michael A. Hitt	AoMJ VOL 49, no 6, 2006	To further knowledge about the bases of internationalisation, we examined the importance of two firm resources: human capital, and relational capital derived from relations with corporate clients and foreign governments. The results show that human and relational capital generally had a positive effect on internationalisation; however, corporate client relational capital was only positive teamed with strong human capital. Additionally, human capital positively moderated the relationship between internationalisation and firm performance, but neither form of relational capital moderated that relationship. Although corporate client relational capital had a strong, positive effect on firm performance, foreign government relational capital had a negative effect on performance.

<p>Capabilities , contractual hazards in governance: integration of resource based and transaction cost perceptions</p>	<p>Kyle Mayer et Robert Salomon (Kafke Marga?)</p>	<p>AoMJ VOL 49, no 5, 2006</p>	<p>... addresses independent and joint effects of contractual hazards and technological capabilities on governance, arguing that strong technological capabilities improve a firm's ability to govern transactions, making outsourcing feasible despite certain contractual hazards. Examining a random sample of 405 service contracts from a single information technology firm, we found that contractual hazards encouraged internalizing transactions. Weak technological capabilities increased the likelihood of subcontracting, but strong technological capabilities had no independent effect. The latter had impact only in the presence of certain contractual hazards. These results illuminate why firms facing similar levels of contracting hazards organize their transactions differently.</p>
<p>The strategic use of decentralised institution: Exploring certification with the help of ISO14001 regards standard</p>	<p>Andrew A. King</p>	<p>AoMJ VOL 48, no 6, 2005</p>	<p>Abstract: In this article, we respond to calls by previous researchers to use strategic analysis to understand the function of decentralized institutions. In doing so, we develop a theory of certification with management standards. We hypothesize that managers employ certification to communicate unobservable attributes to exchange partners. We argue that such strategic application of an institution influences its meaning and use. We test this theory using the pattern of certification with the ISO 14001 management standard. (75 words).</p> <p>PDF download, variables: Certificate ISO 14001, vertical integration , buyer distance, facility size, foreign ownership etc.</p>
<p>-</p>	<p>-</p>	<p>AoMJ VOL 48, no 5 – vol46 no 3, 2003</p>	<p>-</p>

B Qualitative Research

Focus Group: Primary trans-script:

16. Februar 2016:

Focus Group Internationalisierung mittelständischer Medizintechnikunternehmen

Teilnehmer (alphab.):

Herr	Sick AG
Herr	CSC Healthcare Global Business Services
Herr	GCC German Computer Company
Herr	IWP Frankfurt – Mumbai – New Delhi
Frau	NIIT DACH
Herr	MR PLAN Group
Herr	Krauth + Timmermann GmbH
Herr	Philips Market DACH Healthcare
Herr	Olympus Medical Systems
Herr	Philips Healthcare Global Operations

Moderation:

Frau Ingrid Melanie Ankirchner gr-international management services

Ursachen/Antezedens der Internationalisierung mittelständischer Medizintechnikunternehmen

Impuls-Vortrag: Case Study: „Lessons Learned zum Turnaround eines mittelständischen Geräteherstellers der digitalen Bildgebung.“

Der Sinn und Zweck und gleichzeitig Zielsetzung der Diskussion in einer Focus Group war, sich in einem Kreis von 6 bis 8 / 10 max. Personen / Experten über die Thematik „Internationalisierung Mittelstand Medizintechnik“ auszutauschen und zu diskutieren. Dabei sollte die wissenschaftliche Perspektive auf den Punkt gebracht und an den Praxisgegebenheiten gespiegelt werden.

Es sollten die eigenen Annahmen hinterfragt, das eigene Herangehen auf den Prüfstand gestellt, bewährte Strategien und Taktiken bestätigt, aber auch eventuell neue internationale Möglichkeiten und globale Spielräume entdeckt werden. Wichtig und maßgebend war, die akademischen Aspekte (Empirie) und deren Verwertbarkeit daraufhin mit im Fokus zu haben.

Focus Group: Preparation and Questions

Fragen und Diskussion

Internationalisierung Mittelständische Unternehmen der Medizintechnik

Struktur und Stichpunkte zu wichtigen allgemeinen Dimensionen & wichtigen speziellen Aspekten

Fragenkatalog (offen und unsortiert)?

- Was fördert die Internationalisierung?
 - Was fordert die Internationalisierung?
 - Was waren die treibenden Faktoren?
 - Was sind die treibenden Faktoren? Intern? / Extern?
 - Wie werden die marktspezifischen Potentiale eingeschätzt?
 - Wo liegen die Chancen?
 - Wo finden sich Potentiale?
 - Quantität oder Qualität?
 - Wie sehen die Qualitätsanforderungen aus?
 - Patent & Intellectual Property
 - Welche Rolle spielt das Legal System?
 - Was waren die Erfolgsfaktoren?
 - Was sind die Erfolgsfaktoren?
 - Was sind mögliche Misserfolgsfaktoren (KSF)?
 - Wie wichtig sind die eigenen Produkte und **Policy**? – Innovationen?
 - Qualitätsanspruch (national versus international)
 - Welche Rolle spielt die Geographie (Place)?
 - ... der Absatzmarkt und Absatzkanäle: Netzwerk / Kunden / Produktion / Lieferanten
 - Wie wichtig ist die eigene Markt-Position?
 - Wechselwirkung Markt-Position und Preis?
 - Wie wichtig ist es eine eigene **Policy**/Strategie?
 - Wovon hängt eine erfolgreiche Umsetzung, ein erfolgreiches **Deployment** ab?
 - Welches Können, welche Fähigkeiten brauchen Mitarbeiter?
 - Welche Fähigkeiten und welche Erfahrung sind bei Führungskräften wichtig
 - Internationalisierung eine Frage der Kapazität / Größe?
-

Transkription

Blaupause „Z“

Wie sind ihre Erfahrungen als die Fachleute / als die Experten aus dem Mittelstand kommend, oder diesem auch durchaus auch bereits entwachsen?

Welche Rolle spielen die externen Faktoren (Markt, Wettbewerb, etc.) und internen (HR, Mitarbeiter, Organisation, Abläufe, etc.) Faktoren?

CW

„Z“ war direkter Wettbewerber zu „P“ zu der Zeit. Zwei Wettbewerber hatten sich direkt aus dem Markt katapultiert, weil sie die FDA unterschätzt haben.

Wichtiger Faktor ist das Regulatory, wie FDA. Das Regulatory hat großen Einfluss.

GH

"Z" war nicht in der Lage daraus einen Nutzen zu ziehen, weil „Z“ keine Ressourcen hatte. Wir hätten gerne daran partizipiert, konnten aber nicht liefern. Die Umsätze kamen ganz woanders her.

CW

Sie haben FDA erwähnt, wer sich darauf einlässt, international einlässt, kann eben nicht nur mit hochprofitablen und mehr Umsätzen rechnen, er muss auch wissen, was er sich an Qualitätssystem aufhalst. Daran scheitern viele, weil manche sagen, das mache ich nicht mit und ziehen sich zurück.

W.S.:

Ein wesentlicher Punkt und wir haben viele Projekte im Mittelstand und eben auch in der Großindustrie muss man sagen, dass man dort einer ganz anderen Unternehmenskultur begegnet. Die ist diametral entgegengesetzt, zu der Anforderung die sich ergibt und aus den Qualitätserfordernissen (260 Mann Unternehmen versteht sich eher als Entwicklungsbude) die man hat. Die Anforderungen die Qualitätssysteme einem auferlegen, wenn man international agieren möchte, sind immens. Exkurs Airbus Historie und Flugzeugbau hinsichtlich Regulierung.

Der Flugzeugbau hat ähnliche Anforderungen regulatorischer Art (sowohl Entwicklungs- als auch Prozessseite). Exkurs.....

Wesentlicher Punkt

Mittelständische Unternehmen haben Sprungfixe in den Kosten. Man muss sich Leute einkaufen, die Know How haben, die Wissen über Märkte, Zulassung etc. haben. Wenn man sich über Erfolgsfaktoren Gedanken macht, und aus der eigenen Erfahrung aus Projekten heraus, sind Kooperationen und Netzwerke wichtig. Wenn man mittelständisch agiert und in Richtung Mittelstand

denkt, ist ein wesentlicher und wichtiger Punkt, wie man kooperiert, damit man Kosten reduzieren kann!

MW:

Verständnisfrage. „Z“ ist von 107 auf 340 MA gewachsen von 2008 auf 2011, also die Anzahl MA hat sich in etwa ver-drei-ein-half-facht, der Umsatz hat sich von 50 nur auf 100 oder 112 verdoppelt. Muss nicht schlecht sein!?!

Nur einmal 14 % EBIT, Was ich nicht weiß, ob 14 % für den Mittelstand ok ist?

Für die Großindustrie wäre das sehr gut. Für den Mittelstand kann es sein, dass es zu wenig ist, weil mit hohen Peaks zu rechnen ist.

Dieser Sprung Relation MA-Anzahl verdreifacht und Umsatz nur 50 % gehoben ist nicht in einem sehr tollen Verhältnis.

Dies würde ich in die Runde geben, die Ahnung haben, weil ich sie nicht habe. Ist das ok für so ein Unternehmen?

Sie sprachen von IT, mit SAP, interne Prozesse.

Ich glaube der Erfolgsfaktor einen Vertrieb aufzubauen im internationalen Kontext ist sehr einfach, nein, ist in jedem Fall viel einfacher als eine Service & Operation aufzubauen. Das könnte sein, dass das (Service & Operations) der wesentliche Erfolgsfaktor die ist. Die Marke kann der Vertrieb schon nach vorne bringen, aber spätestens nach einem Jahr – die Qualität - wenn man Ersatzteile nicht mehr liefern kann und Hubs bilden muss, das sind enorme Vorhaltekosten. Marke ist, sie kann den Vertrieb nach vorne bringen.

Ja, die Marke kann ein Unternehmen nach vorne bringen.

Frage: Wie viel Umsatz und Marge haben sie aus dem Service und wie viel aus dem Equipment Verkauf gemacht?

Meine eigene Erfahrung aus bildgebenden Bereich: 2/3 Umsatz aus dem Equipment und 1/3 aus dem Service, beim Profit ist es genau umgekehrt.

GH

Das war zum Schluss so, weil die Modelle, Serviceverträge mit Distributoren mehrstufig zu etablieren und diese zum Laufen zu bekommen, das hat gedauert, und damit auch noch Geld zu verdienen hat enorm gedauert. Die Verfügbarkeit Service hat gedauert.

Überhaupt dieses Thema Service als Geschäftsfeld. Zu der Zeit als GE gesperrt war, haben wir die alten Kontakte mobilisiert. Doch selbst wenn GE nicht verkaufen konnte, so machten sie ihr Geschäft über den Service. Fazit: Die Marge liegt im Service. Doch: "Z" war nicht soweit.

Wachstum geht schon in die Richtung die „WS“ gesagt hat. Die Steigerung von 170 Mitarbeitern, auf 340 Mitarbeiter, waren Investitionen, die auch sprunghaft in den Kosten waren.

Wenn man Gesellschaften gründen und wachsen will, in den USA wachsen will, dann muss man investieren! Salesforce, Service, Distributoren.

Wir haben den Fehler gemacht, weil wir sagten, wir gehen ins ganze Land. Wir haben viel Geld bezahlt in Distributoren, Serviceprovider, und wir wurden dann wieder rückabgewickelt, weil die Serviceleistung nicht da war, wir haben es praktisch zweimal gemacht, weil der Service fehlte

MW

Die These bleibt! Dies aus Erfahrung: Die Profitabilität kommt aus dem Service.

Wenn das, wenn der Service nicht steht, ist man über das Equipment ein sterbender Schwan.

CW

Wenn man Service profitable betreiben will, muss man entsprechend organisiert sein, auch regional dann wieder und nachhaltig.

Das ist eine Herausforderung für alle, doch insbesondere für den Mittelstand. Große Unternehmen, wie Philips und GE können auf andere Möglichkeiten und Strukturen zurückgreifen.

GH

Wobei ich sagen muss, meine Erfahrung ist auch wieder anders. Um in China mit dem Service Geld zu verdienen, das ist schwierig, finde ich. machen wir gerade die umgekehrte Erfahrung.

Kö

Wichtig ist gerade das Thema Prozesse im Zusammenhang Wachstum international. Wichtig für uns war und ist, erst Prozesse IT-unterstützt zu machen.

Wenn ich den deutschen Prozess im eigenen Land in der Entwicklung nicht richtig IT-unterstützt habe, dann habe ich auch ein Problem international im Ausland. Das ist nicht nur eine Sache die nicht nur bei Software, sondern ein Phänomen, das auch bei Produkten vorhanden ist. Wohl auch eine Frage der Standardisierung. Und: Es ist auch eine Frage wie bilde ich Prozesse ab, in Excel oder mach ich diese mit Software (standardisiert).

Ti

Export ist bei uns ein absolut geringer Anteil und reduziert sich auf unsere kleine Produktions- und Entwicklungsabteilung in Wedel.

Wir stellen nur fest, dass die regulatorischen Anforderungen ein sehr kritischer Bereich sind.

Ich reduziere dies mal auf unseren Vertrieb, wo wir nicht nur Hersteller, sondern Handels- und Servicepartner in Deutschland und Deutschen Kliniken sind. Handel ist der lukrativere Part, der Bereich Service ist mit Aufwand verbunden, die kontinuierliche Qualifikation der Mitarbeiter ist wichtig.

Wir brauchen den Service fürs Neugeschäft. Aus Ertragsgesichtspunkten ist der Handel für uns wichtiger. Geschäft machen wir mit Handel. Im Service Geld zu verdienen!?! Wir schaffen es nicht

richtig! Wir brauchen aber den Service um den Kunden zu binden. Vielleicht sind sie („Z“, „P“, „O“) als Hersteller in einer besseren Lage und haben eine bessere Position. Ich reduziere das mal auf unseren Fachhandelsbereich; im Bereich Kliniken fällt es uns schwer. Wir müssen Service haben, um das Neugeschäft abzusichern und als Nutzenverkäufer brauchen wir es, um zu den Investitionsgütern auch den Service generieren - im Vergleich zum Handels und Ersatzgeschäft – zu können. Vom Service isoliert könnten wir nicht leben.

CW

Verstehe ich zum Teil. Die Finanzierung der Krankenhäuser ist wichtig.

Es ist so, dass die Krankenhäuser, Kapitalinvestitionsbudget- und ein Operatives Budget haben.

Service kommt aus dem Operativen Budget.

Der Trick ist, beides zu nutzen Als Gerätehersteller ist es einfach an den Service zu kommen.

Wenn sie ganz vorne sind (Produkt und Marktposition) und der Kunde bekommt guten Service, haben sie gute Karten neue Geräte zu verkaufen.

Wenn sie ein Vertriebs- und Servicenetzwerk auf Basis Servicehändlernetzwerk von Distributoren aufbauen, haben sie es schwieriger, an die Kunden direkt ranzukommen.

Denn Sie haben keinen Zugang zu ihrer eigenen installierten Produktbasis. „P“ organisierte den Geräteverkauf über Händler, versucht aber den Service in den eigenen Händen zu halten. Performed ein Händler schlecht, bekommt „P“ das früh über den Service mit. Deshalb war und ist für „P“ wichtig, den Service in eigenen Händen zu halten.

W.S.

Vielleicht stellt sich hier umso mehr die Frage hinsichtlich Kooperationen.

Vor Ort eigene Gesellschaften zu haben, kann sich, ein mittelständische Unternehmen der Medizintechnik wohl kaum leisten.

Für ihn ist eine eigene Organisation zu teuer; Unternehmen wie „P“ und „O“ können sich das leisten.

Was sind die Vor und Nachteile mittelständischer Unternehmen gegenüber großen global agierenden Unternehmen?

MW

Es ist ein Unterschied einmal Handelsunternehmen, ob groß oder klein, und Hersteller ist ein Unterschied. Chirurgische Instrumente Service ist anders als Großgeräte Röntgen. Sie haben es schwerer (als Handelsunternehmen) mit Disposals/Devices (Chirurgische Instrumente) im Service Geld zu verdienen als ein Großgerätehersteller. Die Margen in der Großgeräteindustrie sind viel niedriger, Großgerätetechnik ist niedriger. Die Margen im Investment sind niedrig, sie sind niedriger als im chirurgischen Disposal-Bereich. Bei „P“ ist eben da anders, so dass sie vielleicht keinen Fehler machen mit Service. Für „Z“ war es extrem wichtig den Service, vor allem aber den Fokus darauf, den Service mindestens zeitgleich im Griff zu haben, wenn sie Qualitätsprobleme haben. das

Wachstum zumindest zeitgleich mit dem Produkt im Griff zu haben. Mit Produktwachstum allein kann man sich nicht aus dem Problem wachsen, das ist die falsche Strategie.

CW

Die Folien „Bildgebung“ lassen sich 1 zu 1 von „P“, „S“,... übernehmen. Hier gibt es kaum einen Unterschied. Da wo es sich für den Kunden unterscheidet ist im Service. Ich mache als Kunde keinen Fehler, wenn ich GE kaufe, denn die sind zu groß im amerikanischen Markt. Wenn ich aber keinen guten Service bekomme, dann wechsle ich.

RM

Beispiel: Drei Unternehmen im Internationalisierungsprozess. Zwei führende deutsche Unternehmen aus dem Schwabenland wurden verkauft.

Internationalisierung umgekehrt: Chinesen haben Blut am deutschen Mittelstand gerochen.

Chinesen bieten grundsätzlich bis zu 15 % mehr an und sie übernehmen alles.

Zwei Fragen: In Asien SMEs are more than good! Try to put up a collaboration!

Loblieder über deutschen medizinischen Mittelstand geht Hand in Hand mit solider Art und Weise, wie lässt sich mit sog. „Gauern aus dem fernen Osten umgehen? Welche Rolle spielen kulturelle Aspekte, und welche Rolle die Ressource Mitarbeiter in einem mittelständischen Unternehmen?

Weiter mit und Überleitung wieder zu Vor- und Nachteile des Mittelstands der Medizintechnik gegenüber Großunternehmen der Medizintechnik!

S.J.

Ich komme ja stark aus der Beratung, wir hatten Anfragen von den großen Firmen, wie GE und „P“, „O“ etc., auch mittelständische Unternehmen zu integrieren. Was glauben wir als Berater sind die Erfolgsfaktoren, was sind unsere Chancen mit diesen Unternehmen in den internationalen Markt zu gehen!? Was sind unsere Erfolgsfaktoren, um alleine oder mit einem großen Unternehmen international an den Markt zu gehen?!?

Kultur ist auch ein großer Erfolgsfaktor. Kultur lassen wir für den Moment zurückgestellt, ist aber ein großer Faktor!

Qualität, Produktportfolio...Service, Produkt Lösungen.....! Wo auf dem Journey sind die internationalen mittelständischen Unternehmen?

Wie binden sie Ihre Kunden mit ein in die Produktentwicklung? Was wir Berater uns immer gesagt haben, und hier kommen wir auf die Vor- und Nachteile: Wir haben uns immer erst die Unternehmen politisch angesehen.

Peter Brooker, amerikanischer Ökonom (geboren in Wien, Österreich) hat gesagt: Die größte des Gefahr des Wandels ist auch und die einer erfolgreichen Internationalisierung, das Handeln mit der Logik von gestern. Wir entwickeln uns auf einer neuen Stufe, wir können es nicht nur auf der alten Stufe betrachten und linear weiterführen. Es gehört mehr dazu! Exkurs: Ein ehemaliger Kollege von McKinsey hat ein Buch geschrieben: „Re-inventing Organisations“. Er beschreibt, dass Unternehmen

sich evolutionär auf Basis des Organisationmodells entwickeln, so wie auch der Mensch (Darwinismus). Wir entwickeln uns in Sprüngen. Und genauso ist es mit Organisationen: wenn wir mehr Kognition haben, können wir auch andere Organisationsmodelle der Zukunft entwickeln, oder solche, die einer neuen Umgebung besser entsprechen. Er beschreibt große Konzerne wie GE, hier nur als Beispiel, als moderne leistungsorientierte Unternehmen, wo Prozesse integriert und organisiert sind, der Service passiert und funktioniert. Aber er bezeichnet diese Unternehmen vom „Look & Feel“ als Maschine. Er sagt, das muss (ab)laufen, es gibt Hierarchiemodelle und Anreizsysteme, die Manager werden auf gewissen Ebenen incentiviert, es müssen Ziele erreicht werden. Er bezeichnet Firmen auf dem nächsten Evolutionsstand des Organisationsmodells evolutionären Modell als postmoderne pluralistische Unternehmen. Es sind Unternehmen, die auf der Basis von Kultur funktionieren, die andere Werte haben, die jeden Einzelnen in die Organisation miteinbinden. Das funktioniert bei Großunternehmen so nicht.

WS

Ähnliche Situation haben wir, wenn wir den Blick in eine andere Branche, wie eMobilität werfen.

Wir haben zwei Player die Start Ups und Unternehmen, die eine Struktur haben, um Innovationen vorantreiben.

Hier haben wir den Wettlauf um Ressourcen. Auf einer Folie war Capital ein limitierender Faktor. Geld ist bei vielen StartUps kein Thema, denn sie werden überschwemmt damit. Doch Kapital Zeit ist ein limitierender Faktor. Wer ist schneller? Schaffen es die OEMs schneller den Wandel hinzubekommen, den notwendigen Change-Prozess hinzubekommen oder dominieren die anderen mit einem schnelleren Aufbau neuer dieser Standards.

Mittelstand ist immer schneller und innovativer dabei, und hat die Kultur der Innovation und denkt nicht in Regulatory Affairs und Standardprozessen, was auch die Innovationsfähigkeit behindern kann, und denkt auch nicht so stark in Richtung Regulatory Affairs etc..

Aber: Es geht nicht ohne dem anderen. Wenn ich internationalisieren will, muss ich ein Stück weit in diese Richtung der Standardisierung und Service denken, sonst funktioniert es nicht.

MW

Was ich glaube, nachdem was sie sagten, hat das Silicon Valley Start Up in der Medizintechnikbranche keine Chance (These).

Es sei denn, er lebt nur vom Produktverkauf und Wegwerfartikeln und dem Service. Doch das ist unmöglich mit den gegebenen Regulatorien.

Wird also scheitern, über Equipment zu wachsen. Mit Regulatory Affairs schafft er es nicht mit den zunehmend steigenden Anforderungen. „Z“ ist genau dazwischen und hat es versucht, über Equipment Wachstum hinzubekommen. Ich will ja nicht sagen es ist gescheitert aber nachdem was Sie gesagt haben eine große Erleuchtung. Vielleicht gibt es eine Formel dafür? Das wäre die Frage!

Die Formel ist: Ab welcher Unternehmensgröße beherrscht man und schafft man die Globalisierung in diesem Kontext?

Luffahrt ist hoch regulativ. Flugzeug wird einmal erfunden und fliegt 40 Jahre. Auto ist das Innovationsprodukt was in Massen produziert wird und hoch regulatorisch ist und mit einem Zyklus von 3 Jahren mit Service umgeben. Selbst Tesla schafft es nicht die Globalisierung alleine hinzubekommen.

In der Medizintechnik schafft man es nicht wenn man vom Service lebt, hier sind die Strukturen zu sehr ineinander verzahnt.

Boston Consulting (BC-Matrix Marktwachstum und Relativer Markterfolg) und: Die 6 Erfolgsfaktoren, wovon eine davon:

Operational Excellence ist. Die ist wichtig in der Medizintechnikbranche. Operational Excellence kann der kleine Mittelstand nicht hinbekommen.

WS

Innovationen kommen nicht mehr so sehr von Automobilherstellern. Auch in die Innenwelt der Automobilhersteller geschaut finden sich Hersteller unterschiedlichster Art.

GH

Da würde ich den Blick in Richtung IT und Human-Interface- und Anwendung richten. Die Smartphone-Technologie war als erstes bei „Z“ da.

Es ist die Frage mit High-Tech-Maschinen, wie kann ich sie bedienen!?!

Man muss ja nicht immer in festen Dingen denken. Ein wichtiges Thema ist heute auch die Connectivity, die Software die in Produkten steckt.

Ist es wirklich eine Domain der Operational Excellence?

Der Große kann natürlich Marketing machen.

Ti

Der Große kann natürlich mehr Marketing machen!

NN: Warum haben Sie gesagt, dass sie es von der Kostenführerschaft her nicht geschafft hätten?

G.H.

Da hatten wir von all den Hebeln die Prozesse; bzgl. Einkauf, Stückzahlen, da waren wir eigentlich nicht besonders gut aufgestellt.

Es gibt die Kostentreiber wie Panelhersteller Röhrenhersteller.....

Wenn ich mit Toshiba verhandelt hatte, hatte ich Volumen, aber Scale of Economy war nicht unser Spielfeld.

S.J

Mittelstand ist stark in Innovation.

Es gibt dieses Michel Porter Modell, d.h. ich treibe mein Geschäft über Innovationen, über Kundenintimität und über Innovation und Operational Excellence. Economy of Scale. OEC hat viel Marktanteil gehabt bevor sie auf Kostenführerschaft gegangen sind, d.h. beides ist möglich. D.h. über Kostenführerschaft und Volumen zum Ziel bzw. war, ist die Strategie.

GH

Sicherlich ist es situationsbezogen.

CW

Ich hab noch eine Frage!

Bei der Entwicklung nach 2008, meine ich, hat sich der US-Markt extrem positiv entwickelt.

Dies ist ja der Homemarket von „Z“ gewesen.

Kam die positive Entwicklung aus dem Heimmarkt? Und, wie hat sich der Export verbessert?

GH

Der Heimmarkt war stabil. Das Marktwachstum war in China und den USA.

Key-Faktor für das Wachstum war das Finden des richtigen Vertriebspartners.

Dies resultierte aus der Schwäche von GE, die entschieden, wir machen selbst und nicht über Distributor.

Wir hatten einen, der kannte den Markt, die Kunden und die Technologie und das war der Schlüssel für den Sales.

MW

Meine Wahrnehmung die letzten 5Jahre.

Gegen „Z“ als deutscher Marktführer hatte Philips keine Chance! „P“ hatte sich ausgeruht.

„P“, wenn schlau gewesen wäre und strategisch, hätte „P“ die Distributoren weg gekauft.

Schwieriger Markt, „P“ war überzeugt, es lohnt nicht, man geht in die OP's hinein, und hat selbst ein wenig aufgegeben.

„P“ hatte großen Respekt für „Z“.

GH

Mit der Aspekt, wo wir Groß- und Mittelstandsunternehmen vergleichen gerade hinsichtlich der Vor und Nachteile.

Letztendlich war Ziehm in der Nische, es war der Zwang zur Excellence und Spezialisierung und hier liegt der Vorteil der Mittelständler

Mittelstand kann sich stärker fokussieren.

S.T.

Es fallen mir mehrere Punkte ein, wenn man lange in einem Konzern arbeitet kommt man durchaus zu der Überlegung:

Hätte man nicht erfolgreicher bei einem Mittelständler sein können. Was ich hoch interessant finde. Wir haben sehr oft diskutiert, was mit ein Erfolg ist von „Z“ ist. Warum eine Verbreiterung des Portfolios nicht nur nach oben, sondern auch nach unten?

„P“ hat eine breite Produktpalette. „Z“ muss überlegen überleben mit ihrem Produkt. Wenn sie das nicht tun, dann sind sie morgen insolvent. Das kann man sich nicht leisten, das ist eine ganz andere Überlebensmotivation. Vor und Nachteile Mittelstand: Die Entscheidungswege sind kürzer.

Ich selber habe die Erfahrung nicht gemacht, doch Freunde, die selbst ihre eigenen Unternehmen gegründet haben.

Wenn es einen Punkt gibt, der neuralgisch ist, dann ist und war es eine die sich immer als kritisch herausgestellt hat, dann war das die Finanzierung und das Kapital, die Bank!

Einer hat sogar seine eigene Bank gegründet, ein anderer hat gesagt: „Mir kommt keine Bank ins Haus, ich mach' alles aus Eigenfinanzierung!“

Wie ist das bei Ziehm gelaufen?

GH

Ich versuche mal offen zu legen:

Oft wird mit „Z“ die Person „H“ verbunden. Er ist ja Milliardär, der neben Fluglinien sich auch „Z“ leistet und daraus ist das Kapital geflossen.

„H“ hat viel Geld mit seiner Fluglinie verloren, er war bestrebt sein Kapital zu erhalten. Das war eine, seine und unsere daraus resultierende Prämisse.

Wir haben die Banken an- und abgeklopft, ob sie Geld leihen möchten. Eine ganz klassische Finanzierung an der Stelle.

Vielleicht war es psychologisch ein Vorteil, weil es „H“ im Hintergrund gab, das hat sicherlich geholfen. Aber wir hatten keine Vorteilskonditionen.

ST

Hat man sich bei den Banken irgendwann heraus gekämpft, bekam man bessere Konditionen, hatte man bessere Prozesse!?

CW

Nun, die Besicherung war durch die Person im Hintergrund sicherlich positiv gegeben.

GH

Man hat sicherlich eine Besicherung gehabt.

CW

Es konnten immer Sicherheiten dargestellt werden

GH

Es war am Anfang echt schwierig, das Kapital zu bekommen! Mit der Zeit und dem Erfolg wurde es leichter.

Frage: Qualität in zwei Dimensionen: Produkt, Innovation und die Qualität in der Ressource, sprich auch die Ressource Mitarbeiter

Welche Rolle hat es für „Z“ und ihre Unternehmen, Teilnehmer dieser Runde, gespielt?

S.J

Ich denke, wenn wir über die Chancen Deutscher Mittelstandsunternehmen sprechen, was Internationalisierung angeht, speziell was die Medizintechnik betrifft, bzw. wenn es sich um technisch anspruchsvolle Produkte handelt, zieht „Brand Engineered“ international gerade bei den Kunden. Es gibt ja viele „Hidden Champions“, die sich eben sehr stark spezialisiert haben und international verkaufen. Spezialisierung zählt! Eben gerade die Wahrnehmung des soliden deutschen Mittelstands ist schon gut und das ist eine Stärke. Sie haben auch gerade gesagt, sie kaufen auch von Toshiba ein, das ist aber nicht der Einkauf von Multisource-Unternehmen. Die Hauptkomponenten kommen von ganz woanders.

M.W.

Deutsche Qualitätsarbeit ist, wenn man tatsächlich alles selber macht!

Wenn man von Distributoren abhängt artet das aus. Eingangsqualitätskontrollen und Fertigung etc., dann bekommt es eine andere Dimension.

W.S.

Hier aber auch der Blick in eine andere Industrie. Audi wird immer als deutsches Auto wahrgenommen.

Viel Wertschöpfung kommt aus anderen Ländern, das ist aber nicht die Wahrnehmung

M.W.

Der Unterschied ist, die Automobilzulieferer sind in die Wertschöpfungskette der Automobilhersteller integriert.

Bosch arbeitet nicht mehr in der Boschfabrik in Tuttlingen, sondern bei Opel in Rüsselsheim. Sie sind Bestandteil des Systems.

Das wird der Mittelstand so nicht hinbekommen. Die Einkaufskomponente ist eine wesentliche.

Ich glaube Qualität kürzt sich weg, wenn man selbst macht, und nicht weg, wenn man einkauft.

Dann ist man abhängig und diese Variable ist schwer berechenbar.

Ich wollte nochmal zurück auf das Thema Human Resources, wenn das ok ist!

Sie hatten kein Organigramm gezeigt.

Nun ist die Frage mit bei über 340 Mitarbeitern, wo sitzen die?

Wie viel Kultur, amerikanische, chinesische, deutsche braucht man?

Wie steuert man die, mit welchen Management-Layern?

Wie viel Kultur braucht man hier? Wie viel kann man selbst steuern? Ein 100 Mannbetrieb managed der Eigentümer selbst.

Dann ist die Firmenkultur wichtig (Beispiel Weihnachtsfeier ein guter Gradmesser)

Identifikation mit dem Unternehmen ist in einem überschaubaren regionalen Mittelstandsunternehmen enorm, jeder kennt jeden, jeder bringt sich ein.

Ab einer bestimmten Größe funktioniert dies nicht mehr so.

Wenn man in Deutschland 100 MA hat, dann funktioniert das. Wenn man international agiert, wo sitzen die Mitarbeiter, wie kann man etwas bewirken?

Ohne dass ich Ahnung davon habe, gibt es bestimmt Formeln, die man drüber legen kann.

Kultur! HR, die wissen das, deshalb gibt es immer mehr Berater, Kulturberater....

Das geht es eigentlich nur darum: Wie tickt die andere Seite!

Relationsmanagement in manchen internationalen Regionen das A und O, der Deutsche Mittelstand, wie die meisten Deutschen Unternehmen definieren sich über die Qualität der Technik und des Engineerings.

Herr T und Herr K schmunzelnd und amüsiert

Was ist Ihre Meinung und Erfahrung hinsichtlich HR und Kultur?

Kö

Unterschied ist Wachstum und Internationalisierung. Wenn ich internationalisiere muss ich genauso wachsen wie ich auch im Inland wachse.

Wenn ich größer bin habe ich evtl. eine bessere Qualität. Als großes Unternehmen bekomme ich meist die bessere Qualität.

Dann kommt die Frage der Kultur. Es ist wichtig die Unternehmensqualität zu transformieren in Internationalität, sprich in eine Landeskultur und Interkulturalität. Designqualität in Indien anders wahrgenommen als in Deutschland.

Ich glaube dass der Mittelstand in der Medizintechnik, wenn er internationalisieren will, dies auch anstreben muss, damit er wachsen kann.

Es ist oftmals alles ein Kreisfaktor, bedingt sich. Manchmal liegen einfach Zwänge dahinter.

Ti

Eigene Erfahren: Kultur und Mitarbeiteranzahl spielt in einem Unternehmen eine gewisse Rolle, manchmal sogar eine große Rolle.

Wir haben ein Unternehmen, einen Partner aus Hannover übernommen. Es kamen 12 Mitarbeiter zu 80 Mitarbeitern an einem anderen Standort hinzu

Zuvor hatten wir 20 Jahre zusammengearbeitet. Selbst in überschaubaren Einheiten sind die Menschen ganz anders gewachsen. Und es ist überraschend, wie man nach 5 Jahren immer noch kulturell unterschiedlich sein kann, bei solch Kleingruppen.

Die Identifikation mit dem Unternehmen ist extrem abhängig von den Eigentümern.

Wenn andere Länder, andere Kulturen zusammen kommen, Beispiel Sohn IBR bei Otto Bock, wenn eigenen Agenturen und unterschiedliche Menschen zusammen kommen, ist dies ein Riesenangang dies international zu organisieren. Es ist eine riesige Herausforderung, unabhängig vom Produkt.

Es ist eine große, eine enorme Management-Aufgabe dies vernünftig zu lösen.

MW

HR in großen Organisationen ist geprägt mit Hierarchie. Bei 100 oder 340 ist es eine Größe, wo man sich kennt, wenn es international geht ist es ein x-faches an Anstrengung.

W.S.

Dieser Internationale Mind Set, den man braucht, um international zu gehen, hängt sicherlich stark damit zusammen, wie viele Nationen und kulturelle Bereiche man im Unternehmen vereint. Der Kern eines Mittelständischen Unternehmens ist nicht international, sondern sehr regional geprägt.

Den Sprung international zu schaffen, bedeutet auch im Mind Set sehr international zu werden.

Ein Unternehmen, was das Glück hat, aufgrund seiner Größe international aufgestellt zu sein, das tickt ganz anders.

Das hat mit der Fähigkeit zu tun, kulturelle Unterschiede aufzunehmen und damit zu arbeiten.

GH

Ich kann das bestätigen, es ist nicht einfach zu transportieren, dass Franken nicht der Nabel der Welt ist.

Kö

Wie sieht es bei „I“ aus? In USA wird eine neue Strategie überlegt, wird eine neue Strategie für den Vertrieb angefangen.

Deutschland bekommt diese Vertriebsstrategie übergebügelt als Versuchsland.

Großunternehmen leisten sich mehr Kapital für „Trial and Error“, um das durchzustehen.

Meistens hat es auf das erste Mal nicht geklappt, dann wurde eben angepasst.

Umkehrschluss für uns Mittelständler: Den Markt anders anzugehen, pragmatischer die Ärmel hochzukrempeln.

Nicht das Mind Set: Was die sagen, die von den Großen da oben, sondern zu sagen:

Jetzt habe ich mein Mind Set und guck mal nach, wie sieht der Markt, wie sieht überhaupt der Medizintechnikmarkt aus.

Kann ich das dort auch so produzieren. Gibt es das gleiche Radiologie-Thema in China wie in den USA oder Indien oder in xyz.

MMG

Bei „I“ war es tatsächlich so, dass Deutschland immer das erste Pilotland war, dies galt für viele Innovationen.

Erster Forschungsstandort in Böblingen, usw. die erste Umorganisation, Umstrukturierung fand nicht in USA statt, sondern immer zuerst in Deutschland.

Warum war das so? Über viele Jahre haben sich starke Leader in diesem Markt dafür eingesetzt, die den Finger hoben und sagten: „Ja, ich will diese tolle Idee in meinem Territorium verproben, weil ich dass ich First Mover-Effekte habe“.

Dasselbe Thema: Watson! First Mover im Markt für Cognitive Computing, die anderen folgen!

Es ist abhängig von der Führungsmannschaft und den Personen. Es bedarf schon Courage, Mut und Leadership, und auch die entsprechenden organisatorischen Strukturen. Das internationale Setting ist super wichtig, auch das Zulassen von unterschiedlichen Meinungen.

I hatte die Niederlassung im Schwabenland und es war für die Leute dort gar nicht einfach, jeden Change zu akzeptieren und mitzumachen.

GH

Was ist das, Branchen Medizintechnische?

Beispiel „D“, da haben wir hochautomatische Systeme gehabt, die mit geringster Dosierung gearbeitet haben.

Amerikaner haben die Holzhammermethode verwandt. Es waren unterschiedliche Prozeduren und Applikationen, die anders durchgeführt wurden.

Ist das ein Aspekt, der für die Medizintechnik anders ist?

MW

Es ist eine Marketingtechnische Frage.

Früher ging man nach Features. Heute, wenn man die Value Proposition nicht beachtet, wenn man die Unterschiede in den Ländern nicht sieht, dann wird man mit deutscher Innovationskunst weder in Indien, noch USA Fuß fassen.

Früher sagte man Innovation ist alles, das stimmt heute so nicht mehr! Innovation wird immer teurer.

Aus Marketingsicht gilt es auch als Mittelständler global zu denken. Was ist dieser Markt: Was ist ein feature mit einer bestimmten Value Proposition in einem lokalen Markt wert!?!

Was ist eine Value Proposition für den Mediziner, für das jeweilige Gesundheitssystem, etc. wert !?

Wenn man das nicht beantworten kann, muss man nach Features gehen und die werden nicht bezahlt. Dann muss man über die Menge gehen.

Deshalb ist das Thema muss man über Marketing wichtig und die wird möglicherweise die Feature-Relation noch relativierengehen.

S.J.

Kann ich nur zustimmen! Wir waren bei G Weltmeister Sachen zu produzieren, die niemand haben wollte. Was Sie aber vorhin gesagt haben, Qualität und Innovation spielt keine Rolle, damit kann ich in diesem Kontext, zum Teil auch für die Medizintechnik auch mitgehen, wobei wir uns immer abgeschaut haben, in welchen Märkten sind diese Unternehmen unterwegs. Sind wir in Verdrängungsmärkten unterwegs (jeder hat ein Auto, jeder hat ein Handy. Wenn sie ein Auto oder ein Handy an den Markt bringen wollen, müssen sie ein anderes Produkt verdrängen. Dann kann Qualität auch wieder marketingmässig wieder ein Feature sein, dito Innovationen). , Qualität und Innovation spielt nicht die Rolle, das kann ich, was die Medizintechnik betrifft, mitgehen. Wichtig ist zu wissen, in welchem Markt bin ich unterwegs. Bin ich in einem Verdrängungsmarkt, oder, oder, oder,....!

GE Innovation spielt keine Rolle in Bezug auf Medizintechnik, wobei man immer überlegt, in welchem Markt bin ich unterwegs.

CW

Distributionspartner! Wie wird in den einzelnen Ländern das Gesundheitssystem finanziert. Woher kommen die Gelder, wie sieht das Sozialsystem aus.

Wo und wie sind die unterschiedlichen (Sozial)-Systeme verankert.

Kenntnis der Gesundheitssysteme ist notwendig und, es ist wichtig, dies im Vorfeld zu eruieren, weil die Finanzierungen von Land zu Land sehr unterschiedlich sind. Wichtig ist zu wissen, welche Finanzierungsmodelle, DRG gibt es. Diese sind durchaus von Land zu Land sehr konträr.

Man kann beste Technik haben, doch daran scheitern, weil die Spielregeln sehr unterschiedlich sind hinsichtlich der Finanzierung.

Deshalb wichtig: Welche Finanzierungsmodelle gibt es in den unterschiedlichen Ländern!?

SJ

Super Punkt!

Es gibt grob gesagt, drei unterschiedliche Finanzierungssysteme.

Das privat finanzierte System, wie in den USA.

Das staatlich finanzierte System, wie in GB (NHS).

Die Mischform, das Sozialversicherungs- und Privatfinanzierte System, wie in Deutschland

Ein Punkt, der dem Mittelstand zugute kommt ist, dass die Rahmenbedingungen zwar unterschiedlich, aber die Probleme gleich sind!

Wir sehen, dass die Systeme immer gleicher werden, es findet aufgrund der Gleichheit der Probleme, eine sogenannte Konvergenz der Systeme statt.

D.h. Wir nähern uns mit unseren Systemen alle an und das ist super interessant. Das kommt dem Mittelstand zugute, um in solchen Märkten zu bestehen. Ein Treiber ist das Thema Integration. Das Thema Integration (integrierte Versorgung) funktioniert in Deutschland nicht, in anderen Ländern gut. Wir versuchen es uns abzugucken. Hier ist die Nische für den Mittelstand. Was macht Sinn für einen Mittelständler, wo kann ich rein, was spielt mir entgegen.

Was muss eine Führungskraft mitbringen? Aus welchem Rohstoff muss eine Führungskraft eines mittelständischen Unternehmens in der Medizintechnik sein? Was muss eine Führungskraft mitbringen für den Weg in die Internationalisierung?

ST

Ich glaube was hier gerade anklang, dass man offen, neugierig ist.

Zu wissen: Wie funktionieren Systeme! Was ist für meinen Kunden wichtig. Was habe ich für eine Lobbyorganisation?

Man muss Standing haben und der kulturelle, interkulturelle Aspekt ist extrem wichtig.

CW

Wie managed man überhaupt? Die Kommunikationsmittel sind anders (visuelles Kommunikation ist ein anderes Management). Großunternehmen sind dezentral. Wenn nun ein Mittelständler expandiert, kann man nicht immer vor Ort fahren. Man sieht den anderen nicht, man sieht die Körpersprache nicht, man sieht die Reaktion des anderen nicht, man muss ein anderes Einfühlvermögen entwickeln, und das gilt auch im Kontext der anderen Kultur.

Kö

Wichtig ist wie man denkt! Es läuft viel über das Visuelle!

Man braucht gutes Einfühlungsvermögen in die andere Kultur.

Meine Erfahrung, wenn ich deutschen, schwedischen, indischen, brasilianischen Ingenieuren zusammen eine Aufgabe gebe, kommt nicht viel raus.

Da sind Nationalismen, da kämpft jeder für seinen Standort, will und muss sich behaupten und verantworten. Es ist wichtig die Stärken der jeweiligen Nation, Beispiel der Indischen SW-Entwickler, zu nutzen. Klare Schnittstellendefinition ist wichtig.

WS

Führung in unterschiedlichen Kulturkreisen funktioniert in jedem Land anders.

Das macht es für die Führungskraft schwer. Man muss verstehen, wie ticken die anderen, um gemeinsam Ziele zu erreichen

Kö

Projektmanagement, Softwareentwicklung. Man glaubt, man spricht über gleichen Standard.

Übermorgen fertig, gleiche Begriffe und doch haben die internationalen Kollegen, Inder, ganz andere Bilder im Kopf

Englisch ist die Konversationssprache und, man meint, man hat es verstanden!

Allerdings: Man merkt schon, wie schwierig es ist im eigenen Kulturkreis. Es ist schon im eigenen Kulturkreis schwierig mit der Kommunikation.

User Experience: Wie nutzt jemand ein Smartphone, wie nutzt jemand die Software?

Wie entwickle ich eine Software. Uns ist ganz wichtig das Design. Designer, die machen das Screen Design.

Doch in der Zusammenarbeit mit Indien müssen wir es anders machen. Die Erfahrung war: Trial & Error!

Wie geben wir den Prozess vor, auch visuell, ist wichtig. Wenn das stimmte, hat es super funktioniert

Zu 70 % kam ein gutes Produkt raus Dann immer wieder testen, kontrollieren und wieder testen.

Es sind kulturelle Geschichten, die mit einfließen.

RM

Humor ist wichtig. Die Internationalisierung hat ihren eigenen Charme, dem es gilt, auch als Mittelständler zu erliegen.

Invitation Letter

Sehr geehrte Teilnehmer der morgigen „FocusGroup-Runde“,
nochmals vielen Dank, dass Sie sich die Zeit nehmen, morgen,
Donnerstag, den 16. Februar 2017,

mit uns gemeinsam zur Thematik
Internationalisierung Mittelständische Unternehmen der Medizintechnik
zu diskutieren.

Der Ort und das Ambiente: Hamburg und **Hotel Atlantic**, Raum: **Große Schiffskabine -
Holländisches Zimmer**.

Wir beginnen um 18:00 Uhr und werden gegen 21:30 Uhr (mit Option auf open end)
beenden.

Herr **Gunther Heiss**, **Sick AG Hamburg** (BU-Leitung, **Operations & Standortleiter**,
Analysten) wird einen thematischen Impuls:

„**Lessons Learned** zum Turnaround eines mittelständischen Geräteherstellers der
digitalen Bildgebung.
für den Einstieg in unsere Diskussion geben.

Herr **Heiss** greift auf eine langjährige Erfahrung in verschiedenen Managementpositionen in
der Medizintechnik zurück. Diese Erfahrungen verarbeitet er derzeit wissenschaftlich im
Rahmen seiner Promotion an der **University of Gloucestershire**.

Heute folgen, wie angekündigt, eine Agenda sowie eine Übersicht der Teilnehmer per dato
(15.02.). Ebenfalls mit angefügt haben wir unsere Überlegungen/Fragen zur Einstimmung auf
die Thematik.

Wir freuen uns auf Sie, auf uns alle und, auf eine interessante wie erkenntnisreiche
gemeinsame Diskussion.

Mit freundlichen und herzlichen Grüßen,
Ingrid Melanie **Ankirchner**

2.2	Medical device regulations in foreign countries are sometimes a real challenge	strongly disagree	strongly agree o o o o o o o
2.3	Without cooperating with our network-partners foreign ventures would be difficult for us	strongly disagree	strongly agree o o o o o o o
<p>3. Market specific product potential</p> <p>Question: With regard to your company competition situation, to what extent did you agree or not with the following sentences? (scale1= 'strongly disagree' 2='disagree', 3='partially disagree', 4= 'undecided', 5= 'partially agree', 6='agree' and 7= 'strongly agree')</p>			
3.1	Anything that we can offer in foreign markets our competitors can match easily.	strongly disagree	strongly agree o o o o o o o
<p>Question: When considering the product of the selected international venture in foreign markets, what is your opinion concerning the following?</p>			
3.2	The quality of our products and services is better than that of our major competitors	strongly disagree	strongly agree o o o o o o o
3.3	Compared to similar products developed by our competitors, our product will offer unique beneficial attributes to the customers ...	strongly disagree	strongly agree o o o o o o o
<p>4. Firm specific internal resources</p> <p>With regard to your company resource situation, how do you assess the situation regarding? (scale1= 'limited', 2='poor', 3='somewhat unacceptable', 4='fair', 5='somewhat acceptable', 6='good' and 7= 'extensive')</p>			
4.1	The headcount and the financial commitment, which our firm provides for international ventures is ...	limited	extensive o o o o o o o
4.2	The amount of skilled managers with international experience in our firm can be considered as...	limited	extensive

Cultural understanding						
6.2	Our firm places a high value on open-mindedness towards our foreign partners culture	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; text-align: left;">strongly disagree</td> <td style="width: 50%; text-align: right;">strongly agree</td> </tr> <tr> <td style="text-align: center;">○ ○ ○ ○ ○ ○ ○ ○</td> <td></td> </tr> </table>	strongly disagree	strongly agree	○ ○ ○ ○ ○ ○ ○ ○	
strongly disagree	strongly agree					
○ ○ ○ ○ ○ ○ ○ ○						
Involvement						
6.3	Our firm frequently discusses strategic issues with our foreign partners based on a shared cultural understanding	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; text-align: left;">strongly disagree</td> <td style="width: 50%; text-align: right;">strongly agree</td> </tr> <tr> <td style="text-align: center;">○ ○ ○ ○ ○ ○ ○ ○</td> <td></td> </tr> </table>	strongly disagree	strongly agree	○ ○ ○ ○ ○ ○ ○ ○	
strongly disagree	strongly agree					
○ ○ ○ ○ ○ ○ ○ ○						
<p>7. Organizational coordinating mechanisms Question: With regard to your company situation, to what extent did you agree or not with the following sentences? (scale 1= 'strongly disagree' 2='disagree', 3='partially disagree', 4= 'undecided', 5= partially agree', 6='agree' and 7= 'strongly agree')</p>						
Alignment						
7.1	Functional areas in this company work together in pursuing common goal	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; text-align: left;">strongly disagree</td> <td style="width: 50%; text-align: right;">strongly agree</td> </tr> <tr> <td style="text-align: center;">○ ○ ○ ○ ○ ○ ○ ○</td> <td></td> </tr> </table>	strongly disagree	strongly agree	○ ○ ○ ○ ○ ○ ○ ○	
strongly disagree	strongly agree					
○ ○ ○ ○ ○ ○ ○ ○						
Cooperation						
7.2	In our company there is a sense of teamwork	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; text-align: left;">strongly disagree</td> <td style="width: 50%; text-align: right;">strongly agree</td> </tr> <tr> <td style="text-align: center;">○ ○ ○ ○ ○ ○ ○ ○</td> <td></td> </tr> </table>	strongly disagree	strongly agree	○ ○ ○ ○ ○ ○ ○ ○	
strongly disagree	strongly agree					
○ ○ ○ ○ ○ ○ ○ ○						
Communication						
7.3	There is a strong formal and informal communication through the whole organization	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; text-align: left;">strongly disagree</td> <td style="width: 50%; text-align: right;">strongly agree</td> </tr> <tr> <td style="text-align: center;">○ ○ ○ ○ ○ ○ ○ ○</td> <td></td> </tr> </table>	strongly disagree	strongly agree	○ ○ ○ ○ ○ ○ ○ ○	
strongly disagree	strongly agree					
○ ○ ○ ○ ○ ○ ○ ○						
<p>8. Competitive advantage With regard to your company situation, how do you consider your firm's position relative to your firm's major competitors in oversea markets with respect to? (scale 1= 'much lower' 2=' lower', 3='slightly lower', 4= 'comparable', 5='slightly bigger', 6= 'bigger' and 7= 'much bigger')</p>						

8.1	Production cost per unit	much lower o o o o o o o	much higher o o o o o o o
8.2	Selling price to end users overseas	much lower o o o o o o o	much higher o o o o o o o
8.3	Channel margins (Distribution costs)	much lower o o o o o o o	much higher o o o o o o o
8.4	Customer's perceived product benefit	much lower o o o o o o o	much higher o o o o o o o
9. Business metrics Please state information with regard to the			
9.1	Number of full time employees	<10 -50 -100 -250 - 500 >500 o o o o o o	
9.2	Sales volume (last three years average) in Mio. €	< 2 - 10 -50 -100 <100 unknown o o o o o o	
9.3	Percentage of sales derived from international ventures	< 10 - 25 -50 -70 >70 unknown o o o o o o	
9.4	Percentage of sales derived from oversea ventures (that means outside of Germany and in EU countries)	< 5 -10 -25 -50 >50 unknown o o o o o o	
9.5	Number of years firm has been involved in international business	None <1 -5 -10 >10 unknown o o o o o o	
9.6	Medical device class of the main products (based on MDD)	None I IIa IIb III unknown o o o o o o	

Survey: Cover Letter

Medizintechnik im Norden im Aufbruch –

Studie zur Internationalisierungsfähigkeit von kleinen und mittelständischen Unternehmen in der Medizintechnik

Agilität ist ein Anspruch, der tief mit der Medizintechnik verwurzelt ist. Unsere Branche lebt von Innovationen, die gerade von KMUs getragen werden. Sie entwickeln mittels Hightech und Spitzenleistungen Lösungen für Patienten, um diesen eine neue Lebensqualität zu ermöglichen. Die Medizintechnik gilt seit vielen Jahren als deutscher Exportschlager. So profitiert insbesondere Norddeutschland von einer hochentwickelten Konzentration von Unternehmen aus der Medizintechnik, die hervorragende Voraussetzungen für mehr Wachstum auf internationalen Märkten mitbringen.

Beteiligen Sie sich jetzt an dieser wissenschaftlichen Studie, um das Potential für die Internationalisierungsfähigkeit von KMUs in der Medizintechnik noch besser zu verstehen. Die Ergebnisse werden über das Cluster Life Science Nord veröffentlicht und bieten Ansätze für eigene, zukünftige Handlungsoptionen. Die Befragung ist Teil einer Dissertation an der University of Gloucestershire in England mit dem Titel:

SME Internationalization Study: Investigating antecedents and the effects of organizational capabilities on strategy in the German Med Tech industry.

Sie beschäftigt sich mit Ausprägungen von KMUs in der Medizintechnik, die in internationalen Märkten agieren. Im Mittelpunkt der Untersuchungen stehen insbesondere strategische Ansätze und Voraussetzungen sowie organisatorische Aspekte der Internationalisierung.

Ihr Feedback als Experte der Medizintechnik in Deutschland ist für diese Befragung von besonderer Bedeutung. Als erfahrene Führungskraft in der Medizintechnik bin ich mir über Ihre knapp bemessene Zeit bewusst. Die Befragung wird nicht mehr als 10-15 Minuten Ihrer Zeit in Anspruch nehmen, ist in englischer Sprache verfasst und bleibt anonym. Es werden weder persönliche oder vertrauliche Daten erfasst, noch die IP Adresse gespeichert.

Herzlichen Dank für Ihre Unterstützung!

Gunther Heiss

Hamburg, im April 2017

Survey: Introduction letter and operationalization of the questionnaire (examples)

Internationalization Study of German Med Tech SMEs

Welcome

SME Internationalization Study: Investigating antecedents and the effects of organizational capabilities on strategy in the German Med Tech industry.

Thank you for participating in our survey. It is part of research that investigates the characteristics associated with Small and Medium Sized Enterprises (SMEs) in Germany operating in international healthcare markets. Specific antecedents for their internationalization and the effect of organizational capabilities on their strategy are the central objects of this research.

You have been selected as one of the main experts in the German SME market for medical devices, that's why your feedback to this survey is important. Being an Executive, I am fully aware that time is critical. The survey is voluntary and should take you about 10-15 minutes to complete. The results of this survey will be published in the same clusters or networks where you have been invited to participate in this survey.

Your responses will be confidential and we do not collect identifying information such as your name, email address or IP address. All data is stored in a password protected electronic format. To help protect your confidentiality, the surveys will not contain information that will personally identify you.

Kind regards,

Gunther Heiß, University of Gloucestershire, United Kingdom

Internationalization Study of German Med Tech SMEs

Strategy approach

1. Please consider the role of strategy within your firm.

With regard to your company strategic approach, to what extent do you agree or not with the following?

	Strongly Disagree	Disagree	Partially Disagree	Undecided	Partially Agree	Agree	Strongly Agree
In our company we have a regular formal mid- or long-term planning process	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In our company there may be a strategic approach but this is the task of the top management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Business-strategy and functional strategies guide our business decisions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The measuring of strategic goals and related activities are supported by metrics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Internationalization Study of German Med Tech SMEs

External industry specific factors

2. With regard to your firm's international ventures in foreign markets, to what extent do you agree or not with the following?

	Strongly Disagree	Disagree	Partially Disagree	Undecided	Partially Agree	Agree	Strongly Agree
The market potential in our foreign markets is very attractive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Medical device regulations in foreign countries are sometimes a real challenge	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Without cooperating with our network-partners foreign ventures would be difficult for us	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Internationalization Study of German Med Tech SMEs

Market specific product potential

3. With regard to your company competition situation, to what extent do you agree or not with the following?

	Strongly Disagree	Disagree	Partially Disagree	Undecided	Partially Agree	Agree	Strongly Agree
Anything that we can offer in foreign markets our competitors can match easily	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4. When considering the product of the selected international venture in foreign markets, what is your opinion concerning the following?

	Strongly Disagree	Partially Disagree	Undecided	Partially Agree	Agree	Strongly Agree
The quality of our products and services is better than that of our major competitors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Compared to similar products developed by our competitors, our product will offer unique beneficial attributes to the customers ...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Internationalization Study of German Med Tech SMEs

Firm specific internal resources

5. With regard to your company resource situation, how do you assess the situation regarding?

	Limited	Poor	Somewhat Unacceptable	Fair	Somewhat Acceptable	Good	Extensive
The headcount and the financial commitment, which our firm provides for international ventures is ...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The amount of skilled managers with international experience in our firm can be considered as ...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The extent of established processes and routines with respect to international ventures is ...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Internationalization Study of German Med Tech SMEs

Organizational learning capabilities

6. With regard to your company situation, to what extent do you agree or not with the following sentences?

	Strongly Disagree	Disagree	Partially Disagree	Undecided	Partially Agree	Agree	Strongly Agree
The sense around here is that employee learning is an investment, not an expense	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is total agreement on our business unit vision across all levels, functions, and divisions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In our company everybody knows what their contribution is for success	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Internationalization Study of German Med Tech SMEs

Organizational relationship capabilities

7. With regard to your firm's relationship with partners in foreign ventures, to what extent do you agree or not with the following?

	Strongly Disagree	Disagree	Partially Disagree	Undecided	Partially Agree	Agree	Strongly Agree
Our firm pays close attention in establishing and maintaining strong business ties with other organizations in foreign markets	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Our firm places a high value on open-mindedness towards our foreign partners' culture	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Our firm frequently discusses strategic issues with our foreign partners based on a shared cultural understanding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Internationalization Study of German Med Tech SMEs

Organizational coordinating mechanisms

8. With regard to your company situation, to what extent did you agree or not with the following?

	Strongly Disagree	Disagree	Partially Disagree	Undecided	Partially Agree	Agree	Strongly Agree
Functional areas in this company work together in pursuing common goal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In our company there is a sense of teamwork	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is strong formal and informal communication through the whole organization	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Internationalization Study of German Med Tech SMEs

Competitive advantage

9. Please rate your firm's position relative to your firm's major competitors in overseas markets:

	Much lower	Lower	Slightly lower	Comparable	Slightly higher	Higher	Much higher
Production cost per unit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Selling price to end-users overseas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Channel margins (Distribution costs)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Customer's perceived product benefit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Internationalization Study of German Med Tech SMEs

Business metrics

Please help us with our analysis and complete just a few more questions about your company:

10. Number of full time employees:

<10 10-50 51-100 101-250 251-500 >500

11. Sales volume (last three years average) in Mio:

< €2 €2-10 €11-50 €51-100 >€100 Unknown

12. Percentage of sales derived from international ventures:

< 10% 10-25% 26-50% 51-70% >70% Unknown

13. Percentage of sales derived from overseas ventures (outside of Germany and in EU countries)

< 5% 6-10% 11-25% 26-50% >50% Unknown

14. Number of years firm has been involved in international business:

None < 1 1-5 6-10 >10 Unknown

15. Medical device class of the main products (based on European MDD):

None I IIa IIb III Unknown

Internationalization Study of German Med Tech SMEs

Thank you

Thank you for completing this survey and submitting your answers!

Survey: Internet teaser (example XING – Gruppe MedTech)



The image shows a screenshot of a XING group page. The header features a blue background with a close-up of a person's hands in white gloves holding a blue medical syringe. On the left, there is an orange square logo with a white 'X' and a chevron. The text 'Medizintechnik - XING Ambassador Community' is displayed in white. On the right, a teal box contains the text 'MODERIERT VON DeviceMed DAS COMMUNITY-PORTAL'. Below the header, a white box contains a welcome message: 'Herzlich willkommen auf den Seiten der XING Ambassador Group Medizintechnik. Diskutieren Sie mit, was die Branche bewegt. (Bild: BVMed)'. To the right of this message are three links: 'E-Mail-Benachrichtigungen', 'Über diese Gruppe', and 'Mehr' with a downward arrow. At the bottom, a navigation bar includes 'Beiträge' (underlined), 'Über diese Gruppe', 'Events', and 'Gruppen-Mitglieder'.



Gunther Heiss

Im Forum Managementfragen in Medizintechnik-Unternehmen - 21.04.2017, 13:07 -
Bearbeitet

Medizintechnik im Aufbruch - Studie zur Internationalisierungsfähigkeit von Kleinen und Mittelständischen Unternehmen (KMUs) in der Medizintechnik

Link: <https://www.research.net/r/SMEinternationalization2>

Digitalisierung, personalisierte Medizin, connected & combination devices – die Medizintechnik ist im Aufbruch. International ist Agilität und Innovation gefragt und daraus entsteht ein Anspruch, der tief mit der Medizintechnik verwurzelt ist. Unsere Branche lebt von neuen Ideen, die gerade von KMUs getragen werden. Sie entwickeln mittels Hightech und Spitzenleistungen Lösungen für Patienten, um diesen eine neue Lebensqualität zu

Weiterlesen ...



20

Survey: Hypotheses

H1a: Competitive advantage in an international venture increases with the degree of strategy development

H1b: Competitive advantage in an international venture increases, with the degree of the implementation of an international strategy.

H2a: Learning capabilities strengthen the effect of strategy development

H2b: Coordination capabilities strengthen the effect of strategy development

H2c: Coordination mechanisms strengthen the effect of strategy implementation on competitive advantage

H2d: Relationship capabilities strengthen the effect of strategy implementation on competitive advantage

H3: Attractiveness of foreign market potential is positively related to the development of an international strategy

H4: Similarity of medical regulations is positively related to an international strategy

H5: The degree of possible cooperations is positively related to an international strategy

H6: The degree of competitive products is positively related to an international strategy

H7: The degree of quality products is positively related to an international strategy

H8: The degree of innovative products is positively related to an international strategy

H9a: The extent of physical capital is positively related to the development of an international strategy

H9b: The extent of physical capital is positively related to the implementation of an international strategy

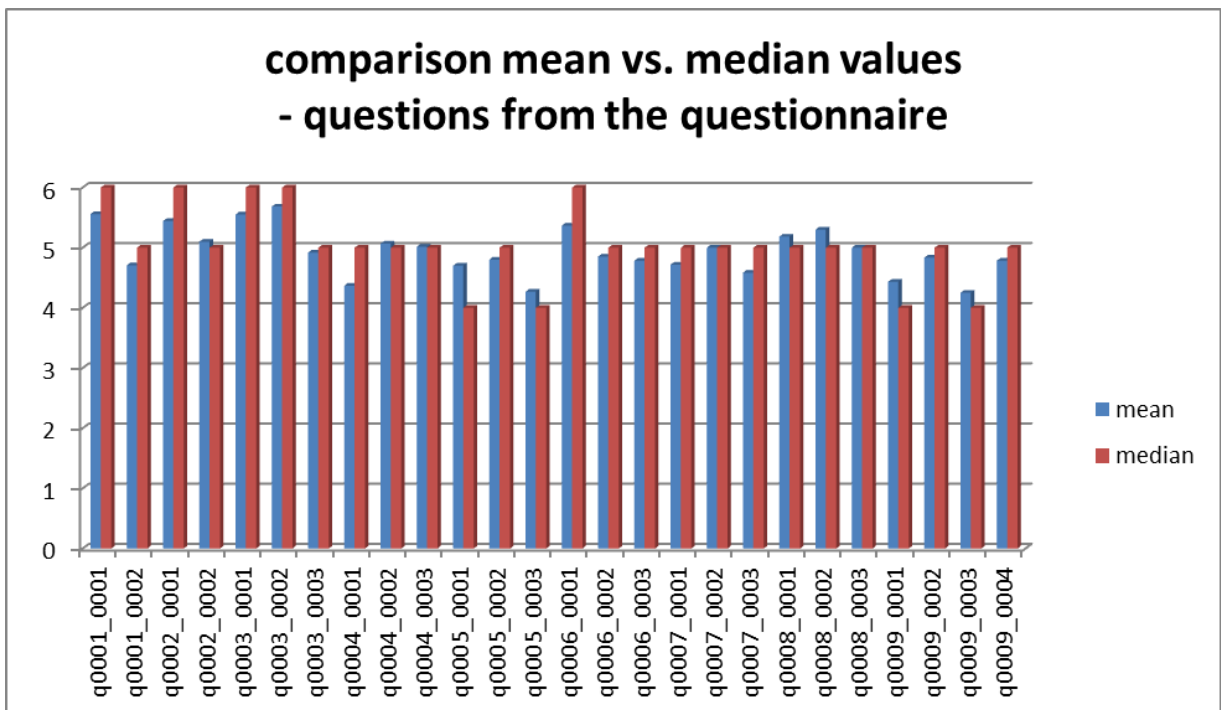
H10a: The more experienced management is available, the more likely is the development of an international strategy

H10b: The more experienced management is available, the more likely is the implementation of an international strategy

H11a: The degree of adequate processes is positively related to the development of an international strategy

H11b: The degree of adequate processes is positively related to the implementation of an international strategy

Survey: Questionnaire: Comparison of mean values vs. median values



Survey: Descriptive Statistics

DESCRIPTIVE VARIABLES RESULTS

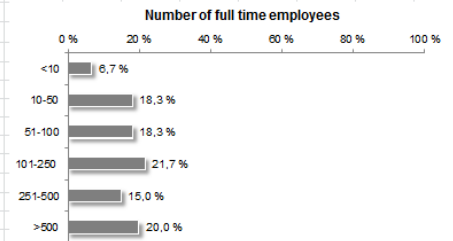
N=60

q0010 Number of full time employees:

	Frequency	Percent	Cumulative Percent
Valid			
<10	4	6,7	6,7
10-50	11	18,3	25,0
51-100	11	18,3	43,3
101-250	13	21,7	65,0
251-500	9	15,0	80,0
>500	12	20,0	100,0
Total	60	100,0	

according to number of full time employees our sample is pretty evenly distributed; the largest portion of sample represent the respondents with

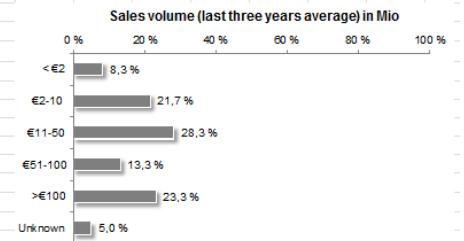
101-250 employees (21,7 %), followed by respondents with more than 500 full time employees (20,0 %)



q0011 Sales volume (last three years average) in Mio:

	Frequency	Percent	Cumulative Percent
Valid			
< €2	5	8,3	8,3
€2-10	13	21,7	30,0
€11-50	17	28,3	58,3
€51-100	8	13,3	71,7
>100	14	23,3	95,0
Unknown	3	5,0	100,0
Total	60	100,0	

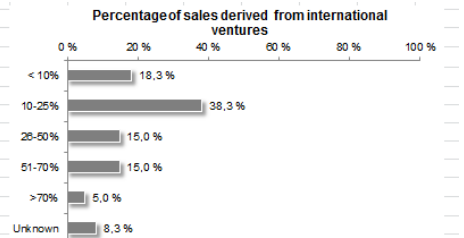
the largest portion of sample represent respondents with 11-50€ of sales volume (28,3 %) and respondents with more than 100€ sales volume (23,3 %)



q0012 Percentage of sales derived from international ventures:

	Frequency	Percent	Cumulative Percent
Valid			
< 10%	11	18,3	18,3
10-25%	23	38,3	56,7
26-50%	9	15,0	71,7
51-70%	9	15,0	86,7
>70%	3	5,0	91,7
Unknown	5	8,3	100,0
Total	60	100,0	

Respondents with 10-25 % of sales derived from international ventures (38,3 %) are the ones with the largest portion in the sample; those with more than 70 % represent smaller portion in sample (5,0 %)



q0013 Percentage of sales derived from overseas ventures (outside of Germany and in EU countries)

	Frequency	Percent	Cumulative Percent
Valid			
< 5%	21	35,0	35,0
6-10%	9	15,0	50,0
11-25%	9	15,0	65,0
26-50%	6	10,0	75,0
>50%	4	6,7	81,7
Unknown	11	18,3	100,0
Total	60	100,0	

the largest portion in the sample represent the respondents with less than 5 % of sales derived from overseas ventures (35,0 %); with raising the percentage of sales, the portion of respondents in sample lowers

