Exploring Internationalisation Effects on Firm Performance

Quantitative Empirical Study among German, Swiss and Austrian Listed Companies

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to my family

Abstract

Purpose – The purpose of this thesis is to explore the relevance of internationalization in the context of other factors of firm growth and to explore additional effects of internationalization in the context of M&A, R&D, intangible assets and capital structure neglected in prior firm growth and internationalization research and based exclusively on financial data and financial analysis research. Consequently, this research combines several distinct theoretical lenses.

Design/methodology/approach – This thesis uses an explanatory approach based on the financial data analysis applying the multiple regression analysis and tests for differences (t-Test) to (1) determine the differences between companies with a high level of internationalization and companies with a lower level, (2) explore causal effects on firm performance among individual groups such as high-growth companies, the research-intensive groups and other groups formed by firm performance determinants mentioned in prior firm growth research.

Findings – Internationalization was not found as an explanatory variable for quantitative and qualitative growth in the exploratory analysis of both the total sample and the high-growth group. Therefore, internationalization cannot be considered in general as a high-growth strategy. Instead, the 'average MNE' is slow-growing in terms of quantitative and qualitative growth and struggling year by year to keep the operating margin above the break-even point. It is concluded, that MNEs are more pulled into internationalization instead of pushing this process. However, at a certain firm size level, the only way to grow further is to internationalize but at the cost of profitability.

Originality/value – This thesis' approach is explorative. Many variables included in the variable set are not included in prior empirical studies. The study is based on structured numerical data which are highly comparable due to international accounting standards required in the home countries of the sample's companies. Furthermore, the criticism on prior internationalization and firm growth research is considered to secure the validity of this study. The results partially support empirically–the total sample is equal to 54% of the German GDP (2013)–and allow to extend the existing state of research concerning different effects of internationalization in the context of firm growth. Additionally, the empirical results are used to develop general models of quantitative and qualitative growth and high-growth. Based on the empirical findings form analysing 569 listed companies, strategic management recommendations for growth and internationalization are developed beyond the existing standard models integrating research areas.

Keywords – internationalization, firm growth, resource-based view, firm performance, knowledge-based view, theory of the firm, multinational enterprise (MNE)

I declare that the work of 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: December 28th, 2018

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Chapter 1. Introduction

1.1 Problem Statement

The subject of this study is the internationalisation of companies and its effect on firm performance. The term *internationalisation* generally refers to any type of cross-border activities of companies (Dülfer & Jöstingmeier, 2008, p. 173). At least two different approaches can be identified in the internationalisation research in business economics: (1) managerial theories and (2) microeconomic theories. The following paragraphs provide an overview on both research streams as well as on the results of the empirical research to determine the research gap providing the basis for this study's research question and research design.

The history of ideas of the internationalisation discourse in the context of management theory can be summarized as a progression from a schematic to a more sophisticated model (Wach & Wehrmann, 2014, p. 10). According to Wach and Wehrmann (2014, p. 11), seven different research approaches in the area of internationalisation research can be identified: (1) stage models, (2) resource-based management theories, (3) holistic approaches, (4) theory of multinationals, (5) network approaches (6) international entrepreneurship and (7) management models (see Figure 1).

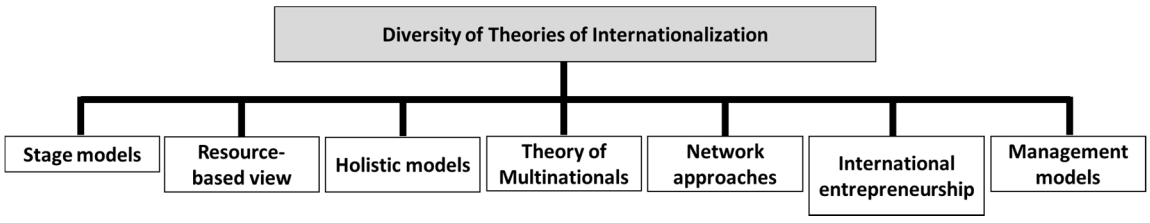


Figure 1. Typology of Internationalisation Research Concepts

Source: Author' presentation based on Wach & Wehrmann, 2014

Table 1 provides a detailed overview of these approaches and their main representatives as well as of further details characterizing the approaches presented in Figure 1.

Table 1. Typology and Representatives of Internationalisation Theories

Approaches	Models	Representatives
Stages Models Descriptive Approach focusing on the Internationalisation Process on Firm Level	U-model	Johanson & Wiedersheim-Paul (1975); Johanson & Vahlne (1977); Pukal & Calabro (2014); Sun et al. (2015)
	I-model	Bilkey & Tesar (1977); Cavusgil (1980); Reid (1981); Wortzel & Wortzel (1981); Czinkota (1982); Lim, Sharkey & Kim (1991); Rei et al. (1992)
	Hybrid models	Yoshihar (1978); Swedenborg (1982); Juul & Waters (1987)
Resource-based Models Firm- & Management-Level Research	Resource-based Models, Capabilities-based Models or Mixed Models	Wernerfeld (1984); Sebastian & Hernansanz (2000); Westhead, Wright & Ucbasaran (2001), Toulan (2002), Javalgi et al. (2003); Bobilo et al. (2007), Ahmed (2012), Nalcaci & Ysagci (2014); Lioukas et al. (2016); Panda & Reddy (2016); Panda & Reddy (2016)
	Knowledge-based Models	Kutschker, Bäurle, Schmid (1997); Mejri & Umemoto (2010)
	Theories of Network Internationalisation	Johanson & Mattsson (1988); Håkanson & Johanson (1992);Johanson & Wiedersheim-Paul (2009); Pinho & Pinheiro (2015)
International Entrepreneurship Models Behavioural Models on Management Level	International Entrepreneurship	Ruzzier et al. (2006), Etemad (2004), Schweizer; Vahlne Johanson (2010); Ganotakis & Love (2012); Hessels & Parker (2013); Hsu et al. (2013)
	International new ventures (INVs)	McDougall & Oviatt (1994)
	Born Globals	Knight, Madsen & Servias (2004); McNaughton & Bell (2004)
	Rapid Internationalisation	Kalinic & Forza (2012); Hashai & Almor (2004)
	Strategies-based Models	Bell, Crick & S. Young (2004), Hagen, Zucchella & Cerchiello; Giovanni (2012)
Management Models Rational, Decision-focused Models focusing on Strategy	Decision-making models	Schweizer (2011)
	Organization-based models	Andersson & Florén (2008), Nielsen (2010); Hessels & Parker (2013)
General Holistic Models (Mixed Models)	Combination of different models of other approaches mentioned above	Flecher (2001); Bell, McNaughton, Young & Crick (2003), Etemad (2004), Mtigwe (2005); Siebers (2009), Polat & Mutlu (2012), Onkelinx et al. (2016)
Theory of the Multinational Enterprise	Microeconomic models and institutional economics concepts	Buckley & Casson (1976); Buckley & Casson (2009); Hennart (2012); Pitelis & Teece (2017)

Source: Based on Wach (2012, p. 99; 2014a, p. 16; 2014b, p. 146); restructured and updated.

All these approaches observe different details of reality following their presuppositions or concepts. Thus, for example, stage models observe internationalisation sequences, the resource-based approach focuses on firm-specific resources as preconditions of internationalisation success, holistic models combine different concepts and management models focus mainly on operations in the context of internationalisation. Stages models are called classical theories of internationalisation, such as the business strategy approach and the resource-based view, while the network approach, international entrepreneurship and holistic models can be considered as new approaches (Wach & Wehrmann, 2014, p. 14). However, all three research approaches can be further reduced to the one generic concept because all three approaches are behavioural models describing entrepreneurial characteristics and behaviour contrary to all other models focusing on the firm level.

Stage models refer to the entire process of the internationalisation of companies and describe this process in its various stages without referring to rational decision making. Thus, for example, the classic model of Johanson and Vahlne (1977) describes internationalisation as a step-by-step internationalisation from one country to another. The selection of countries focuses on the cultural proximity and proceeds in concentric circles, whereby companies start the next stage of internationalisation when the preceding market entry has reached a stable business. Thus, companies gradually intensify their business from country to country. Overall, three different types can be identified among the stage models of internationalisation: (1) U-models, (2) I-models and (3) hybrid models (see Table 1). These models differ mainly in their description of internationalisation sequences. However, their essential assumption is that internationalisation is a gradual process of increasing intensification of business activities abroad.

Resource-based models assume that unique firm resources and capabilities provide a competitive advantage in new markets abroad. A company disposes on (1) success-relevant resources to gain competitive advantages leading to a monopolistic advantage in foreign markets or on (2) adaptive production capabilities allowing to benefit from economies of scale resulting in a cost leadership advantage in foreign markets. Thus, for example, Sebastian and

Hernansanz (2000) or Javalgi et al. (2003) find that size is a good predictor for internationalisation activities. Larger companies can make better use of their firm capabilities through internationalisation profiting from the economies of scale in foreign markets with smaller competitors.

Stage-models and resource-based models as well as international entrepreneurship, management models and the other approaches mentioned in Table 1 are focusing on qualitative aspects of internationalisation collecting qualitative and quantitative primary data. They aim on describing patterns, strategies, characteristics of entrepreneurs and companies in the context of the internationalisation process. Besides these approaches focusing on processes, resources and management recommendations, another approach can be identified in the internationalisation research, which is interested in internationalisation only concerning its quantitative effects on firm growth. This research stream is not based on primary data but on financial data provided by professional financial databases. This type of research examines statistically measurable effects of internationalisation on the firm. However, Ruigrok and Wagner (2005) as well as Yang (2009) state that this kind of quantitative empirical research concerning the effects of internationalisation on firm performance indicated only marginal effects. This is a surprising result because many of the qualitative models in Table 1 assume positive effects of internationalisation on the firm level, such as knowledge spill-overs (e.g. Autio, Sapienza & Almeida, 2000; Fu, 2012), economies of scale and cost efficiency effects (Buckley & Casson, 1976; Porter, 1985). Ruigrok and Wagner (2005) note that the findings of 89 studies conducted between 1974 and 2004 on the effects of internationalisation on firm performance are inconsistent. Therefore, they conclude that internationalisation has only a marginally positive effect on firm performance, mostly in terms of slight cost savings and increased profitability. Other research generally denies a positive impact of internationalisation on firm performance (e.g. Greenaway & Kneller, 2007).

Consequently, the question arises whether these inconsistencies in the results of empirical research should be interpreted in the way that the effect of internationalisation on firm performance is only theoretically assumed and overestimated or whether some methodological issues are unsolved, as

maintained by several scholars. Ruigrok and Wagner (2005) as well as Annarvarjula and Beldona (2000) see methodological issues as the reason for inconsistent results, particularly in terms of operationalisation of variables and their sampling approaches. Furthermore, performance measurements vary widely. Yang (2009) states that studies in the 1980s and 1990s preferred market- and accounting-based metrics.

Another reason for inconsistencies is of methodological nature. Ruigrok and Wagner (2005) and Yang (2009) suggest that the assumptions of internationalisation theory are derived from mainly industrial economics (e.g. Porter, 1985; Greenaway, 2004). Recent studies rather prefer micro-economic metrics, such as factor productivity (e.g. Bekes & Muroközy, 2016). This may also lead to inconsistent results, since these metrics lose their explanatory power in different contexts, such as economies dominated by the service sector. Using such measures in analysing larger cross-industry samples containing mostly a majority of firms from the service and technology sector will not show, for example, the effect of cost advantages.

Furthermore, a selection bias may cause inconstancies. Yang and Drifield (2012) argue that the inconsistent results may arise from selection bias from the applied statistical test. They found that it is, first of all, important to collect company data from countries with a strong export focus and, second, the statistical analysis must include not only tests for differences, such as t-test or ANOVA but also regression analysis. In this context, Krist (2009) states that the heterogeneous results may also be caused by moderating variables because there is increasing evidence that internationalisation effects on firm performance are not simple linear relationships between a few variables with direct effects.

To sum up, internationalisation theories and the quantitative research in the context of firm growth research provide opposing views. Internationalisation theory and models assume implicitly positive effects of internationalisation, while the firm performance view on internationalisation mainly focuses of the quantitative effects of internationalisation of selected firm performance indicators based on the analysis of secondary data mainly from financial databases including accounting data. Internationalisation theory and models focus much

more on the qualitative aspects in terms of internationalisation process structure, applied strategies, internationalisation management and other topics.

1.2 Research Gap and Research Aims

This research combines both approaches. Financial data are analysed following the mainstream of firm performance research. Moreover, accounting data are used for an in-depth analysis of management activities. Consequently, not only the effect of different internationalisation degrees on firm performance is examined but the sample is grouped by internationalisation intensity and examined concerning differences in firm performance characteristics (profitability, quantitative and qualitative growth) and management activities, such as differences in R&D investment, M&A investment and other characteristics. By doing this, this research applies the instruments of financial analysis research to such an extent, which is not the standard in quantitative performance-internationalisation research as well as in the qualitative internationalisation research.

Furthermore, the examined sample consists only of companies from three strong export countries (Germany, Switzerland and Austria) with comparable external environments and regulations. Only financial analysis metrics are applied, as they are established as valid measures for firm performance and firm analysis. The total sample includes not only blue-chip companies that are mainly industrial companies but also all other companies included in the prime standard and second-line stocks to control the economic sector share. The statistical analysis will not only be based on test for differences but also on different regression analysis methods. The data basis consists only of financial data complying with the International Financial Reporting Standard (IFRS), so that these data are standardised and, therefore, comparable.

This previous research literature overview has structured the internationalisation research into two main streams: (1) the qualitative research focusing on the internationalisation process and required resources based on primary data and (2) the quantitative research focusing on firm performance effects based on secondary data. The quantitative research's main focus is the identification of factors mainly in the areas of the operating business, such as, for example,

productivity, profitability and revenue growth. However, what seems to be neglected are the financial economics of the firm. No study was identified focusing on the effects on the capital structure of the firm or the investment activities of internationalising firms in terms of the cash allocation. This seems to be a relevant research gap. Chapter 2 will identify the negligence of the effects on the financial economics of the firm in internationalisation research. No study is identified focusing on the effects on the capital structure and the revenue stream of the firm or the relationship between investment activities of internationalising firms in terms of the cash allocation. To sum up, it appears that the results are mixed concerning the relationship between firm performance and internationalisation resulting from different data analysis approaches, sample biases and other reasons. However, it must be stated that no study can be identified examining the capital structure and the revenue stream characteristics and their relationship with internationalisation. Firm performance is defined only in terms of operational business parameters, while the financial economics of internationalisation are neglected, which will be discussed in the literature review in Chapter 2.

Based on the methodological criticism mentioned in the previous section stating inconsistent results of the quantitative research examining the effects of internationalisation on firm performance, the following five objectives are defined as the research objectives of this study:

(1) Identifying main effects of internationalisation on firm performance assumed in the model-theoretical literature and empirical research.
(2) Determining additional effects of internationalisation, which are quantifiable and reliably measurable according to the financial analysis research but are neglected in prior research.
(3) Determining the differences between companies with a high level of internationalisation and companies with a lower level of internationalisation based on the identified quantifiable effects.
(4) Defining a final regression model to detect causal effects of firm performance among individual groups and between the group of internationalised and the group of non-internationalised companies.

(5) Developing cause–effect models derived from the results of statistical data analysis.

Consequently, this research aims on answering the following research question:

Does internationalisation determine firm performance?

To examine the performance-internationalisation relationship, this research follows an explorative quantitative approach. Therefore, this research includes only stock-listed companies due to the data availability allowing the collection of large sets of structured numerical data that are highly comparable because they are unified by international accounting and financial reporting standards (IFRS and IAS).

1.3 Methodology and Research Methods

The studies mentioned in the literature review mainly apply three different approaches: (1) the qualitative–direct approach, (2) the quantitative–direct approach, and (3) the quantitative–indirect approach. The qualitative–direct approach examines soft factors, i.e. qualitative factors that are not quantifiable directly. This approach is appropriate in particular for case studies (e.g. Vahlne & Johanson, 2010). The preferred method of data collection is conducting interviews (Zikmund et al., 2013, pp. 132, 156). Most of the research on the management level is based on this approach as well as the descriptive process models.

The quantitative–direct approach measures statistical effects between variables. Quantitative company data are collected outside and inside the company for the purpose of data analysis. Quantitative studies with a direct approach also use soft factors, which must be operationalised numerically. Quantitative data collection in the context of internationalisation research attempts to examine the relationship between internationalisation characteristics and potential success factors (e.g. Meri & Umemoto, 2010). Such an approach is typical, for example, in several studies in the context of the international entrepreneurship approach or the network theories of internationalisation.

The quantitative–indirect approach uses only quantitative secondary data, such as company financials and other quantitative secondary sources (e.g. Hagen et al., 2010). This study's approach is quantitative–indirect, based on existing structured numerical data and statistical analysis. A multitude of variables included in prior research concerning firm performance and internationalisation is included in this research to identify a factor model explaining the effects of internationalisation on firm performance. The general approach of this study is a positivist econometric approach. It is assumed that empirical data and statistical methods generate positive knowledge through analysing structured numerical data from annual reports based on the International Financial Reporting Standards (IFRS) allowing to generate empirical evidence for causal relationships between different variables. Consequently, this research uses the financial model of the firm as data model for analysing the financial data of a cross-industry dataset consisting of 569 active stock-listed companies headquartered in Germany, Switzerland and Austria (see Appendix I). For these companies, the financial data were completely available for the period from 2003 to 2013. At the time of data collection, data series were incomplete for the years 2014 and 2015. Therefore, they are excluded. 277 of these companies have a revenue share of > 25 abroad, so that they are, per definition, multinational enterprises (MNE) (Baharin et al., 2012, p. 50), which are examined in comparison with all non-MNEs concerning their growth sources, such as their investment behaviour (in R&D and M&A), their financial performance and other factors explaining qualitative growth measured by operating income growth and quantitative growth measured by revenue growth.

The applied statistical tests, such as the multiple regression analysis and the t-test are standards in business research (Burns & Burns, 2008). This research is based on 14 variables from the companies' annual reports, 12 growth ratios and 25 other ratios applied in the financial analysis research to examine firm performance and their sources.

1.4 Research Contribution

While the qualitative internationalisation research implicitly assumes positive effects of internationalisation on firm effects examining the patterns and

characteristics of the internationalisation process, the quantitative performance internationalisation has not generated evidence for this assumption. To sum up, it could be said that internationalisation takes place and can be described by process and resource models but is not necessarily a firm performance factor. Therefore, this research examines the effects of internationalisation on the financial economics of the firm andthe differences of firm characteristics between internationalised and non-internationalised companies. Consequently, the research approach is mainly explorative because many variables included in the variables set are not included in other studies. Consequently, this research has a strong explorative character but is based on quantitative numerical data that are highly comparable due to international accounting standards required in the mentioned countries.

Furthermore, the identified criticism in the field of empirical internationalisation research is considered to secure the validity of this study. Therefore, it is assumed that the existing state of research can be extended concerning additional effects of internationalisation in the area of financial effects and other effects of internationalisation. Thus, the models and theories discussed and criticised in the literature review are not seen as competing but as complementary models describing internationalisation from different perspectives with a specific explanatory strength. However, this research provides evidence that, internationalisation can be considered generally as a late-stage option of firm growth and not a panacea for perceived growth limits but leads to effects like decreasing profitability due to overstretch.

Furthermore, internationalisation is not a precondition for growth, which it is often seen as. At first glance, these findings do not seem to be substantively new insights. However, this research supports initiatively logical insights as well as the implicit assumption of deductive approaches of internationalisation process theories and models with exploratory research through applying financial data analysis instruments and research coming to similar conclusions as other (non-positivist) research-based qualitative data from direct data collection, case studies and other approaches. Accordingly, the research contribution is to support many of the implicit assumptions or evidence found in qualitative data and quantitative research by analysing secondary data (financial data) on firm

level including 569 active stock-listed companies headquartered in Switzerland, Austria and Germany. Based on the research period of ten years (2003-2013) and 40 variables, 234,400 observations are included, whereas the sample accounts for a revenue of EUR 1,824bn (2013) which is equal to 54% of the German GDP in 2013.

1.5 Thesis Structure

Chapter 2 reviews the existing literature in the field of internationalisation research and firm growth research, insofar the relevance for this study's research aims is given. This applies for seven areas of research:

(1) Process models on internationalisation (see Section 2.1.1)
(2) Management theories of Internationalisation (see Section 2.1.2)
(3) Entrepreneurial theory of internationalisation (see Section 2.1.3)
(4) Special process models of internationalisation (Born Globals) (see Section 2.1.4)
(5) Theory of the multinational enterprise (see Section 2.1.5).
(6) Theories of firm performance in terms of firm growth (see Section 2.2)
(7) Empirical research on the performance-internationalisation relationship (see Section 2.3).

Chapter 2 concludes that the research on firm performance and internationalisation provides only mixed results, whereby the mentioned five areas of internationalisation research provide different models and concepts depending on their specific research focus (process view vs. firm/top-management team characteristics) and the size of the research objects (firm size).

Based on the results of the literature review, Chapter 3 develops the research design by positioning this study's approach as following the positivist paradigm, defining the methodology as quantitative-exploratory, and explaining the data model, the selected variables, the data collection and preparation procedure and the statistical test performed using SPSS 24 (Statistical Package for Social Sciences, Version 24).

Chapter 4 presents the data analysis results based on a mixed data set including small, medium-sized, large and multinational companies. Large does not necessarily mean multinational. A multinational enterprise is defined in this research as a company with a foreign revenue of at least 25% following Baharin et al. (2012, p. 50).

The results of the data analysis are discussed concerning the sources of growth and the meaning of internationalisation in the context of firm growth. Chapter 5 draws conclusions from the data analysis by discussing the findings with respect to the findings of the internationalisation research as far as they are discussed in Chapter 2, provides a firm growth model as well as recommendations both for management practice and for future research.

Chapter 2. Models, Theories and Empirical Research

As mentioned in the introduction, Chapter 2 reviews the existing literature in the fields of firm growth research and internationalisation:

- Section 2.1.1 summarizes process models on internationalisation which can be seen as the starting point of any internationalisation research on the firm level examining basic geographical patterns of internationalisation behaviour.
- Section 2.1.2 refers to the management theories of Internationalisation which can be considered as the link between the first-generation theories and management practices.
- Section 2.1.3 discusses third-generation theories focusing not on larger companies but on the entrepreneurial firm dominated by the entrepreneur or a small management team.
- Section 2.1.4 refers to companies considered as Born Globals which are generally driven by entrepreneurs but following – due to specific product characteristics – the geographical internationalisation patterns of large enterprises. Internationalisation theory of the firm, respectively, the theory of the multinational enterprise (see Section 2.5.3).
- Section 2.1.5 discusses the results of the research focusing on multinational enterprises whereby this approach can be considered as the bridge between internationalisation research and the theory of the firm and firm growth because of the inclusion of elements from both research areas.

Furthermore, Chapter 2 discusses theories and models of the theory of firm and the theory of firm growth (see Section 2.2) which is the further foundation of this research. In this section, the theoretical basis for firm growth research and their general concepts are added. Moreover, Chapter 2 reviews the existing empirical research on firm performance and internationalisation and the issue of measuring firm performance which is in both areas a central issue.

2.1 Theories and Models of Internationalization

As mentioned in the introduction, the term *internationalisation* refers to any type of cross-border activities of companies (Dülfer & Jöstingmeier, 2008, p. 173). In

this very wide framework, the following literature review examines and discusses the models, theories and results of empirical research focusing on the firm level or management level.

In the study of international corporate activity, the question for motives and intentions of internationalisation is the starting point of research (Scherm & Süß, 2001, p. 5). Traditional theories of foreign trade seek to explain internationalisation motivation by economic necessities (Bode, 2009, pp. 33-48). Beside other, more individual motives of employees or entrepreneurs, there are so-called company-related motivators identified as decision drivers. In the literature, there main internationalisation motivators are mentioned (Kreikebaum et al., 2002, p. 9; Perlitz, 2004, pp. 35-39; Fuchs & Apfelthaler, 2009, pp. 71-74; Mathew & Javalgi, 2018).

- search for new sales markets (for example due to market saturation in the domestic market),
- defence of an established position in the domestic market, access to resources and new technologies,
- increase of manufacturing efficiency by utilizing economies of scale and factor cost differences

The motivation for internationalisation can thus arise both from the internal pursuit of growth and from external influences through competition (Scherm & Süß, 2001, p. 5; Dülfer & Jöstingmeier, 2008, p. 114). In contrast to the internationalisation motivators, the literature distinguishes the company-related intentions (international intends) and objectives. Companies intends to realize through internationalisation (Macharzina & Wolf, 2008, p. 928; Kieser & Walgenbach, 2007, pp. 290-291; Contractor et al., 2007, pp. 404-407).

- sales objectives to expand the company's business and/or to improve the market position,
- procurement objectives to achieve the cost-effective supply of resources,
- cost objectives in terms of realizing a more cost-effective service provision process abroad through benefiting from the effects of the economies of scale and scope or cost advantages between different countries.

The motives, intentions and objectives of internationalisation may be diverse, but ultimately the strategic purpose of international operations and internationalisation for companies is to defend competitiveness, create new competitive advantages over competitors, and grow the company (Bode, 2009, p.20). According (Eschlbeck, 2006, p. 581) internationalisation allows to realize the following aims:

(1) Sales-oriented aims, such as better global market positioning in an industry sector or access to new markets to increase sales volume for higher utilisation of capacities that are poorly utilised due to narrow domestic markets and other reasons.

(2) Efficiency-oriented aims, such as increasing profitability using cost advantages available in foreign procurement markets (offshoring) or a higher demand volume in new markets to increase sales to generate the economies of scale effects resulting in a comparably higher profitability.

(3) Strategic aims, such as increasing the revenue stream by entering new markets to increase internal financing capacity for expansion investments or breaking out of saturated domestic markets' growth limits, taking preventive action against international competition through production extension with the result of better utilisation of economies of scale and strengthening competitiveness.

The reasons (push forces) or triggering factors (pull forces) that move companies towards internationalisation can be classified as follows (Backes-Gellner & Huhn, 2000, p. 185): (1) push forces that create pressure on companies to internationalise, such as saturated domestic markets, high competition, cost pressure and others; (2) pull forces that pull companies into an internationalisation process, such as, for example, new market potential, special expertise not available in the home country, cost advantages, specific demand. In summary, it should be noted that most of the abovementioned objectives and reasons are reactive, which is coherent with some empirical internationalisation research findings (Herstatt et al., 2007, p. 6).

The goal of this chapter's literature review is to structure, assess and discuss internationalisation research and firm performance research. Two research streams are examined: (1) the qualitative research focusing on the internationalisation process and required resources based on primary data and (2) the quantitative research focusing on firm performance effects based on secondary data. It is found that process models and theories are examining internationalisation on the firm level studying internationalisation paths, necessary skills and resources, managerial and entrepreneurial activities. Process models represent ideal-typical sequences of internationalisation paths and business activities. The Uppsala Model (U-model) or the Innovation Model (I-model) are examples for this approach. Empirical quantitative and qualitative research identifies necessary resources for successful internationalisation mainly in the form of human capital, such as entrepreneurial skills, management skills or staff skills or organisational capabilities, such as learning capability, innovation potential and other factors. International Entrepreneurship (IE) models and network models of internationalisation are examples for this approach. Process and resource models are analysed and discussed in Section 2.1 and 2.2, while Section 2.3 discusses the entrepreneurial theory of internationalisation (see Table 2). The subsequent sections discuss special process models, firm growth theories in the context of internationalisation and the theory of the multinational enterprises.

In contrast to that research stream, effect-oriented studies empirically examine the effects or the results of internationalisation on the firm, respectively. They are mainly based on larger datasets of stock-listed firms due to the data availability. These studies focus on financially measurable effects mainly in combination with firm resources measured as investment activities, such as R&D investment, capital expenditures, investment in property, plant and equipment and other investment activities. In the case of these studies (see Section 2.6), firm success in terms of an increase of revenue, profitability, market capitalisation and profitability is the main benchmark to measure the financial effects of internationalisation.

Table 2. Models and Theories discussed in the Literature Review and Their Central Findings

Models and Theories discussed in the Literature Review	Approach and Central Findings in the Context of this Research
Process Models on Internationalisation (see Section 2.1)	– Describes the internationalisation process on the country level – Basic models: U-model, sprinkler model, waterfall model – Internationalisation patterns can be clustered into a few groups of general patterns – Normative and quantitative-descriptive focusing on SMEs and large corporations
Management Theories of Internationalisation (see Section 2.2)	– Classifies internationalisation strategies on the decision-making level – Basic strategies: international strategy, multinational strategy, transnational strategy, market entry strategies – Classifies internationalisation options and their cost-benefit calculi to provide the basis for rational decision making – normative and qualitative-descriptive focusing on the management of large corporations
Entrepreneurial Theory of Internationalisation (International Entrepreneurship) (see Section 2.3)	– Examines mind sets, activities, human resources (skill, dispositions and other factors.), social capital (network resources and other resources), individual approaches/activities to the internationalisation process – Qualitative and quantitative empirical research mainly on the descriptive level focusing on the entrepreneur or the top management team
Special Process Models of Internationalisation (Born Globals) (see Section 2.4)	– Examines a specific type of companies (instant internationals) – Some companies are forced to internationalise in the start-up stage to keep their competitive advantage and to realise a pioneer premium due to the low market volume of the domestic market or due to product characteristics allowing international distribution in the early corporate lifecycle (digital products) – Qualitative and quantitative empirical research mainly on the descriptive level focusing on the management/entrepreneur level
Theory of Firm Growth (see Section 2.5)	– Aims on explaining the sources of firm growth – A multitude of crucial growth factors are detected depending more or less on the research focus – Internationalisation is generally not addressed – Theoretical, qualitative and quantitative research focusing on the firm level
Internationalisation Theory of the Firm/Theory of the Multinational Enterprise (see Section 2.5.3)	– Aims on examining reasons and effects of internationalisation and explaining the emergence of multinational enterprises – Mainly theoretical research or qualitative, case-study-based approaches

Source: Author's presentation.

2.1.1 Process and Resource Models of Internationalisation

Since the 1960s, extensive literature has been accumulated on the subject of internationalisation. This literature comprises general theories and models and/or examines special issues of internationalisation (see Figure 1). Stage models, managerial and strategic approaches as well as the resource-based view are sometimes also called classical theories of internationalisation, whereas network approaches, international entrepreneurship and holistic models can be considered as new approaches (Wach & Wehrmann, 2014). However, to reduce the complexity of Wach's (2012) typology, the literature review is based on the following distinction between theory and model:

(1) Model is understood as a complexity-reducing representation of a relationship among various factors or a process based on a limited set of assumptions (Hausman, 1992, pp. 25-27). Essential functions of a model are abstraction and reduction:

   a. Abstraction aims on reducing the complexity of the observed relationship or process to identify significant factors, whereby factors are elements having an effect not only on specific cases but on all observable cases (Hausman, 1992, p. 59).

   b. Reduction aims on the omission of details for emphasising significant factorsk.

   Based on this definition, this chapters second section discusses mainly stage models. Other approaches mentioned by Wach (2012) are rather theories.

(2) *Theory* is considered here as a system of propositions or statements to explain or describe elements or parts of the observed relationships or processes (reality), respectively, allowing to predict future events (Hausman, 1992, pp. 52-56). A theory provides explanatory (causal) or descriptive statements on specific parts or elements of reality, respectively. In general, a model is the basis for a theory. However, a model is not a mandatory requirement (Hausman, 1992, pp. 26-27). According to this definition, this chapter's third section discusses all other

approaches, such as international entrepreneurship, network approaches, managerial approaches and other concepts mentioned in Wach's typology (see Figure 1 and Table 1).

This typology of different theories and models provides the basis for the further examination of this research field, which is the objective of the following sections.

According to Schmid (2006, pp. 19-20), 'classic' ideal-typical models of internationalisation are the Uppsala Model (U-model), the so-called sprinkler model and the waterfall model:

(1) The U-model: The Uppsala model describes internationalisation as a step-by-step process, in which companies intensify their internationalisation activities gradually (Glowik & Smyczek, 2011, p. 118). Companies first challenge markets that are mentally and/or culturally closest to them. Only then follows the penetration of culturally or geographically distant markets. Market entries take place successively and time-delayed, whereas the resource input is limited to reduce the risk of failure.

(2) The sprinkler model: According to this model, internationalisation is carried out as a simultaneous entry into multiple markets, such as a simultaneous product launch on several country markets with high resource input and management complexity, higher risk of failure and higher initial costs (Perlitz, 2000, pp. 125-130; Berndt, Fantapie & Sander, 2010, pp. 161-170).

(3) A third basic model is the so-called waterfall model. In contrast to the sprinkler model, the waterfall model is more focused and a more slowly and adaptive process (Glowik & Smyczek, 2011, p. 118). According to this model, internationalisation is characterised by a sequential and concentric proceeding. There is no simultaneous penetration of multiple markets but smaller groups of countries with similar characteristics are penetrated at the same time. Thus, following the typology of Table 1, the waterfall model is a hybrid of the sprinkler and U-model.

The U-model is, so to speak, the original model of internationalisation research. This model distinguishes between temporal and spatial patterns. In terms of a temporal pattern, companies first gain experience in the domestic market and

begin to export. If this step is successful, the establishment of international offices and possibly international production sites follows. In terms of a spatial pattern, companies challenge markets closest to them culturally and then enter culturally or geographically distant markets, as mentioned above (Johanson & Wiedersheim-Paul, 1975; Johanson & Vahlne, 1977).

While the waterfall model and the U-model basically follow a learning-theoretical, behavioural approach, the sprinkler model is a normative rational model in terms of traditional decision-theoretic models; the expected utility of several activities is weighted regarding its utility and its probability of occurrence leading to a preference order allowing to rank all alternatives regarding their payoff to derive decisions for payoff maximisation (Hees & Roy, 2009, pp. 58-69).

Furthermore, the models differ in their perspective. The waterfall model and U-model focus on the corporate level (Glowik & Smyczek, 2011, p. 118; Vissak & Zhang, 2012, p. 143), the sprinkler model focuses on the product management level (Moutinho & Chien, 2008, p. 118). U-models and I-models (innovation models) conceptualise internationalisation as a sequential and gradual development by stages, based on a series of incremental decisions as a result of expectations, perceptions, managerial capabilities and experiences (Vissak & Zhang, 2012, p. 143). Additionally, U-models and I-models interpret internationalisation decisions mainly as triggered by pull or push forces, so that internationalisation is not just a result of a rational strategic decision but of a multi-factor system of forces and intentions (Ostendorf, 2003, pp. 175-180). The only gradual difference between the I-model and U-model lies in the role of decision making. While U-models are rather a special theory of the firm and explain internationalisation as a result of business economics and incremental decision making (Macharzina et al., 2001, p. 638), I-models pronounce the role of decision makers in the internationalisation process and are, thus, more an entrepreneurship model that pronounces the innovative and driving role of entrepreneur or management, respectively (Zucchella & Magnani, 2016, p. 57).

While internationalisation models conceptualise mainly the process of internationalisation of the firm, management and entrepreneurship theories examine the strategic behaviour and decision making within companies and the

relevance of specific resources, which are the management itself and its skills or other resources, such as human resources, which must be acquired by or are a product of management activities. Both approaches differ considerably. While management approaches discuss strategic options and develop a rational decision-making process, entrepreneurship theories show a pragmatic, behavioural science approach with a focus on the operational level and without any attempt to develop an ideal-typical strategy process. Thus, it can be stated that managerial theories of internationalisation are grosso modo normative, while entrepreneurial theories are of descriptive nature without testing cause–effect relationships.

2.1.2 Management Theories and Models of Internationalisation

Many recent monographs on strategic and international management show a schematic view of internationalisation, frequently based on Porter's (2008) competitive strategy concept. Büter (2010) is one recent example of this pattern. He provides the same approach as many other handbook-like monographs, which consists of citing the literature and modifying recent models (Büter, 2010, pp. 17-28, 39-54). Büter (2010) as well as other monograph authors, such as Perlitz (2000) or Morschett et al. (2009), hardly use any findings of quantitative empirical research. References to the 'real world' are made through selective case studies to illustrate the developed models.

Büter (2010, p. 52) postulates the building and maintenance of a competitive advantage as a general internationalisation aim. To reach this goal, the rational manager disposes of a comprehensive portfolio of strategies on different corporate levels, such as overall corporate strategies, market selection strategies (single market strategies, supranational and global market strategies), business unit strategies, such as cost leadership, differentiation, niche strategy, pioneer strategy or follow-up strategy, and functional area strategies, such as international procurement strategy and international financial strategy (Büter, 2010, p. 53). The beginning of the rational decision-making process is an analysis of international challenges, such as external environment, the specific situation of potential target markets as well as an analysis of the company's internal resources and capabilities that enable or limit internationalisation. Subsequently,

the strategic mission and strategic objectives of internationalisation are to develop within the framework of the given corporate strategy, followed by long-term, medium-term and short-term planning of the internationalisation process (Büter, 2010, p. 53).

Büter's (2010) example depicts the general impression that literature on internationalisation in the context of strategic management and international management often provides. Ideal-typical management processes are developed on the 'drawing board' for ideal-typical businesses without curtailing the effects of size, industry or other characteristics. Instead of referring to the importance of networking and entrepreneurship, the literature usually provides summarising lists with the classifications of models, strategies and other theoretical content. Differences can be noted only in cultural terms. While German-language literature rather tends to encyclopaedic comprehensiveness by developing descriptive typologies and theoretical models, the Anglo-Saxon is more business-school-oriented literature that uses case studies more frequently. However, these case studies mostly relate to multinational companies (e.g. Ahlstrom & Bruton, 2010), as does German-language literature, if they use case studies at all (e.g. Morschet et al., 2010). Piekkari and Welch (2011, p. 3, 11) state that the case study approach is still the major approach in empirical research, whereas Aharoni (2011, p. 50) states that the research focus was mainly on MNEs since the 1970s. The German fixation on models instead of praxeological issues and empirical research has been criticised for a while (Kutscher, 1993, pp. 2-3; Kutschker, 1999, p. 70; Macharzina & Oesterle, 2002, pp. 11-14; Lierow, 2006, p. 6).

Overall, however, managerial theories of internationalisation show a general reference to multinational companies, which ultimately mirrors the frequent proposals for a rational process of internationalisation, which is quite resource-intensive in its implementation in practice. Thus, for example, Wilderer (2010), Bruhn (2002) and Müller (2010) name international strategy, multinational strategy, transnational strategy and global strategy as the main options in internationalisation (Bruhn, 2002, pp. 407-414, 422; Wilderer, 2010, p. 97; Müller, 2010, p. 231).

It seems as if global, transitional or multinational strategies can only be implemented by companies from a certain size upwards. The same goes for the typically recommended sub-strategies. The foundation of subsidiary companies, direct investments and mergers and acquisitions are typically mentioned as classic entry strategies (e.g. Perlitz, 2000, p. 158; Bartlett & Ghoshal, 2002, p. 74), require significant financial resources and experience, available generally only in multinational companies.

The same applies to ideal-typical decision-making processes often provided as workflow charts. Thus, for example, Perlitz's (2000, p. 158) ideal-typical decision-making process contains 32 options. Here again, such a complex rational planning and decision-making process exceeds the resources of many companies, especially at the beginning of an internationalisation process. Accordingly, the criticism is directed against the high complexity of management research and questions the general validity of these approaches due to missing empirical evidence (e.g. Wolf, 2011, p. 153).

2.1.3 Entrepreneurial Theories and Models of Internationalisation

International entrepreneurship (IE) research stresses the 'human factor' instead of the 'planning factor'. Strategy is conceptualized as evolutionary process in which formalised strategy provides at best 'guidelines' for entrepreneurial initiatives (Garret & Covin, 2007) and is not the core of internationalisation activities. According to this, IE describes internationalisation as a "*combination of innovative, pro-active, and risk-seeking behaviour that crosses national borders and is intended to create value in organizations*" (McDougall & Oviatt, 2000, p. 903).

The IE examines and prioritises the role of the entrepreneur as the key driver in the internationalisation of SMEs (Wach & Wehrmann, 2014). Network theories of internationalisation and hidden champions research emphasises the role of the company's network of suppliers, customers and business contacts in internationalisation but pronounces also the driving role of the top-management team or the owner-manager (Mitgwe, 2006). In conclusion, network opportunities (effects) are of more essential importance to the framework of the market

selection process, decision making and market entry approaches than strategy building and planning (Burt, 1997; Madsen & Servais, 1997).

Based on the results of qualitative empirical research, international entrepreneurship research offers a descriptive process model of internationalisation and property theories of resources an entrepreneur should dispose on. IE research develops in a typical internationalisation process sequence starting with opportunity seeking by the entrepreneur in networks, foreign information databases, personal connections to internal acquisition of skills and resources or external acquisitions, process restructuring and other activities leading to increased operational performance, revenue growth and profitability (Manesh, 2011, p. 14). Manesh's approach represents the key differences between the managerial theories of internationalisation. IE models are simple, descriptive and not prescriptive or normative. IE theory combines general patterns with a resource-based view (Chan & Foster, 2001, pp. 56-59). Additionally, IE sees the entrepreneur at the beginning of all processes (Zucchella & Scabini, 2007, p. 19). The entrepreneur seeks market gaps and seizes opportunities, identifies fits and gaps between firm resources and business opportunities under uncertainty (Bygrave & Zacharakis, 2011, p. 11)

The network theory of internationalisation is an extension of the entrepreneurship theory and goes back to Johanson and Mattson (1987) and Kutschker and Schmid (2008). According to them, entrepreneurial internationalisation occurs evolutionarily in small steps by expanding networks, the step-by-step increase of knowledge, experience and business contacts and the subsequent gradual expansion abroad. As part of this incremental internationalisation in the context of organic growth, the entrepreneur gains access to local resources in target markets, such as information, knowledge and business contacts. The entrepreneur and/or key employees develop networks with distributors and customers and obtain more information about the new markets to avoid the risk of Greenfield investments (Blunck & Martin, 2011, pp. 135-136).

The recourse to behavioural concepts both in international entrepreneurship and in network theory mirrors the rejection of the idea of internationalisation as rational planning, as management theory of internationalisation suggests

(Reihlen & Rohde, 2006, p. 177; Kutschker & Schmid, 2008, p. 431). Furthermore, both approaches are based on empirical evidence finding that bounded, opportunity-driven rationality is the dominant pattern in internationalisation in smaller companies (Kutschker & Schmid, 2008, p. 426). Only then begins an implicit, intuitive evaluation of a target market and, thus, a gradual rationalisation of the internationalisation process (Kutschker & Schmid, 2008, p. 427). A particular mind set determines the first internationalisation steps but not rational business calculations. Thus, it is also observable that the decision for specific target markets is contrary to existing corporate objectives (Amschlinger, 2011, p. 63). In any case, both entrepreneurial research approaches pronounce the importance of gradual learning in the internationalisation process instead of rational business planning. Only the successful learning process in the first steps of internationalisation leads to the more rational search and decision-making in follow-up internationalisation (Amschlinger, 2011, p. 64). However, this step-by-step internationalisation process, partly driven by accident and partly by individuals, ultimately also follows a rational calculus:

(1) The structure of networks as a key success factor in the internationalisation of companies, in particular in B2B markets or without the resources available for multinational companies, needs diligence and time to avoid risks.

(2) In particular, for smaller companies, slow internationalisation is a question of risk and financial resources management, because these companies cannot afford any major investment failures caused by a multinational internationalisation approach.

It seems evident that especially smaller companies or even smaller corporations do not have the resources for a large rollout, as the management theories of internationalisation ‘prescribe’. In particular, the initial risk of Greenfield activities based on detailed and resource-intensive planning and high initial investment with non-predictable results is not suitable for smaller companies. For these reasons, even large companies choose the Brownfield alternative: ‘buying’ customer bases, sales staff and distribution networks through mergers and acquisitions. However, this alternative contains, even for larger corporations,

considerable risks, such as post-merger integration problems or overpriced takeover costs (Böcker, 2011, pp. 48-51). For medium-sized companies with little to no experience in internationalisation and, with no experience in larger acquisitions, both alternatives are more or less no viable options (Staude & Theisen, 2000, pp. 127, 129-131; Holtbrügge & Puck, 2008, pp. 207-211). In this respect, SMEs and smaller corporations have no choice but to successively expand their partner networks, slowly recruit key employees in target countries and collect market information (Institute for Educational Business Research, 2009, p. 7).

The importance of networking in the systematic development of business opportunities in the internationalisation process becomes even more apparent concerning the internationalisation of services. Services are intangible goods. The new customer cannot assess the quality or performance of a service before having experienced it (Renker, 2005, pp. 24-25). Additionally, services and particularly knowledge-based services frequently need country-specific adaptations. This peculiarity of service goods means, for smaller companies and corporations abroad, building trust turns out as the main challenge (Lehman, 2005, p. 12) because the introduction of services with large marketing campaigns or a longer timeframe with negative income is excluded with limited financial resources. Trust is achieved through market reputation or recommendation. Thus, international entrepreneurship and network theories pronounce trust as a key mechanism in the formation of networks and successful internationalisation (Zaheer & Zaheer, 2006). This is especially true in intercultural or cross-border commerce. Thus, the network theory pronounces the interpersonal level of business as the basis of a successful internationalisation of networks: "*Networks are personal, not institutional*" (Carsrud & Brännback, 2007, p. 27).

2.1.4 Special Process Models of Internationalisation (Born Globals)

This section examines special process models of internationalisation. These models merge resource-based concepts and process concepts. Thus, for example, the born globals research focuses on a specific process sequence and managerial skills, while the hidden champions approach does not define a clear model but derives from a qualitative and quantitative empirical approach a

comprehensive set of specific results converging in a heuristic praxeology of internationalisation.

It turns out from the perspective of entrepreneurial and network theories that internationalisation is, in case of non-multinational companies, a process that is difficult to plan, where soft skills like cultural understanding, networking abilities, global mind set and entrepreneurial spirit are essential (Holtbrügge & Enßlinger, 2005, pp. 22-24). This problem is even more true in the case of the so-called born globals, e.g. companies that are already internationalised in the start-up phase on a global scale, while previous internationalisation theories and models refer to mature companies or at least to companies already established in their home markets.

The born globals concept was first introduced by Rennie (1993). Born globals have special features that allow them, and also ultimately force them, to set up export business in the start-up phase to accelerate the market entry into several new geographic markets at the same time, to profit from their pioneer status as long as possible. Correspondingly high is their export ratio in relation to the company's age. The reason for this lies in the narrow market segment (niche), which born globals occupy. This means that the home market becomes too small very quickly or is too small from the beginning, so that internationalisation in the start-up phase is mandatory to profit from the competitive advantage and pioneer premium for the longest possible time to generate revenue for financing the next innovation step (Wesseley, 2010, p. 37).

Technology companies are frequently seen as born globals architype (Kutschker & Schmid, 2006, p. 1162). With their firm-specific innovation resources, they usually constitute a new market which is, at least initially, too small for larger companies, so that the entry barrier is higher for larger corporations so that the high specialisation of technology start-ups protects from competitors with a high financial power prolonging the period of pioneer profits (Pock, 2011, p. 24).

Often, products and services of born globals are a customised combination of special service or product features delivered for specific customers (Wurster, 2011, p. 191). This advantage can only hold long enough to reach a reasonable size when born globals start internationalisation more or less at the same time as

they enter the domestic market. Otherwise, as it happens all the time in high-margin markets, international companies with more disposable resources develop competing services or products and push them very quickly into the market due to having more financial resources (Fuchs & Apfelthaler, 2009, p. 158), with the result that the necessarily high early-stage investment of technology start-ups is lost.

Although some companies already internationalise relatively early in the corporate lifecycle, this does not mean in principle that these companies are also born globals. Many companies, particularly from countries with a relatively smaller economy, such as Denmark, Sweden, Singapore and other countries, internationalise early in the corporate lifecycle due to narrow domestic markets for specialised products and services (Autio, Sapienza & Almeida, 2000, p. 909). Here, it is appropriate to call them "*global startups*" or "*instant internationals*", as they have, with the start of their businesses, a significant global competitive advantage (Mathews, 2002, p. 29; Oviat & McDougall, 1994, p. 49; Servais, Madsen & Rasmussen, 1997).

However, these companies are not as integrated in a global value chain network as are born globals on from the beginning. Instead, global start-ups establish a global network in the seed phase, which is the main difference between born globals and global start-ups. Born globals do not have the explicit objective to internationalise; however, due to their cooperation with other companies on a global scale already at the development and seed stage, which is necessary to develop their specialised products and services, they are already internationalised prior to launching the product (Pock, 2011, p. 115; Hollensen, 2007, p. 77). However, the fundamental question arising here is how already existing in the seed phase of internationalisation occurs. Here, born global research provides the same answers as international entrepreneurship research. Vision, vigour, networks and personality traits of the founder or the top-management team are the decisive factors for early internationalisation (Autio, Sapienza & Almeida, 2000, pp. 909-910; Pulkkinnen, 2006; Cavusgil & Knight, 2009, p. 11). Thus, it is clear that born global research is basically the application of the international entrepreneurship approach but in the special case of fast-growing technology companies. This is evident already in the fact that only a few

studies on born globals deal with companies from other sectors (e.g. Servais, Madsen & Rasmussen, 1997).

However, while on the one hand, the ‘skipping’ of the stage ‘development and penetration of the domestic market’ is considered a new phenomenon and a distinct characteristic of born globals, this is, on the other hand, also the reason for their frequent failure, because they do not internationalise step by step and, thereby, slowly build up experience. The empirically measurable result is that born globals fail disproportionally more often and go bankrupt more frequently than other start-up companies (Cavusgil & Knight, 2009, pp. 11, 43; Chetty & Campbell-Hunt, 2004).

In general, the following characteristics are constitutive elements of born globals:

(1) Born globals introduce a new product as an unknown provider with a small budget simultaneously in several geographical markets without testing their products in the domestic market before internationalisation because of their limited resources (Lehmann & Schlange, 2004, pp. 206-208; Wurm & Harmsen, 2012, pp. 20-21).

(2) They are already developing products and services that meet the distinct needs of multiple national markets before company foundation.

(3) The capital requirements of born globals exceed, already in the seed phase, the capital needs of companies seeking step-by-step growth and internationalisation. This also increases the risk of failure considerably (Lehmann & Schlange, 2004, pp. 207-208, Wurm & Harmsen, 2012, p. 24).

(4) The success of born globals is highly dependent on managerial and entrepreneurial skills to master simultaneous founding and internationalisation (Lehmann & Schlange, 2004, pp. 207-208; Wurm & Harmsen, 2012, pp. 69-85).

2.1.5 Theory of the Multinational Enterprise

The ‘internationalisation theory of the firm’ and the theory of the multinational enterprise (MNE), respectively, is based on the transaction costs concept. Coase

(1937) stated that the transactions on markets are associated with transaction costs, irrespective of whether they are organised within the firm (internal) or between the firm and external agents or entities. The reason for the existence of firms is that costs of specific transactions can be lowered by founding a legal entity, so that the market is internalised. Based on this concept, Buckley and Casson (1976) have developed a theory of the multinational enterprise. This theory assumes that benefits from reducing transaction costs are even larger when the firm internalises value chain operations across borders, which Buckley (2014) describes as the "*rise of the global factory*" (p. XVI).

The benefits of the global factory may particularly arise when domestic markets do not provide specific resources for the company or in the case that the internal transaction costs can be reduced by using factor cost differentials (comparative cost advantages) existing between different countries (Buckley & Casson, 1987). However, this explanation only explains that internationalisation and growth are somehow linked but does not provide a basis for determining when firms decide to 'multinationalise', which is not only exporting in the context of internationalisation.

Also, macroeconomic theories of foreign direct investment do not provide a final explanation. Posner (1961), Hirsch (1967) and Veron (1966; 1974) considered that technology gaps between countries may trigger 'mulit-nationalisation' because companies seek to incorporate new skills and knowledge for further growth. Vernon (1974) used this assumption in combination with the product lifecycle concept stating that firms multinationalise when their products have reached a maturity stage in the domestic markets and innovation is needed. Yet, Cantwell (1995) as well as Hakanson (1992) criticised this assumption indicating that particularly innovation leaders are not necessarily sourcing research and development (R&D) resources globally. However, Pavitt (1987) and Cantwell (1989) noted that steady generation of innovation and international production are a self-enforcing process leading to an oligopolistic dominance in some market segments.

Companies learn to source and increase globally experiencing incentives not only in the form of cost advantages but also in the form of self-enforcing synergies.

However, the main pattern that can be recognized in most theories and concepts of internationalisation or multinationalisation, respectively, is that there is not only one trigger, reason or threshold marking the transformation of the firm from a one-country firm to an international or multinational firm. Yet, switching between the modes one-country firm (with businesses only in the domestic market), international firm (with businesses in one market abroad) and multinational firm (with businesses and operations in several markets abroad) seems to be rather a stochastic process than a rational decision-making process (Sachse, 2012, pp. 351-360, 375-377) and can, therefore, not be explained or predicted through microeconomic or macroeconomic theories.

However, the theories of internationalisation discuss the circumstances under which the benefits of internationalisation outweigh their disadvantages. They pronounce the benefits in terms of efficiency and profitability of foreign investment. Almost all theories of internationalisation discussed in the literature implicitly assume that decisions in enterprises are always in line with the goal of profit maximisation (Glaum, 1995, p. 2). A different view is taken by the principal–agent theory of internationalisation. Penrose (1959), Baumol (1959), Williamson (1964) and Marriss (1964) can be seen as precursors of the principal–agent theory assuming that managers were not aiming at maximising profit but maximising revenues (Glaum, 1995 p. 79). These assumptions about the investment behaviour of manager-led enterprises are justified by the fact that the personal goals of the managers are most likely to be fulfilled by the formation of a large and as diversified as possible enterprise. Besides the problem of inefficient management compensation schemes, ‘empire building’ to fulfil the management’s quest for power, prestige and self-fulfilment through ‘challenging’ activities are also an explanation of recent research for forced internationalisation (Tulder et al., 2017, p. 446)

After all, the manager is interested in the security of their employment. While shareholders generally derive their income from diversified portfolios, at least in the model-theoretical world, the manager is primarily dependent on his earned income. Therefore, it affects the overall risk of its business, as opposed to the shareholder, which can reduce the systematic risk of a single investment by diversifying the portfolio (Tichy, 1990, p. 455), whereas international

diversification can be considered as another way for risk diversification (Furner, 2011, pp. 176-177).

Both arguments—'empire building' and diversification—have been used for some time in the financial literature mainly to explain acquisitions. Numerous studies using different research methods have found high failure rates of corporate takeovers; M&As are not leading to the increase of firm value and, thus, the increase of shareholder value (Hassan & Ghauri, 2014, pp. 60-62). From this perspective, acquisitions appear to be an instrument that enables managers to pursue their quest for expansion, even when the opportunities for their internal growth have been exhausted, which may also be considered concerning internationalisation because internationalisation is often linked to M&A (Hassan & Ghauri, 2014, p. 63).

The criticism of these explanations is directed on the argument that the principal–agent theory is strongly focused on a group of people. Although the top management team undoubtedly has a central role in strategic decisions, in reality, there are other groups involved in the internationalisation process, such as middle management, staff departments, banks and external consultants (Bonnafous-Boucher & Rendtorff, 2016, p. 44).

In this context, the question arises as to what consequences both reasons for internationalisation lead. Internationalisation itself is subject to manifold risks, such as transaction costs, asymmetric information and control costs concerning value chain partners, currency risks, imperfect information on markets, laws and other factors. Internationalisation as a result of empire building motivation and 'employee hazard diversification' may lead to additional risks due to non-rational decision-making. Williamson (1985) has not only examined and modelled principal–agent problems but also the problem of asymmetric information in the internationalisation process resulting in transaction costs. Teece (1986, pp. 21-30) and Hennart (1985, pp. 1-9; 2012, pp. 182-185) have applied Wiliamson's approach to internationalisation research to develop a theory of the multinational enterprise (MNEs). They note that transaction cost risks lead to the internalisation of internationalisation to avoid control costs with an extended partner network in various countries with different jurisdiction, market conditions, consumer and

customer preferences and other factors, whereas internalisation means mainly M&A instead of Greenfield activities, but at the price of size-related inefficiencies. Buckley (2016, pp. 76-80) notes that the theory of the multinational enterprise and is confirmed by several empirical studies arguing that internationalisation is the management's approach for better risk controlling in terms of avoiding control costs resulting from asymmetric information occurring from market transactions instead of incorporating existing businesses.

Academic research on multinational enterprises (MNE) focuses on two traditions, which were described by Buckley and Hashai (2005, p. 655) as 'economic school' and as 'managerial school':

- Economic theories of foreign direct investment are located at the interface of microeconomics and economics. They try to explain why direct investment is taking place between which countries and in which sectors.
- Management theory has developed concepts of the organisational and management structures of multinational companies and tried to explain them through different corporate strategies.

The currently dominant theory of the multinational enterprises and direct investment was developed in the 1970s by Dunning (1977; 1979; 1993; 2000). This approach, also referred to as eclectic theory, combines elements of previous direct investment theories, notably of Hymer (1976), which saw multinational corporations characterised by the transfer of proprietary resources, elements of geographic advantages (location theory) and transaction cost theory (Coase, 1937; Williamson, 1975), which had already been applied to multinational companies by McManus (1972) and Buckley and Casson (1976). According to their eclectic paradigm, direct investment has three conditions (Hofmann, 2013, pp. 102-104):

- The investing company must have an ownership-specific advantage (O-advantage) providing a competitive advantage over other companies operating in the foreign country. These business benefits may arise from different competencies in the areas of product or production knowhow, marketing, finance or management in general are based on specific assets of the acquiring firm buys.

- The target country must provide a location-specific advantage (L-advantage). This location advantage may consist in particular of low factor costs for simple or highly skilled workers, energy and other intermediate products or low tax burdens; but also, easier access to the market, be it due to import restrictions, high transport costs for export market supplies or other customer proximity requirements.
- Finally, there must be an internalisation incentive advantage (I-advantage), i.e., it must be more favourable for the investing company to use its advantages abroad itself than, for example, sell licenses or other contracts to third parties, resulting in reducing transaction costs through foreign direct investment.

It is crucial that all three conditions are fulfilled at the same time, so that there is a direct investment:

> "The more a country's enterprises possess ownership specific advantages, relative to enterprises of other nationalities, the greater the incentive they have to internalize rather than externalize the use, and the more they find it in their interest to exploit them from a foreign location, the more they (and the country as a whole) are likely to engage in international production." (Dunning, 1981, p. 31)

This scheme—also known as the OLI paradigm—can well explain internal company growth. However, in general, research on foreign direct investment and multinational corporations deals with M&A (external growth) rather marginally. For example, Rugman and Brewer (2003) in their 'Oxford Handbook of International Business' deal with the M&A topic only one and a half pages of more than 800 pages in total. Also, Dunning (1993) handles takeovers only marginally in his standard reference 'Multinational Enterprises and the Global Economy'. The peculiarity of external growth through acquisitions is that the investor does not combine only his own O-advantage with the L-advantage of another location.

O-advantages of the other company can also play an important role. However, O-advantages of acquisition objects, which are associated with their historically grown regional structures, are not theorised in the eclectic theory of foreign direct investment and cannot be integrated into the OLI paradigm (Hofmann, 2013, p.

104). However, theoretical problems arise from a systematic consideration of takeovers for the concepts of the O-advantage and the I-advantage, which are not included in the O-advantage concept (Dunning & Lundan, 2008, pp. 119, 120-123).

The concept of I-advantages seems to be relatively unproblematic at first. It seems obvious that a takeover must be given an I-advantage. Only a unified management will be able to realise the synergy effects that often form the decisive motive for takeovers. However, it is conceivable that the synergy effects are not only based on a wider use (economies of scale and scope) of the O-advantages of the investor but also on a wider use of the O-advantages of the investment property through their transfer to locations of the investor (Dunning & Lundan, 2008, p. 119).

At this point, it seems appropriate to make a comment on a paradigm that seeks to explain FDI solely by the advantage of internalisation, and to which Dunning also refers in his conception of the I-advantage. Surprisingly, however, in particular researchers following this paradigm examine external and internal growth only as different forms of market entry (e.g. Caves & Mehra, 1989; Caves, 1996; Buckley & Casson, 1976, 1998). Acquisitions are interpreted both as an alternative to new investments and as an alternative to export. This interpretation is based on the assumption that the investing company intends to enter a new market and exploit its own O-advantage there. The eclectic theory assumes that the O-advantages relevant for making a direct investment are owned solely by the investing company. This is also the case with many acquisitions: Often, the product range, production facilities and the organisation of acquired companies are being profoundly transformed by means of a transfer of O-advantages from the acquiring company. But even in these cases, as with all takeovers, at least if they are to be successful, the buyer needs very specific company advantages, such as adequate access to finance or even the ability of the management to incorporate the newly acquired company and to integrate and realise synergy effects after the takeover (Hofman, 2013, pp. 114-118). In this respect, it can be argued that the investor must always have crucial O-advantages (Dunning, 2000; Dunning, 2003).

Of the three conditions of the OLI paradigm explaining FDI, the L-advantage in acquisitions is the most problematic. In the case of external corporate growth through takeovers, the investor does not combine own O-advantages (only) with the generally available L-advantages of the acquisition target but (also) with the specific O-advantages of the asset being acquired. The L-advantages of the target country are often of secondary importance. In many cases, takeovers even take advantage of location disadvantages. A stringent consideration of location advantages is no longer possible by the investor, especially in the case when not single factories but entire multinational companies are taken over (Hofman, 2013, pp. 114-118).

Where acquisitions in the context of the eclectic paradigm or related theories—especially the internationalisation theory—are addressed, this usually happens under the keyword *entry mode* (Brouthers et al., 2015, p. 145). Besides exports, acquisitions and new investments are interpreted as different forms of market entry between which the investor has to choose (e.g. Caves & Mehra, 1989; Caves, 1996; Buckley & Casson, 1998). In fact, it is conceivable that acquisitions constitute a particular form of market entry, but the idea that takeovers are an alternative to Greenfield operations must be seen critical, particularly in the case of O-advantages, because if a company has an O-advantage in a foreign market the acquisition of another company in the target market can only lead to buying market shares (Hofman, 2013, pp. 114-118).

Time and again, empirical studies have been conducted into why foreign direct investment is made in which countries. One of the most commonly tested variables is labour costs in host countries, which may represent a crucial L-advantage in the theory of direct investment. Various studies (e.g. Lortz, 1993; Moore, 1993; Braunerhjelm & Lipsey 1998; Jost & Nunnenkamp, 2002 and the literature mentioned in Dunning, 1993, pp. 137-140) agree that low labour costs as an explanatory factor of international direct investment play no or, at most, a minor role. The size of the market or the comparative advantages of the host country are the most relevant factors in these analyses based on statistical analysis.

The same result is also described in surveys in which companies were asked about their investment motives. It is noteworthy, however, that the investment mode (internal or external) is not inquired in some studies (e.g. Beyfuss & Kitterer, 1990; Löbbe et al., 1997; Beyfuss & Eggert, 2000; Kinkel et al., 2004a, 2004b; Lau et al., 2005). In particular, these surveys lack the data of investment motives that are especially relevant for takeovers, such as the acquisition of knowhow or market shares (established customer relationships) or other company advantages. Therefore, Raines and Döhrn (1999, pp. 36-37) state that several studies show questionnaire misconception, because companies that have grown through takeovers only may not be able to offer alternative answers. Furthermore, it is also striking that empirical studies (e.g. Lorz, 1993) conclude that the proximity of the destination country and the EU membership correlate positively with the volume of German foreign direct investment, since these markets are relatively easily supplied by exports from Germany. These investments can only be explained by acquisitions for which location advantages are not decisive.

The earlier versions of the OLI paradigm were, at least implicitly, suggesting that the transfer of O-advantages is a one-way street from the target company to the parent company. Cantwell and Dunning (Cantwell, 1989; Cantwell & Dunning, 1991) later relativised this one-sidedness. They showed that foreign subsidiaries are often concentrated in agglomeration areas and that multinational companies also use the O-advantages developed there throughout the group. However, they initially assumed that the O-advantages of the foreign subsidiaries were created within the company, as foreign subsidiaries use L-advantages, such as an innovation-supporting environment and the availability of skilled labour (Dunning & Lundan, 1998). Later, Dunning introduced a typology of foreign direct investment (Dunning, 1993, pp. 56-62) that distinguishes between four foreign engagement goals:

(1) resource seeking (sourcing of raw materials and other factors of production, such as cheap labour),
(2) market seeking (access to a market),
(3) efficiency seeking (exploiting economies of scale and scope),
(4) strategic asset or capability seeking.

In the latter type, companies try "*usually by acquiring the assets of foreign corporations, to promote their long-term strategic objectives—especially that of sustaining or advancing their international competitiveness*" (Dunning, 1993, p. 60). Thus, the possibility is seen that company-specific capabilities, which are located in the investment target, can be an important motive for direct investment (Eden, 2003, pp. 253-257). Dunning does not refer to these as O-specific advantages. This concept is not systematically tied back to the OLI paradigm (Eden, 2003, pp. 253-257). The typology of the four investment motives stays beside the eclectic paradigm and does not correct its deficits (OECD, 2001, p. 35).

Foreign direct investment theories, Dunning's eclectic theory in particular, assume international growth of multinational companies as a 'normal case' for multinational companies. However, as overseas growth becomes more important through acquisitions, the explanatory power of these theories, which have systematically ignored the peculiarities of external growth, is diminishing significantly. Company-specific advantages of the investment object (assets or capabilities) relativise the investment-critical importance of the company-specific advantages (O-advantages) of the investor; but in particular reduce the importance of location advantages (L-advantages) of the target country or even the acceptance of location disadvantages.

To sum up, Dunning's eclectic FDI theory ignores external growth (through acquisitions) despite its obvious importance (Hofmann, 2013, p. 114), which is probably the result of Dunning's claim to provide "*a general explanation of international production*" (Dunning, 1993, p. 80; Dunning & Lundan, 2008, p. 103). Dunning's theory aims at supplementing the classic trade theory by explaining when and why foreign markets are supplied not by export but by production abroad, or when production is relocated abroad. However, the case of acquisitions, the investor just does not make any location decision in the narrower sense; and acquisitions have, at least indirectly, no impact on the international production and trade structures. Through takeovers only the ownership changes.

A theory explaining the international external growth of multinationals as well as theory explaining internal growth of multinationals is currently not in sight

(Wortmann, 2008, p. 133). Since multinational companies grow primarily through acquisitions, this also means that there is currently no viable general theory available on foreign direct investment or on the development of multinational companies (Wortmann, 2008, p. 133).

In the mid-1980s, economists – following the new economic geography of globalization – developed new models to explain the internationalisation of enterprises (Wortmann, 2008, p. 133). These models assume that internationalisation leads to economies of scale. The approach developed by Helpman (1984) assumes that internationalisation processes are vertical in nature and that multinationals work their activities along the value chain, taking advantage of the comparative cost advantages between home and host countries and internal economies of scope to different countries.

The approach developed by Markusen et al. (Markusen, 1984; Markusen & Venables, 1998; Markusen, 2002; Markusen & Maskus, 2002), yet, assumes that economies of scale emerge in the area of headquarter services, e.g. in the area of research and development as well as in management functions, such as financing and the application of larger technological systems such as IT-infrastructure.However, similar to the older direct investment theories, takeovers do not come into view in both approaches. Jungnickel and Keller (2003) criticise Markusen's approach for not making asset-seeking investments that are predominantly made through takeovers. Therefore, such theories lose the ability to adequately explain the internationalisation of multinational companies.

Systematic consideration of external growth is a prerequisite for a comprehensive understanding of the causes of direct investment and the internationalisation processes of multinational companies. Economic motives for takeovers can be assigned to two main groups (Kleinert & Klodt, 2000):

- On the one hand, takeovers allow for a variety of internal synergy effects, from diversifying risk or managing the acquired companies more efficiently to reducing transaction costs for vertical takeovers to an increase in efficiency that can be realised through the transfer of knowhow or through restructuring measures after the acquisition (Seth et al., 2002; Bertrand et al., 2004).

– On the other hand, takeovers can increase market power vis-à-vis suppliers or customers and, thus, secure mono- or oligopolistic advantages.

To develop a similarly concise paradigm for the external growth of multinationals as Dunning's eclectic theory of internal growth as the basis for the general theory of multinational companies, such a theory would have to explain not only international acquisitions as such; but also, why these entities are made by companies in certain sectors from certain countries in certain other countries or groups of countries, such as the OLI paradigm does in the case of internal growth. Approaches to such a theory seem to be nowhere in sight. There is even evidence that such a theory is not possible to develop and, in particular, that the location characteristics of the target countries for acquisitions are often irrelevant (Schief, 2000; Schief, 2003; Dunning, 2003, p. 36).

Since no theory that can explain external business growth abroad is in sight, the economic school theory of multinationals still sticks to a model based on the assumption that companies grow internally focusing on growth through international relocation, acquisition and restructuring of production or R&D (Wilson, 1999, p. 99; Wortmann, 2008, p. 136). Yet, the research perspective is at investigating the 'classic firm' with a strong headquarter and major operations in the home country and satellite activities in foreign countries.

Management-theoretical approaches investigate and explain internationalisation with the focus on management structures and operations following Chandler's assumption that structure follows strategy (Chandler, 1962). Strategy refers to the operational orientation of the company's activities with the aim of supplying certain markets, called configuration by Porter (1989). Structure, on the other hand, refers to the management structure, which is called coordination by Porter. It is assumed that companies set up their management structure in such a way that the operative tasks can be optimally managed. Current management-theoretical theories of the multinational enterprise pronounce the transnationality of modern corporations acting in several countries. According to them, the global strategy leads to two different and opposing processes: (1) The decentralisation of the value chain, and (2) the centralisation of corporate functions and business

administration in particular (Wilson, 1999, pp. 99-101; Wortmann, 2008, p. 190) resulting in reality in network-like, transnational companies, increasingly growing externally through takeovers and trying to achieve synergy effects through cross-border centralisation of their own and acquired activities.

Compared to the OLI-paradigm research, these activities – based on a globalization strategy – leads to different corporate architectures in which companies leave the classic centre-periphery pattern. Therefore, since the late 1980s, the concept of transnational companies (TNC) has been increasingly used in the globalisation debate (Chung, 2014, p. 14). TNCs can be described as "*polycentric, networked entities*" (Mense-Petermann, 2006, p. 65), while multinational corporations are more like a network of similar structured branches (Korff & Heidenreich, 1991, p. 2). Basically, the model of transnational companies goes back to Bartlett and Ghoshal (1989). They distinguish between different cross-border types of companies. Thus, a TNC differs from an international, multinational or global enterprise primarily in three aspects:

> "It builds and legitimizes multiple diverse internal perspectives to sense the complex environmental demands and opportunities; its tangible assets and management capabilities are distributed but are interdependent; and it has developed a robust and flexible internal integrative process." (Bartlett & Ghoshal, 1992, p. 477)

The cross-border structure and division of labour within transnational companies encompasses all location-specific corporate activities and, thus, includes all production sites and branches (Eckardt et al., 1999, S. 174). Against this background, a large number of internal exchange processes exist within the transnational network. This includes the cross-border transfer of both tangible and intangible benefits and resources. For example, numerous (intermediate) products along the value-added architecture are transferred across borders and information and knowledge are exchanged between the business units. In addition to cross-border supply and service flows, there is also an exchange of personnel within the internal network via expatriates and the development of

standalone and cross-border project groups and teams (Kotthoff, 2006, pp. 280-281).

As a result, TNCs have a high proportion of in-house transactions, which are handled transnationally within the framework of “transnational” organisational boundaries. These exchanges are largely embedded in internal hierarchies between the business units of the network. The predominantly hierarchical relationships within transnational corporations seem necessary to facilitate the division-of-labour regional-complementary cooperation along the value-added chains, the need for constant and intensive coordination between the corporate units (Klemm & Popp, 2006, pp. 191-192).

Transnational companies are a hybrid of organisational forms. Powell (1990, pp. 295-336) considers networks as completely independent forms of coordination alongside market and hierarchy (e.g. Teubner, 1992; Klein, 1996; Thorelli, 1986), the network within this work is considered a hybrid. Accordingly, the form of the network is positioned in the continuum between the extremes of market and hierarchy (Williamson, 1985; Jarillo, 1988; Miles et al., 1992; Sydow, 1992). Consequently, TNCs are hybrid forms for organising economic activities containing both market and hierarchical elements within their organisational structure. Multinational corporations acquire relevant resources for value creation, which are not available internally using their growing management capacities increasing with each overseas acquisition, which leads to the core competence for centralisation processes. Centralisation, thus, takes place not only in the home country of the entire group but also in the home countries of the acquired companies and, in some cases, also in locations of companies previously taken over by them. On the other hand, after acquisitions and mergers, especially due to sunk costs, there is never really any comprehensive integration and site consolidation, so that various value-added activities in Germany and abroad are often considered suboptimal locations by the respective group management.

Consequently, it can be noted that internationalisation means in the the first step the founding of subsidiaries (FDI), franchising, joint ventures or other forms of market entry strategies. In a second step, internationalisation results in

multinationalisation, which means that the company links different value chain components located in several countries generating a rising vertical or horizontal depth. The third step is transnationalisation. The transnational company has developed not only core competencies in terms of products and operations but also in organising the internationalisation process. The company has developed intangible assets in the form of competences in managing international value chain networks.

The concept of the network-like, transnational company overcomes the prior concepts of external and internal internationalisation. In reality, companies are increasingly growing externally through takeovers and trying to achieve synergy effects through cross-border centralisation of their own and acquired activities resulting in restructuring processes on the global scale. A global management structure expresses that corporations are no longer seeking to achieve synergy effects of various kinds primarily through coordination of various activities at the national level but through cross-border coordination in globally converging industry markets. In the context of converging global markets, intensifying product-related coordination (global integration) across national borders brings greater benefits than country-specific coordinatiion: "*Transnational companies have the ability to leverage different factor costs and factoring because of their vast production networks*." (Berndt, 2004, p. 95)

Internationalisation is seen in the theory of transnational companies as the emergence of transnational corporations as a network made up of many globally scattered and largely self-responsible units, between which there is an intensive exchange of parts, products, people, resources and information is which is supported and controlled by a central management, but not directed (Bartlett & Ghoshal, 1989; Hirsch-Kreinsen, 1997). Furthermore, the company integrates the dispersed resources:

> "The transnational centralizes some resources at home, some abroad, and distributes yet others among its many national operations strong interdependencies." (Bartlett & Ghoshal, 1989, p. 60)

What researchers share with this approach is that they understand the transnational corporation as a product of corporate dynamics in response to

changing and more complex world market conditions, without, however, addressing external and internal growth as separate (Berndt, 2004, p. 146). But in the end, it is their essential contribution to the description and explanation of internationalisation and the theory of multinational enterprise longer seeks mono-causal explanations in terms of searching for dominant reasons for internationalisation.

2.2 Theories of the Firm and Firm Growth

2.2.1 Theory of Firm Growth

According to the classical theory, the firm is to a greater or lesser extend shaped by cost optimisation activities forced by the market (Barca, 2017, p. 157). Differences in growth rates of companies active in the same markets are the result of differences in the combinations of input factors resulting in firm-specific cost structures. However, market efficiency leads to an equilibrium price so that cost structures of competing companies converge levelling larger differences in the firm performance (Becerra, 2009, pp. 12, 46-47). Consequently, internationalisation in the context of microeconomics is simply the expansion of supplier and demand markets, which leads to cost advantages and larger markets while firm-specific resources as the basis of firm-specific competitive advantages, positioning and market-entry strategy selection are insignificant in explaining firm growth (Beugelsdijk, 2013, pp. 190-192).

Theories of firm growth expands the complexity of firm growth explanations. While the microeconomic view considers the firm as entity determined by the more or less efficient adaption to market price fluctuations, more management-oriented approaches consider the firm as market maker (Holsapple & Oh, 2018, p. 370). Furthermore, microeconomic models and the neo classical models, respectively, are based mainly on theoretical reflections and mathematical models. On the contrary, the theory of the firm explains growth beyond microeconomic mechanics and market cycles (Taehakkyo, 1996, p. 9). Wach (2012, p. 44) identifies seven different models of theory of the firm growth models.

(1) Deterministic models explaining growth as a result of several different internal and external factors, whereby time-independent dominant factors can be observed and measured.
(2) Stochastic models explaining growth as depending on many factors, of which none is dominant. Instead, they are changing continuously, so that they cannot be separated.
(3) Corporate lifecycle or stage models describing growth as a succession of stages with specific challenges for the organisation, which must be mastered by the management to avoid so-called growth pains.
(4) Resource-based theories of firm growth explain growth by firm-specific resources such as firm-specific skills, products and other distinct characteristics leading to a better market positioning and the possibility to create continuously new markets or new products for existing markets.
(5) Learning models as a specific form of resource-based theories explaining growth as a result of firm-specific skills and knowledge.
(6) Managerial models explain growth through management decisions and strategy selection.

Except the evolutionary and company lifecycle models, the mentioned models are based on theoretical considerations and are the basis for multiple empirical studies in firm growth research. Instead, evolutionary and company lifecycle models are often descriptive and have not generated a considerable number of empirical research, so that such models are excluded from the discussion of firm growth models in the following section.

2.2.2 Stochastic Growth Models

The stochastic theory is based on the research of Gibrat (1931), Mowery (1983) and Evans (1987). Gibrat (1931) has investigated the statistical distribution growth rates in relation to firm size resulting in the so-called Gibrat's law of proportional effects stating the independence of growth rates and firm size (e.g. Evans, 1987; Geroski et al., 1993; Sutton, 1997; Dosi, 2005).

However, empirical studies based on stochastic models find only contradictory evidence (e.g. Evans, 1987; Reichenstein & Dahl, 2004; Bottazzi et al., 2011).

Evans (1987) as well as Reichenstein and Dahl (2004) question the explanatory power of the stochastic theory. Laitinen (1999, p. 47) examines Finnish firms finding evidence that the class including the smallest companies tends to grow excessively faster than the class including larger companies, which is contradictory to Gibrat's law. Studies examining large companies find that Gibrat's law failed because firm growth decreased with firm size (Kumar, 1985; Evans, 1987; Hall, 1987). Also, recent empirical evidence based on the analysis of firm-level data of European companies (e.g. Reichstein & Jensen; 2005; Bottazzi et al., 2002, Bottazzi et al., 2011; Duschl et al., 2011) as well as industry-level data indicate that growth rates are not normally distributed (Bottazzi et al., 2011), so that the stochastic firm growth theory can be seen as at least questionable.

Stochastic models consider a multitude of factors as causes for firm growth, of which none is dominant. Therefore, firm growth must be viewed as a stochastic process, on which many factors converge (McMahon, 1998; Bottazzi & Secchi, 2003; Bottazzi et al., 2002; Bottazzi et al., 2011). However, if firm growth was random, basic rules of success or the 'one best way' to firm growth cannot exist. Critics of the stochastic view state that "*sometimes the growth is observed as stochastic, but it would seem that the underlying process is indeed deterministic.*"" (Relander, 2011, p. 65).

2.2.3 Resource-Based and Learning Growth Theories

Following the stochastic approach, internationalisation can be seen as only one of several factors explaining firm growth ignoring learning effects, firm-specific advantages due to firm-specific resources and other possible factor with cumulative positive effects over time explaining an upward trend in firm dynamics (Ferragina et al., 2014, pp. 1-3). Seht and Chi (2006) considers the resource-based firm growth theory as the "*intellectual roots of internalization theory*" (p. 107). According to the resource-based firm growth theory, growth depends on the combination of internal competences and resources (such as the employees' human capital, the managerial and entrepreneurial social capital), tangible capital (such as plants, machines and other tangible assets), financial resources (such

as the availability of organisational capital (e.g., incorporated skills and knowledge), debt capital or private equity, and other essential resources.

According to Penrose (1959, p. 1), growth as an improvement in quality or an increase in size as a process of development. Growth results from internal activities and by taking opportunities as well as from external events effecting the firm's operations (Penrose, 1959, p. 2). Firm growth requires increasing inputs, such as human and tangible resources, to match increased demand. Therefore, management attempts to change the conditions of the firm's markets operations by avoiding both excess demand by pricing policy and marketing activities as well as avoiding spare capacity and maximum utilisation over a longer period. Consequently, management spends considerable time for getting demand in line with resources supply.

According to Penrose (1959, p. 5), the firm is a portfolio of intangible and tangible resources. Consequently, management can be considered as the management of a portfolio of firm-specific resources. However, identical resources are not equal for any two companies (Penrose, 1959, p. 5). Differences in the uses of identical resources exist between companies (Penrose, 1959, p. 25). Consequently, the management's task is to activate, to integrate and discover new resources or unused existing resources or the recombination of resources available within or outside the firm for new services and products (Penrose, 1959, pp. 85, 145).

But although Penrose's theory has gained only a limited influence in economics and business administration research (Petilis, 2010, p. 2) Penrose's theory is often the starting point in firm growth research and is the basis for further models such as concept of core competencies, organizational learning and the knowledge-based theory of the firm (e.g., Hamel & Prahalad, 1990; 1994; Itami & Roehl, 1987; Nonaka & Takeuchi, 1995). Moreover, managerial theories are also rooted in Penrose's model explaining firm growth mainly by the management's 'visible hand' combining factors of production effectively and finding the right positioning and making the right investment decisions to meet future market demand.

2.2.4 Managerial and Deterministic Growth Models

Deterministic models view firm growth as determined by firm-specific (internal) and external factors. The determinants can be identified by statistical data analysis (Davidsson et al., 2002; Barringer & Jones, 2004). Porter (1980; 1991) identifies cost or customer advantages as the sources of firm performance. Firms with a higher market share and lower costs can benefit from scale effects resulting in higher forcing other companies to leave markets while the remaining firms incorporate the market shares of the firms forced to leave the market (Buzzell et al., 1975). Consequently, firm size growth results from productivity differences leading to the increase of market shares and from 'right' decisions in the area of positioning allowing to enter new high-growth markets so that these firms can avoid suffering from decreasing returns in mature and declining markets (Capon et al., 1990). Consequently, deterministic models of firm growth are similar to neoclassical theories and industrial economics, defining minimising costs and maximising profits and as well as the finding growth markets as the main management objectives.

Many instruments of modern management are developed based on the assumptions of deterministic theory of firm growth and industrial economics, such as the Boston Consulting (BCG) product-portfolio matrix, Porter's different models and strategy classification and other decision-making instruments (Morgan & Sturdy, 2000, p. 131). Therefore, both approaches can be summarized as market-based view (MBV) which is the antipode to the resource-based view (RBV) (Klug, 2006, pp. 7-8).

In the 1970s, the post-war upward cycle ended, so that the business research focus and, thus, the theoretical lens shifted. Firm growth in saturated markets was no longer achievable by adapting allocation of company resources with varying demand just through optimizing cost-efficiency (Klug, 2006, pp. 7-8; Schwenker & Spremann, 2009, pp. 91-94). Consequently, also the firm growth research focus shifted from RBV to MBV. The new overall research focus was the search for approaches to create additional and new demand instead of searching for the most efficient combination of firm resources to meet the changing demand (Schwenker & Spremann, 2009, pp. 91-94). The theoretical lens shifted to the market to explain how firm growth is realized int mature

markets. However, the market was no longer considered as a simple price-signal generator, but as – at least partly – designable by the management's 'visible hand' through generating new products and, thus, new demand (markets).

The basis for the RBV as a new paradigm arising in the context of the emerging management science in the 1950s. According to Drucker (1954), business is not allocating resources to generate products. Instead, a company creates satisfied customer (Drucker, 1954, p. 37). The idea that a company is not necessarily growing simply with its markets but by intentional decisions was further developed by Ansoff (1965). He developed a product-market matrix model of growth strategies intended as a strategic management instrument. Ansoff (1965, pp. 98-99) identified four 'generic' strategies can be identified: (1) market development, (2) market penetration, (3) product development, and (4) diversification resulting in product–market matrix (see Table 3) as the first analytical framework of rational strategy selection. His approach became the predominant paradigm in the management science in the 1960s and 1970s.

The 1980s showed the most advanced extension of Ansoff's growth management concept (Wöginger, 2004, p. 71) in the form of Porter's (1980) concept systemizing competitive advantages and assigning strategies (cost leadership strategy, niche strategy, and differentiation strategy. In the 1990s, additional concepts occurred developed as instruments for rational strategic decision-making, such as the growth companies marketing matrix (Kotler, 1999, p. 47) as well as the models of Graumann (1994) and Schoppe et al. (1995) distinguishing different growth strategy concepts such as, for example, internal and external growth (see Table 3). However, the concepts of the Table 3 focus on management practice and not on explaining firm growth.

Table 3. Growth Types according to Ansoff (1965), Grauman (1994) and Schoppe et al. (1995)

Strategic Focus	Type of Growth
Product–Market Relationship (Ansoff's product-market matrix)	- Market penetration (existing product/existing market) - Product development (new product/existing market) - Market development (new market/existing product) - Diversification (new product/new market)
Direction of Expansion	- Horizontal (range extension to similar products) - Vertically (increasing the depth of range) - Concentric (diversification into new industry with similar products) - Conglomerate (diversification into new industry with new products)
Extension of the Firm's Capacity	- External extension (acquisition of existing capacity) - Internal extension (additional capacity created by the company itself)
Growth Focus	- Quantity (e.g., revenue increase) - Quality (e.g., performance improvement)

Source: Ansoff (1965, p. 132); Graumann (1994, p. 501); Schoppe et al. (1995, p. 23).

Porter's generic strategies concept is based on the concepts of industrial economics postulating that the combination of production factors (combination of resources) must be appropriate to the market environment which leads to a competitive advantage (Porter et al., 2006, p. 400). The central concept of the Five-Forces Model is that growth is determined or limited essentially by the market structure. The firm-specific skills (core competencies) and resources enables to reach a superior market positioning leading to firm growth (Porter et al., 2006, p. 400). Consequently, Porter's concept can be considered as a RBV-MBW mix which is evident in his industry-structure analysis (Five-Forces Model) developed as an instrument for industry analysis to support strategic decision-making and corporate planning based on industrial economics.

Porter's industrial economics approach provided the basis for the Profit Impact of Market Strategies (PIMS) study (Haenecke, 2002, p. 166; Woywode, 2004, pp. 16–17; Thomas & Gup, 2010, p. 23). Originating in a research project of General Electric aiming on identifying business activities determining revenue and earnings growth by using statistical data analysis, the PIMS study has collected a large data set from different sectors and industries for a large period

(Neubauer, 1997, p. 437; Woywode, 2004, p. 16; Thomas & Gup, 2010 p. 2) providing empirical evidence that the increase of market shares is a main predictor for firm growth. Competitive advantages (customer or cost advantages) enables a firm to achieve higher market shares to realize scale effects resulting in outperforming competitors in terms of growth and profitability.

The PIMS study does not only analyse company-level data but strategic business unit (SBU) data which is – per the PIMS definition – a profit centre, division or product line. Ratios such as ROI (return on investment) and ROS (return on sales) and are applied as performance indicators. However, empirical evidence is relatively modest. Malik (2008, p. 152) states that the PIMs database analysis has provided 15 factors with an accumulative explanatory power of 30% in explaining the variance of the ROIC whereby the relative market share is considered as the most important explanatory variable (Buzzell et al., 1975, p. 98) explaining 13% of the ROI (Luchs & Müller, 1985, p. 88). However, PIMS critics state that only successful and industrial companies are included leading to a survivor bias and an industry-bias, while smaller companies or service-industry companies are significantly underrepresented (Homburg, 2000, p. 70).

2.3 Empirical Findings: Internationalization and Performance

Research that has been carried out over the past two decades on the success of internationalisation differs in numerous features. This makes the comparison and the evaluation of its results difficult. The reason for the difference is, first, a restriction common to empirical research, which is derived from the fact that empirical studies are always based on a specific sample collected at a specific time (or over a period of time) in a given country (or in several countries) and can, therefore, be compared only to a limited extent. The empirical research on the success of international companies, however, differs not only in its samples but they also come from different streams in economic research. They, therefore, use different methods and, on closer examination, also pursue different aims of knowledge. Hennart (2012) explains the differences as the result of competing models and theories of internationalisation, which lead to differences in using the same variables, depending on the research perspective, as dependent variables or independent variables. This issue becomes apparent, for example, in the case

of foreign direct investment. While some research uses this variable as an internationalisation performance measure, other studies include this variable as an explanatory variable to examine the cause–effect relationship with firm performance because FDI can be seen as an indicator for acquiring external resources as well as an indicator for internationalisation intensity (Hennart, 2012, pp. 169-170).

Fundamentally, two forms of empirical work must be distinguished also in these research fields: (1) data-based and (2) theory-based research (Glaum, 1995, p. 129), which can also be qualified as deductive and inductive approaches. Data-based research aims at systematic ways to gain new knowledge from the collected data for deriving theoretical hypotheses, whereby such an exploratory approach is appropriate in areas where there are still no precisely defined theories or opposing theories coexist. The latter serves the examination of an existing theory. Both approaches can be identified in the current internationalisation research, which is discussed in the following sections.

2.3.1 Internationalisation Process

In the past decade, internationalisation research focused much more on small and medium-sized enterprises (SME) than on multinational enterprises (MNE). The term SME refers to companies that do not exceed defined limits in terms of number of employees, sales revenue or balance sheet total. The classification usually takes place independently of the chosen legal form or the ownership structure. Companies that cross these borders are called large companies. According to EU Recommendation 2003/361/EC of the European Union, companies with more than 250 employees and an annual turnover of more than EUR 50m or a balance sheet total of more than EUR 43m are considered large enterprises.

The generally increasing research interest in SMEs results from the significant meaning of SMEs for the European economies (Cao & Autio, 2016). Therefore, recent empirical internationalisation seems to be dominated by an SME bias. Consequently, the research discussed in the following focuses mainly on SMEs.

Gedo (2011, p. 27) concludes, based on a summary of 32 empirical studies on SME internationalisation, that there is no uniform state of research regarding internationalisation paths or initiating and success factors. Furthermore, there is no evidence concerning the relevance of rational planning and strategy for internationalisation success. Many recent empirical studies on SME internationalisation cannot identify rational strategy patterns. According to them, planned strategic action cannot be found in the reality of successful companies (Coviello & McAuley, 1999; Hashai & Almor, 2004; Ruzzier, Hisrich & Antonicic, 2006; Haric et al., 2013). This is confirmed by the finding that SMEs usually first internationalise to a neighbouring country with which there is a certain cultural proximity and in which the company already has business contacts, mostly with suppliers or existing customers from the domestic market, which can be described by as a stage-wise process following the mentioned stage-model approach.

German SMEs and larger companies, which are renowned for their export success, typically internationalise without strategy. Stehr (2012, p. 38) has not found any evidence for a methodical approach in the selection of target countries in German SMEs in collecting qualitative data through interviewing 272 executives of German SMEs. However, this finding should not be regarded in a negative way. On the contrary, research findings provide evidence that an optimal and unique approach in the context of entrepreneurial internationalisation is not applicable to all companies alike (Stehr, 2012, p. 38).

Some studies find that successful SMEs focus on the actual strengths at home and seek, on this basis, a gradual growth with key customers and partners abroad (Ahlert et al, 2007, p. 55; Haric et al., 2013, pp. 103-110). Thus, it seems that successful internationalisation is not rooted in rational and planned approach but of a pragmatic approach in terms of seeking, finding and taking business opportunities, which can be also found in larger companies and even multinationals in certain industries, such as the retail industry (Burt et al., 2003).

The empirical SME research shows that, particularly at the beginning of internationalisation, there is no plan or internationalisation strategy. These are, if any, generated ex-post (Wiesner, 2005, p. 90; Garret & Covin, 2007, p. 13). SME

studies conclude explicitly that smaller companies successfully operate internationally without going through the particular phases of decision-making and planning sequences, as they are widely recommended in management literature (Ahler, Hesse & Kruse 2008, p. 54). On the contrary, improvising entrepreneurial activity is observed in practice as the decisive success factor (Ahler, Hesse & Kruse 2008, p. 68). In markets in which a company or its products are not known, the market entry's success depends on the management's ability to build networks and to develop the market (Merz & Stute, 2010, p. 47; Carsrud & Brännback, 2007, p. 27), in particular due to the SME-specific shortage in information, skills and resources (Meyer, 2006, pp. 7-8).

In contrast to the complex strategy and planning theories of the 'classic' international management theory, the U-model already explains internationalisation as an incremental process of recursive learning and gradual build-up of networks and market knowledge which is also supported by research on high-growth entrepreneurship, hidden champions and international entrepreneurship.

Smaller and medium-sized companies prefer to expand to neighbouring countries, irrespective of which surrounding target markets are interesting strategically and financially (Wolf, 2011, p. 148). The normal case of internationalisation in medium-sized and smaller companies is the use of business opportunities and existing contacts. Beginning from this, most companies slowly proceed from the "*known*" to the "*unknown*" (Blunck & Martin, 2011, pp. 135-136). This correlates with the findings of organisational theories. Organizations slowly gain experience and subsequently develop them further into a methodical approach based on organisational learning (Simon, 2007, p. 156).

Overall, the process of internationalisation involves high risks, even for large companies with extensive resources (Crick & Spence, 2005). Medium-sized and smaller companies avoid large-scale, risky and aggressive market entry strategies, particularly for cost reason (Wolf, 2011, p. 153). In the beginning, their focus is often only on export into one country, which is mostly due to customer demand from abroad (pull factor) or existing supplier contacts. On this basis, an average medium-sized company establishes a sales staff abroad, expand

continuously the sales activities. After archiving a specific level of sales volume and profitability, the establishment of a subsidiary company follows (Wolf, 2011, p. 154; Kutschker & Schmid, 2008, p. 823; Müller-Stewens & Lechner, 2005, p. 397).

Another special case in the field of internationalisation research is the hidden champions concept. This field of research is generally not explicitly internationalisation research but rather a part of the so-called success factor research. However, one of the driving success factors of hidden champions is internationalisation on their way to growth. The category ‘hidden champions’ emerged in the 1990s, founded by Hermann Simon who examined German growth companies. Since 1996, Simon has conducted a panel, the sample of which includes 1,316 companies of German-speaking countries (Simon, 2007, pp. 29-35). Hidden champions are defined as companies being European or global leaders in niche markets, generating a revenue of at least EUR 100m up to EUR 3bn and are not stock-listed, but mostly led by their owners so that it can be assumed that these companies are no driven by short-term interests of shareholders.

Hidden champions are successful through superior performance in a narrow and well-defined niche market, not through price wars and low-price/high-volume and cost leadership strategies but through specialisation and consequent quality leadership (Simon, 2007, pp. 29-35). The basis of their success is the positioning as a specialist in specific product and customer segments. They focus only on a few products, thus, on a few but profitable customer/market segments, which are too small in volume for larger companies with cost leadership and price-volume strategies. These niche markets are either established by themselves or they are specialised on a specific segment in mass markets and gained their quality leadership through continuous improvement, innovation and closeness to the customer. Therefore, they reject the general trend toward outsourcing and offshoring and rely on a deep value chain and a small range of products and services, so that they can control quality along the entire value chain itself (Simon, 2007, pp. 87-97).

Hidden champions aim not on what can be ‘just sold on the market’. Therefore, they tend not to behave opportunistically, as it is generally typical for manager-led companies (Hoefle, 2010, pp. 161-175). This is evident not at least because they often establish a new market with their products but also by the fact that the typical hidden-champion business takes place in low-involvement industries. Their products are generally neither trendy nor technologically disruptive (Rasche, 2003, p. 220).

In addition to the studies of Simon (2007, 2012), other studies on European and world market leaders among medium-sized and larger companies from German-speaking countries (Switzerland, Austria and Germany) exist. Especially consulting firms, such as McKinsey, Ernst & Young and Droege & Company have researched in the same direction (Meffert & Klein, 2008; Blommen & Bothe, 2008; Alter & Kalkbrenner, 2010), and there are other examples of this trend to investigate success factors of medium-sized and larger companies. These publications, as well as the recent publication by Simon (2012), achieve comparable results. The key success factors of hidden champions are (1) specialisation and high quality, (2) high added value ratio, (3) advanced internationalisation and (4) customer orientation.

Hidden champions can serve as best practice examples of successful internationalisation (Kutschker & Schmid, 2008, p. 246), although their internationalisation behaviour is “*unstructured or even chaotic*” (Kutschker & Schmid, 2008, p. 499). The average export share of a company in the hidden champions sample is 61%, with an average annual turnover of EUR 326m and an average of 2,030 employees. Approximately 70% produce industrial goods (Simon, 2007, p. 33). Hidden champions are heavily involved in the emerging markets, with a clear preference for China, India and Russia and a decreasing interest in transatlantic markets (Simon, 2007, p. 134).

Based on their general approach to “*create in-depth uniqueness and market leadership*” (Simon, 2007, pp. 168-171), the success of hidden champions is not driven by strategic planning but by emergent strategy, as particularly shown in their internationalisation paths. Thus, hidden champions correspond fairly precisely to the theory of international entrepreneurship: Own resources, notably

‘key employees’, entrepreneurial initiative and existing networks, are the essential basis for their success by taking advantage of opportunities and utilising company networks to enter new markets. This is all the more important, as hidden champions, like born globals, must internationalise relatively aggressively and early in the corporate lifecycle, because – due to their niche strategy – firm growth can only be realised through exiting the narrow domestic market very quickly (Simon, 2007, pp. 65-67).

Hidden champions are, therefore, as born globals, determined toward internationalisation. Due to their strategic positioning, internationalisation is not one of several options but the only one in which to grow. Their success is, therefore, highly dependent on their success in the internationalisation process. In this respect, hidden champions research is all the more relevant to the issue of this thesis because it combines the search for success factors with the issue of internationalisation. In other words, the hidden champions approach is not generally interested in internationalisation but in internationalisation success factors. However, the difference between the hidden champions studies and this study is that this research focuses on stock-listed companies allowing to include standardized and therefore comparable financial and other firm data while the hidden champions research mixes quantitative and qualitative data whereby the latter data are collected by surveys and are, therefore, difficult to reproduce while this research can be reproduced by any other research due to publicly available data. Moreover, the hidden champions research includes companies which are not required to account for according to international accounting standards which reduces the comparability of the included data among the hidden champions sample.

However, for hidden champions, internationalisation is a process that takes several generations and is not a ‘forced action’ but a slow learning and optimisation process due to limited resources (Simon, 2007, p. 82). The hidden champions of Simon’s sample prefer to internationalise, first of all, on their own by founding sales organisations in new markets (Simon, 2007, p. 121). To export their goods, they quickly establish subsidiaries abroad that do not only execute sales tasks but also parts manufacturing, so that they can meet specific customer requirements in the target market directly. This is all the more important because

proximity to the customer is one of the hidden champions' key success factors (Simon, 2007, pp. 132, 159-163).

Entrepreneurial leadership style is generally constitutive for hidden champions but also essential particularly in the context of internationalisation. It is characteristic for hidden champions that they are usually not managed by managers but by owners or managing partners (Simon, 2007, pp. 80, 330-340). Therefore, and due to the lack of reliable databases on the vagaries of distribution and procurement in the new target markets (Simon, 2007, p. 145), the entrepreneur is the driving internationalisation factor, so that hidden champions internationalisation is characterised by a "*warhorse approach*" (Simon, 2007, p. 145), which is also supported by the International Entrepreneurship (IE) research (e.g. Kutschker & Schmid, 2008; Manesh, 2011; Chandra et al., 2015).

As a result of hidden champions research regarding internationalisation, it can be stated:

(1) Hidden champions often follow existing customers and suppliers in their markets.
(2) They do not select target markets based on comprehensive, objective rational strategies and analyses.
(3) They are successful without a planning approach but due to situational activities of individual actors, i.e., by emergent strategies and feedback learning loops, which then structure subsequent steps for further internationalisation.
(4) The internationalisation of hidden champions is significantly dependent on entrepreneurship of the owner, managing partners and key staff.

To sum up the results of the hidden champions research, this approach has supported at least three research streams discussed above: (1) the resource-based theory of firm growth, (2) international entrepreneurship and (3) managerial theories. According the results of hidden champions research, the fundamentals of growth are firm-specific resources developed or consolidated more or less systematically by the firm's management or entrepreneurial activities, respectively. Based on the resulting qualitative competitive advantage, a hidden champions company can select a positioning in a niche market or create

a new market and a quasi-monopoly in this market, respectively. Furthermore, opportunity seeking (high entrepreneurial intensity) and using existing networks are additional requisites for success, whereas internationalisation is an important prerequisite for further growth due to the limits of the domestic niche market.

2.3.2 Internationalisation and Firm Performance

Theoretically, firms internationalise "*when the perceived benefits outweigh costs*" (Vithessonthi & Racela, 2016, p. 31). However, even today, there is little consensus among researchers on this assumption because empirical research has provided only mixed results (Vithessonthi & Racela, 2016). Ruigrok & Wagner (2005) as well as Yang (2009) state, on the basis of a meta-analysis of prior research, that the impact of foreign investment on firm performance is only marginal. This is a surprising result due to the many models of firm internationalisation assuming many positive effects, such as knowledge spillovers (e.g. Prahalad & Hamel, 1990; Autio, Sapienza & Almeida, 2000; Fu, 2012), economies of scale advantages, cost efficiency effects (Porter, 1985; Breaugh, 2003; Richter, 2014) and other advantages or benefits mentioned in past research. In total, five clusters of more or less positive effects of internationalisation on firm performance is detectable in the research literature (see Table 4).

Internationalisation should have an effect on firm performance measured by profitability. Thus, the question arises whether these effects deduced from model-theoretical considerations are only fictional or non-relevant or if the results of empirical studies may have a methodological problem, as some researches note. For example, Yang and Drifield (2012) argued that one problem arises from selection bias, another from the applied statistical test. They found that it is, first of all, important to collect company data from countries with a strong export focus and, second, the statistical analysis must include not only tests for differences, such as t-test or ANOVA, but also regression analysis.

Table 4. Main Effects of Internationalisation

Researcher	Reasons for Internationalisation	Effect of Internationalisation
e.g. Porter (1985); Breaugh (2003); Ruigrok & Wagner (2004)	Cost advantages, cost efficiency due to lower factor prices	Decreasing transaction costs, material costs, labour costs
e.g. Lessard (1976); Morck & Yeung (1991); Hwang & Chen (2016)	Portfolio and risk diversification	Exploitation of regional and national divergence of tax quotes, factor prices, financial resources
e.g. Prahalad & Hamel (1990); Autio, Sapienza, & Almeida (2000); Dunning & Lundan (2008); Yang (2009); Fu (2012)	Access to intangible assets (technology, knowledge, knowhow) or other resources constrained by the limited size of the domestic market	Resources for competitive advantages not available to firms operating purely domestically
e.g. Gomes & Ramaswamy (1999); Richter (2016)	Economies of scale, organisational learning	Prize advantage can be realised
e.g. Mefford (2009); Ganotakis & Love (2012); Altaf & Shah (2016)	Better utilisation of capacities	Higher productivity and, therefore, higher revenue and profitability

Source: Author's presentation.

However, based on the literature review, the following effects of internationalisation were identified: (1) Cost advantages in terms of lower factor prices, (2) portfolio and, thus, risk diversification, (3) access to intangible assets (technology, knowledge, knowhow) or other resources constraint by the limited size of the domestic market, (4) economies of scale effects, (5) organisational learning and (6) higher utilisation of existing capacities or higher productivity, respectively (see Table 4). However, in contrast to assumptions of significant positive effects, Ruigrok and Wagner (2004) note that the findings of 89 studies between 1974 and 2004 on the effects of internationalisation on firm performance are inconsistent. They conclude that internationalisation has a marginally positive effect on firm performance, mostly in terms of slight cost savings and increased profitability effects. Just like Ruigrok and Wagner (2004), Annarvarjula and

Beldona (2000) see methodological reasons for inconsistent results, particularly in the context of operationalisation research variables.

Other research generally denies a positive impact of internationalisation on firm performance. Greenaway and Kneller (2007), for example, note that market entry costs are the bottleneck factor, where only profitable companies will win an advantage with internationalisation; but mainly in terms of growing revenues and market shares but not in terms of profitability. In other words, if a company is not cost-efficient and profitable in its domestic market, it will gain no advantages from internationalisation. Furthermore, performance measurements vary widely. Only earlier studies prefer market- and accounting-based metrics (Yang, 2009, p. 35). Recent studies frequently use micro-economic metrics, such as factor productivity (Mefford, 2009; Ganotakis & Love, 2012). This fact may also lead to inconsistent results, presumably due to the meaning of this ‘industrial view’ dwindling in service economies. Using such measures in analysing larger cross-industry samples containing mostly a majority of firms out of the service and technology sector may not show, for example, cost advantages.

Other studies examine rather more complex internationalisation advantages instead of simple models transferred from microeconomic models. For example Hwang and Chen (2016) examine manufacturers operating in different countries to assess risk perceptions and production relocation decisions. They find that external risks lead to a reconsideration of location decisions concluding that also risk avoidance drives location decisions. Hence, it could be assumed that internationalisation may be seen as an instrument to handle country risks.

Also, Altaf and Shah (2016) examine a more complex effect of internationalisation on firm performance. They find a significantly negative effect of product diversity on firm performance in general, whereas product diversity in the framework of internationalisation increases firm performance. This finding should receive attention because internationalisation can be seen as an alternative to the portfolio management cycle. This opens up the possibility to extent product lifecycles and increases, thus, the return on investment in terms of the total amount generated from the R&D expenditures.

Several studies, such as recently Yezegel (2015), Ozdemir and Upneja (2016), or Vithessonthi (2016), investigate the immediate financial effects from the viewpoint of financial analysis. The financial analysis examines firms on the basis of financial data included in annual reports and provided by professional financial databases, such as Thomson Reuters One database integrating as Thomson Reuters One and Datastream databases. Such databases provide financial data for the investment industry and the banking industry including not only the published financial data but also a multiple set of ratios calculated on the basis of the accounting data provided by stock-listed companies. Based on such databases, Ozdemir and Upneja (2016) examine the effect of internationalisation on the IPO performance of service firms. They find that the long-term performance in terms of stock prices increases with increasing internationalisation degree. Therefrom, one could conclude also that firm performance in terms of business financials increases assuming that firm performance and stock price are positively and highly correlated, which is the main assumption in financial research (Yezegel, 2015).

Vithessonthi (2016) investigates 1,270 Southeast Asian firms regarding the effect of the internationalisation degree and its relationship with capital investment and firm performance applying several panel regressions over the period from 1990 to 2014. Capital investments are measured by the financial data on total assets, property, plant and equipment (PPE) capital expenditures (CAPEX); firm performance is measured in terms of return on assets (ROA) and revenue growth. Vithessonthi (2016) concludes that the level of internationalisation is not associated with the return on assets; however, revenue growth is positively correlated with internationalisation as well as stock return. In contrast to these findings, Tsao and Chen (2012) examined 790 Taiwanese firms over a seven-year period (2000-2007) finding a significant positive linear effect between revenue growth, return on assets, Tobin’s Q and the internationalisation degree. However, their research is based only on an ordinary regression analysis and the results for ROA and revenue growth are very modest with r=0.093 (ROA) and r=0.153 (revenue growth), respectively.

Lin et al. (2011) find that technology firms with a higher internationalisation degree benefit in terms of a higher and more stable capacity utilisation. Thus, this

result supports indirectly the findings of Ganotakis and Love (2012) and Altaf and Shah (2016). In this context, internationalisation is an opportunity to scale up domestic production capabilities, which can be refinanced through open up new markets abroad.

Vithessonthi and Racela (2016) investigate the short- and long-run effects of internationalisation and R&D intensity on firm performance. They could not find an effect of the internationalisation degree on the ROA. Concerning the implications for practice, Vithessonthi and Racela (2016) conclude that internationalisation does not only increase firm performance in terms of return on sales in the short run but also weakens the negative effect of R&D intensity on the operating performance in the long run, which they call a buffering effect of internationalisation because the negative short-term effects of investing in R&D could be mitigated. This effect is comparable to the previously discussed findings of Altaf and Shah (2016), from which it is concluded that internationalisation can be seen as a means of generating more cash from product development costs.

Only few studies have applied a different logic. Most studies discussed, as well as the mainstream in quantitative internationalisation research, are based on the linear model.

The empirical examination of the relationship between firm performance and the degree of internationalisation is a topic of interest for at least 30 years (Ruigrok & Wagner, 2003; Kirca, et al. 2011; Contractor, 2012) because internationalisation is considered as a major factor of firm success (Contractor, 2012; Li, 2007). The general model assumes that firm performance increases positively and linear with the degree of internationalisation (e.g. Ling, Liu & Cheng, 2011; Kirca, et al., 2011). Contrarywise, other studies such as, for example, Gomes and Ramaswamy (1999), Thomas and Eden (2004) and Ang (2007) find a negative linear effect of the degree of internationalisation on firm performance. Consequently, it could be noted on the first view that empirical research does not provide conclusive evidence concerning the effects of internationalisation on performance (e.g. Bausch & Krist, 2007; Bae et al., 2008). They examine linear relationships and apply linear regression models in the data analysis. Consequently, it can be stated, first, that two main and different

research models are established: (1) positive linear models and (2) negative linear models (see Appendix II). Positive linear models assume an always positive linear relationship between the degree of internationalisation and firm performance (e.g. Contractor et al., 2003) in terms that a greater degree of internationalisation results in a firm performance. Increase. In contrast, negative linear models assume the reverse effect particularly in the sense of diminishing returns. Although the effect of internationalisation remains positive on firm performance the benefits begin decrease with the increasing degree of internationalisation over time (e.g. Gomes & Ramaswamy, 1999).

Only recently, studies started to focus on nonlinearities (Yang & Driffield, 2012). Studies with a longer time horizon find evidence that the internationalisation-performance relationship results in a U-shaped diagram (see Appendix II). At the beginning of the internationalisation process companies can benefit from internationalisation. However, this trend changes over time slowly into a negative relationship but changes finally into positive relationship again (e.g. Ruigrok & Wagner, 2003; Contractor, Kundu & Hsu, 2003; Contractor, 2012).

Yang and Driffield (2012) conducted a meta-analysis based on 54 studies and find, that the internationalisation performance relationship for non-US firms is typically U-shaped in terms of sales growth, return on sales and other profitability measures. These results may suggest that a company can grow and become more profitable in the first steps of the internationalisation process. At a certain stage, problems of complexity lead to diseconomies of scale and of scope. The management of a widening product portfolio increases the management and organizational skills and requirements. Consequently, companies pass through a stage, which is called theory of control crisis in the corporate lifecycle (Stacey, 2007, p. 164). Yang and Driffield (2012) conclude that U-shaped internationalisation-performance relationship means that internationalising companies tend to suffer losses in the internationalisation process before the returns of internationalisation can be realised. Also, Elango (2012) find from examining a three-year data set of 795 companies from five countries, namely the US, Japan, Germany, the UK and France, a quadratic relationship between several performance variables and internationalisation, even though the selected time period is very small.

Already earlier research found the opposite effect in the form of an inverted U-relationship (e.g. Sullivan, 1994; Gomes & Ramaswamy, 1999; Hitt et al., 1997). In the first stage of internationalization, quick gains can be realized while in the in the course of the internationalisation process the positive impact on firm performance is levelled by the different coordinating costs of international operations with a rising number of countries and their specific and diverse challenges. Thus, Hitt et al. (1997), for example, find that that a greater geographic dispersion increases coordination costs of coordination. However, in the beginning the internationalization process until the performance climax the company benefits from an increasing economies-of-scale effect and the use of cost advantages between different countries (e.g. Gomes & Ramaswamy, 1999). However, the increasing coordination costs with the increase of the degree of internationalisation levels the effects of the economies of scale resulting in cost advantages.

More recent research has conceptualized a sigmoid curve type model based on a 3-stage theory of the performance-internationalisation relationship (see Appendix II) mainly due to the results of empirical studies making use of new models (e.g. Contractor, Kundu, and Hsu, 2003; Lu and Beamish, 2004; Thomas & Eden, 2004; Chiang & Yu, 2005; Krist, 2009; Contractor, 2012). These stages are (Contractor et al., 2003; Li, 2007; Contractor, 2012; Cantele et al., 2016):

- Stage 1: The first stage converges with the Uppsala model (Johansson & Valhne, 1977). Firms focus on markets similar to the domestic market. After relatively fast performance growth, this stage determined mainly by export activities, the firm is confronted with larger costs from learning resulting from the lack of market-specific knowledge concerning the regulatory, cultural and economic environment. Therefore, this stage is characterized by an inverted U-curve.
- Stage 2: At this stage, the growing geographic scale of sales and operations results in an increasing cost efficiency improving firm performance indicators such as revenue growth and overhead costs per country as well as the possibility to use cost advantages between countries. The firm has a better access to lower costs and can use the best market opportunities. Consequently, the performance-internationalisation

relationship becomes increasingly positive represented by a U-shaped performance-internationalisation Relationship

- Stage 3: The stage-2 effects combined with learning effects prolongs the upward cycle resulting in a positive linear relationship. However, empirical results show often a new downward cycle, so that the third stage shows characterized rather an inverted U-curve than a positive linear relationship. The negative slope at the end of this stage results from over-expanding beyond the optimal firm growth and firm size level. For such firms, the incremental expansion costs exceed incremental benefits affecting the total firm performance. This development can be explained by at least two factors: (1) Beyond a certain point, the firms is left with domestic markets with a lower potential for profit because the more lucrative markets are already developed; (2) Furthermore, the optimal number of domestic markets in relation to the growth of coordination and control costs is exceeded. Beyond this firm-specific optimal number, the benefits of expansion are consumed by the costs from the complexity of managing operations in different countries. Therefore, the relationship performance-internationalisation relationship turns negative again but will not reach the low level of stage 2 due to consolidation and learning effects.

These five models are an attempt by the researchers to describe and explain internationalisation activities and their relationship with firm performance in the course of an increasing degree of internationalisation. Among these theories, the 3-stage theory could be considered as a synthetic theory allowing to understand the challenges firms are facing in the internationalisation process and how they can take advantage not only in the medium-, but also in the long-term. Therefore, its proponents claim that the 3-stage theory can be considered as a ‘general theory’ (Krist, 2009, p. 80). However, even among these studies differences in performance-internationalisation relationship patterns are notable. Thus, for example, while Contractor et. al. (2003), Lu and Beamish (2004), Thomas and Eden (2004), and Ruigrok et al. (2007) find a horizontal s-shaped relationship, Thomas and Eden (2004) as well as Ruigrok et al. (2007) find quite the opposite sequence of the slopes reported. Ruigrok et al. (2007) explain these contradictory results by arguing that the performance-internationalisation curve fitting best

depends upon the firm's country of origin. They argue that the cultural and economic proximity to neighbouring as well as the domestic market size explains the opposite curve shapes. The magnitude of liability of foreignness determines whether the first steps of internationalisation lead to a rise or decline of firm performance, the size of the domestic market determines the inflection point at which the cost-benefit trade-offs changes.

The 3-stage theory is challenged by some researchers doubting the universally applicability of this model (Kirst, 2009, p. 11). It must be stated that the curve type patterns of the 3-stage theory must be considered as context-dependent concerning to the cultural distance or proximity (in terms of language, culture, regulatory environment, and economic development level) of the foreign markets and the domestic market size. The research of Thomas and Eden (2004) as well as Ruigrok et al. (2007) has shown that prior research has based their concept on an idiosyncratic domestic market ignoring the possibility that the shape of the performance-internationalisation relationship must be considered as context-dependent determining the cost-benefit trade-off associated with internationalisation. However, it must be mentioned that the differences in the initial conditions lead only to an inverted curve patterns but do not question the underlying systematic structure determined by the problem of cost-benefit trade-offs changes, over-expansion, the challenges of optimal firm growth and firm size level amid increasing control and monitoring costs and the issue of the firm-specific optimal number of markets.

2.4 Research Issues: Measuring Firm Performance

As well as in the case of firm performance research and the research on performance-internationalisation, the question arises of the nature of firm performance and, consequently, its indicators. Achtenhagen et al. (2010) note that managers and researchers have a different understanding and concepts of firm growth. Managers view firm growth and firm performance, respectively, as the result of a complex process of internal developments. Consequently, managers rather prefer qualitative indicators for measuring firm performance and growth. On the contrary, academic research uses simple quantitative indicators derived from macroeconomics. Delmar (1997) and Delmar et al. (2003) state that

revenue (sales/turnover) is the most commonly used growth indicator (30% of the studies examined). But they also find that, still, 29% of the studies in the research area applies the number of employees as growth metric. Shepherd and Wiklund (2009) even found that 60% of firm growth studies are based on revenue growth as growth metric, while only 14% use profit growth or profitability ratios and 12% resort to employee growth.

Achtenhagen et al. (2010) compared growth metrics in academic research analysing 55 empirical studies published in the context of firm growth research. According to them, almost 42% of 55 studies examined apply revenue growth as a performance indicator, 27% in terms of employee growth (see Table 5).

Table 5: Growth Indicators in Empirical Research

Variables	U.S.-based/Europe-based journals	Frequency	Percent
Growth measure			
Sales/turnover	17/6	23	41.8
Employees	10/5	15	27.3
Growth willingness/Growth intention	6/4	10	18.2
Profitability	3/1	4	7.3
Combinations of the previously mentioned measures	5/4	9	16.4
Growth strategies (e.g., diversification; product extension; internationalization)		9	16.4
Others (e.g., assets; value added)	0/4	4	7.3
Not reported	4/1	5	9.0
N	38/17	55*	
Time frame			
Cross-sectional	16/6	22	40.0
Longitudinal	22/11	33	60.0
N	38/17	55*	
Source of data			
Primary data	19/9	28	50.9
Secondary data	12/4	16	29.1
Both	7/4	11	20.0
N	38/17	55*	
Theoretical basis			
(-)	17/11	28	50.0
(+)	22/6	28	50.0
N	39/17	56	
Type of paper			
Qualitative	9/7	16	28.6
Quantitative	29/8	37	66.1
Mixed method	0/2	2	3.6
Conceptual	1/0	1	1.8
N	39/17	56	

Source: Achtenhagen et al. (2010, p. 293)

Additionally, these authors interviewed 2,000 Swedish CEOs to examine the gap between the entrepreneur's perception of growth and how it is measured and discussed entrepreneurship research (Achtenhagen et al., 2010, p. 309). They concluded that growth measures and indicators in academic research are mainly quantitative, whereas, in management practice, performance is not only measured as quantitative growth but also by qualitative indicators (Achtenhagen et al., 2010, p. 309). However, qualitative measures are rare in academic research. Some few studies use qualitative indicators, such as innovation intensity as a qualitative growth indicator (e.g. & Zand, 2014; Frenz & Letto-Gilles, 2009). Wach (2012, p. 35) as well Kanji et al. (2015, p. 51) note that classic measures of growth and performance are unidimensional, focusing only on isolated areas, whereas the complexity of firm growth and performance needs a more complex approach (Kanji et al., 2015, p. 51). Other recent studies measure firm performance in terms of the share of innovative sales of the total revenue (Frenz & Letto-Gilles, 2009; Beers & Zand, 2014).

However, recent studies based on qualitative measures for growth have not found correlations between firm performance and, for example, innovation growth (e.g. Acs et al., 2008; Coad et al., 2014). On the contrary, it should be assumed that such indicators allow only to measure firm performance in technology-driven industries or that such indicators are good predicators to explain revenue or income growth, respectively. Furthermore, innovation growth does not seem to be appropriate to provide a firm performance indicator in the case of analysing cross-industry samples (Coad et al., 2014, p. 35).

To sum up, firm growth research uses mainly two indicators for measuring firm growth: (1) employment growth or (2) annual turnover or sales growth. Profitability ratios are not often used. This finding reflects the criticism of Achtenhagen et al. (2010) in terms of more or less irrelevant form performance measures. Neither the revenue nor the increase in the number of employees can be seen as an appropriate firm performance indicator in the context of business research (Achtenhagen et al., 2010, p. 309). For example, employee growth may be seen in a macro-economic perspective as an appropriate indicator for firm performance but not in the perspective of managers or business researchers, where employee growth indicates, first of all, increasing costs.

Therefore, this study applies different measures to cover more dimensions of firm performance: (1) revenue growth as an indicator for quantitative growth, (2) operating income growth as an indicator for qualitative growth and (3) ratios like ROA, ROE and ROIC as firm performance indicators in terms of profitability. Consequently, this study includes, on the one hand, revenue growth as an indicator to receive comparability with prior studies but, on the other hand, also includes several other indicators to distinguish qualitative and quantitative growth and find relationships between investment activities and profitability.

2.5 Research Implications

Chapter 2 has discussed and presented the main models and approaches of the research in the field of internationalisation and firm growth. To sum up, five main approaches in the context of management and business research with the focus on internationalisation were found and discussed in this chapter (see Table 2). All these approaches have stimulated further recent research based mainly on one of these research paradigms verifying their validity for current research despite their longer period of existence. The reviewed literature has yielded:

(1) The internationalisation process is increasingly rational, with increasing firm size in terms of rational decision making and strategic planning, the larger the company is. While medium-sized and smaller companies—except born globals and hidden champions—expand to neighbouring countries, using less risky and small-scale approaches and prefer to use emerging business opportunities and existing customer and supplier networks, larger enterprises apply rather aggressive, multi-country and large-scale market entry strategies.
(2) However, the internationalisation process is characterised by high risks, even for large companies with extensive resources, so that it can be presumed that internationalisation costs often outweigh internationalisation benefits.

Although the findings are heterogeneous concerning the relationship between firm performance and internationalisation due to different data analysis approaches, sample biases and other reasons, deductive theories of internationalisation tends to refuse the assumption that internationalisation is

associated with negative effects on firm performance and shows a missing examination of internationalisation risks in the form of decreasing profitability due to operations overstretch and, thus, neglecting the issues of organisational growth as a key competence to benefit from internationalisation.

Furthermore, a unified model in terms of stage sequences, required skills, a general strategic planning approach or a theory of firm performance in the context of internationalisation could not be identified. Instead, it can be asserted that the findings provided by the research examining the internationalisation process, required resources and management strategies/activities depends very much on the research design. For example, companies from small countries should be forced to internationalise much earlier in their corporate lifecycle so that studies based on a sample including, for example, only Swedish firms and/or US firms should show very different results concerning the internationalisation stage sequence, the degree of risk aversion or the sources of financing internationalisation. Consequently, it can be concluded that research findings depend on the aim and perspective of research, and the subject explaining differences concerning data collection methods, the measured aspects of internationalisation and other differences. However, this does not decrease the value of each specific approach, concept, model or theory. On the contrary, they provide a detailed view on the internationalisation process on the management and firm level (see Table 2).

Moreover, the relation between firm performance and internationalisation remains a research issue as the main research gap to bridge by this study. One of the reasons for this gap may be, as mentioned, the restrictive perspective of several studies focusing only on specific internationalisation aspects. Another issue may be the selected approach. While firm growth research prefers a quantitative confirmative approach, internationalisation research prefers a qualitative explorative approach. This research intends to combine both approaches by using standardised numerical data without a specific focus on internationalisation effects, so that an explorative approach resulting more or less from the plurality of models and theories follows. Furthermore, and as an additional consequence from the explorative approach, the measuring of firm performance is not reduced to one indicator as a dependent variable but to

several indicators reflecting qualitative growth, quantitative growth and profitability, which is in line with the criticism of Achtenhagen et al. (2010) concerning the use of inappropriate performance indicators in business research. Furthermore, firm size must be taken into account in evaluating the result of a given study. Most of the IE studies include only small companies, hidden champions studies are based only on larger firms and research focusing on multinational companies and management theories examine exclusively large corporations. Therefore, this study includes companies of different size.

Chapter 3. Research Methodology and Design

Section 3.1 clarifies the research philosophy. Constructionism and positivism are the epistemological frame of this study. This study uses financial data to examine and explain firm growth in the context of internationalisation. Financial data are artefacts resulting from social conventions and represent, therefore, social constructions of reality. However, the financial data collected are the result of a process standardised by international accounting standards. Consequently, the analysis of this data follows a positivist approach, because the data can be seen as quasi-objective empirical data, which can be examined without an observer bias.

In the second section, the research methodology is determined. As noted, this study is not based on a cause–effect model. Therefore, this study is a quantitative-explorative study resulting in a research model. However, as presented in Section 3.2, this research is grounded on a data model resulting from accounting standards and the financial analysis determining the data collection and preparation procedure explained in Section 3.3 and 3.4.

Section 3.5 explains the data analysis methods—regression analysis t-test—to explore cause–effect relationships and group differences. Section 3.6 presents the research procedure which is—in the context of an explorative approach—only generally defined.

3.1 Research Philosophy and Methodology

3.1.1 Research Philosophy

Easterby-Smith et al. (2015, p. 8) requires beginning the development of the research design by explicating the research philosophy. A research philosophy is less an issue of methodological reasoning but explicating a priori given preconceptions leading the researcher. Consequently, the research philosophy is more a system of presuppositions as components of the researcher's worldview instead of clear epistemological concept (Saunders et al., 2016, p. 124) resulting in researcher-specific methodological choices reducing the range of research strategy options (Easterby-Smith et al., 2015, p. 95).

Moreover, the selection of a specific research strategy following from researcher-specific preferences as the result of his specific worldview, limits the range of appropriate methods in the area of collecting and analysing data.

This research has its sources in positivism assuming that knowledge is independent from the observer and considering that research objects are independent from the subjective judgment or description of the researcher (Goldman, 2010, pp. 1215-1218). Objects in the observer-independent reality can be measured and modelled, resulting in objective knowledge (Weber, 2004, pp. 235-239). Therefore, positivists prefer mono-methodical approaches in the form of collecting quantitative data and statistical analysis over a qualitative or a mixed-method approach combining both methods (Hunt, 2010, p. 268).

Kuhn (2012, pp. 145, 211) has criticised the concept of observer-independent knowledge considering knowledge is socially constructed. Researchers construct rather than discover reality. Thus, the question arises what kind of reality is observed in internationalisation and firm growth research because companies are per se an artefact and are, therefore, socially constructed. The same applies to accounting which provides the data for this research. However, a constructionist approach would only explain the emergence and behaviour of institutions as a result of the interaction of different stakeholder groups such as shareholders, managers, suppliers, consumers, and other stakeholders. On the contrary, this study observes only the results of interactions between these groups in terms of the changes in in the data representing the results of these interactions, whereby the data are standardised due the regulations for accounting provided by the International Financial Reporting Standards (IFRS).the posMoreover, these data reflect changes in the material (objective) world. Therefore, this research is considered as following a positivist approach.

In the author’s view, qualitative factors should be considered as latent variables contributing to a composite variable of which quantitative variable is also part of. It is undisputed that, also in the context of business performance, not everything that counts can be quantified (Einstein, cited in Mustajoki & Mustajoki, 2017, p. 170). However, from the business point of view, every qualitative factor should result in effects appearing in accounting. Thus, for example, high-level or

academic textbook conform strategic management or brand management should yield higher revenue growth rates, higher gross margins or other effects. However, high-level management is irrelevant if it is not measurable in terms of business performance. Therefore, this research considers qualitative factors as latent variables, which can be identified, at least to a certain extent, by means of financial analysis, while qualitative factors remain unidentified. Consequently, this research follows, on the one hand, a constructionist view in following the mental model of accounting (Napier, 2009, p. 43). On the other hand, this study follows the positivist view by considering only numerical facts that allow robust assumptions concerning cause–effect relationships in the framework of the finance-based view of firm. Thus, in my view, everything that counts in business results in accounting effects. Therefore, this study is based on the financial model of the firm provided by financial reporting standards which can be considered as financial-data-based model of the firm for informing different external stakeholders on the business economics and performance(Sunder & Yamaji, 1999, p. 27).

Like a theory, a model represents a system of relationships between elements of a subject area (Bryman & Bell, 2011, p. 229). And like a theory, a model's function is to bring relevant knowledge about a subject area into a manageable order (concept). In both cases – theory and model –, this is done by establishing a system of relationships (Bryman & Bell, 2011, p. 229). Consequently, as a definition of a model it can be proposed the following basic definition:

> A model is a simplified representation of a subject area. The mapping consists of either a visualization or a mathematical description describing relationships between constitutional elements of a system or area.

Helfrich (2016, pp. 67-71) defines three essential requirements for model building:

- A simplified representation always requires an abstraction, i.e. a reduction in the complexity of the subject area.
- Consequently, a model should not contain superfluous parts, it should be as simple as possible and as complicated as necessary.

– Therefore, the abstraction includes a reduction of the subject area to the relevant or important components and their relationships.

What is considered relevant depends on the aim of the model. Following the objectives of business administration as an academic discipline, the aim of modelling may be the description, explanation or prediction of economic facts on the firm level as well as the design of measures in the context of firm activities. Depending on the respective aim, different components and their relationships are relevant. For example, for an explanation, the functional relationships within the considered realm of reality are relevant, while they may be irrelevant to the design of actions.

As already mentioned above, there are different types of models. In principle, two types are distinguished: (1) heuristic, content-based models and (2) formal models:

(1) Content models are – as well as theories – assigned to a particular subject area, while formal models are applicable to various subject areas. Content-based models represent a simplified image of a subject area. The focus is on the inner nature of the considered section of reality. Content models are descriptive or functional models. They describe a structure or functional relationships.
(2) Formal models, on the other hand, are quantitative models. They describe natural systems through formal and quantifiable relationships. From the formal structure of the model conclusions can be deduced that arise solely from the formal rules and are independent of the interpretation of the content of the model. The main areas of application in business research and economics are improving economic activity by optimizing business decisions and processes as well as forecasting economic data. The aim of these optimization models is to maximize or minimize a target size (e.g. the sum of the coverage contributions) under certain restrictive conditions (e.g. capacity constraints) and technical constraints (e.g. the sum of the costs). The optimization is formulated as an objective, mathematical function, which represents the variable to be optimized as a function of certain input variables. The aim of the optimization is then the

determination of the extreme values. The optimal value of the target size is thus not an absolute extreme value, but an extreme value under certain conditions.

The system of income statement, balance sheet, and cash flow statement can be interpreted as a financial theory, respectively, financial model of the firm, or as the "*accounting model of the firm*" (Bruner et al., 1998, p. 165), which results from external requirements by shareholders and regulation and legislation demanded in the form of annual reports containing the income statement, balance sheet, cash flow statement and other statements such as risk-management statement or the corporate-governance report (Wahlen et al., p. 94). However, the fundamental content of annual reports are the financial numbers provided according to the accounting model of the firm (see Figure 2).

Some researchers consider the modern financial reporting model as an independent theory or independent model of the firm in terms of "*a rational abstraction of the firm's economic and decisions-making processes*" (Zambon, 2013, p. XVIII). The three constituents of the existing standard of the financial model of the firm are the income statement, the balance sheet and the cash flow statement (Most, 1977, p. 38). The balance sheet reflects stock variables, while both the cash flow statement and income statement represent flow variables (Sunder & Yamaji, 1999, p. 28). The stock variable represents a quantity at a point in time, while a flow variable expresses a quantity over a measured time period (Dwivedi, 2010, p. 31). Both forms of variables are used in the empirical part of this research.

3.1.2 Methodology

The literature on methodological issues distinguishes two main approaches in social science research: (1) the quantitative approach and (2) the qualitative approach. The main difference lies in the structure of data. While quantitative methods rely on structured numerical data and statistical analysis, the qualitative approach is not based on numbers and calculations but on arguing based on unstructured data (Niglas, 2010, p. 220). The second distinction exists concerning the research aim. Quantitative and qualitative studies could have an explanatory and/or a confirmative aim, which depends on the research question

and the existence or non-existence of research models, respectively (Clark & Badiee, 2010, pp. 278-279). Correspondingly, in empirical economic research and empirical business research three main groups can be distinguished:

(1) Qualitative-explorative studies work with smaller samples and a case study approach (Klenke, 2016, p. 66). Qualitative firm growth research are often qualitative-exploratory studies which are not bases on an explicit model to confirm. Instead, they are often based on a smaller number of cases selected by quantitative criteria to determine potential qualitative performance determinants (Herr, 2006, p. 58). However, this approach generates generally rather non-comparable or non-reproducible results based on qualitative primary data (Göttgens, 1996, p. 34; Sontag, 2012, p. 123; Herr, 2006, p. 83; Dömötör, 2011, p. 59). Consequently, this approach's main issues are the subjectivity in terms of research focus, data collection and data analysis by qualitative instruments (Annacker, 2001, p. 8; Niglas, 2010, p. 220). Consequently, such studies do not usually claim that they provide representative or generalisable findings.

(2) Quantitative-exploratory studies aim at the discovery of structures and relationships by filtering from a wide variety of relevant variables those that actually affect the independent variable. However, an explicit cause–effect model does not exist as a research design basis (Raab et al., 2009, p. 282; Sontag, 2012, p. 124). Yet, such studies are based on numerical data producing comparable results. But, unlike quantitative-confirmatory studies, they do not have a model concerning the interrelations of the selected variables. Accordingly, they use structure-discovering methods in the data analysis, such as path analysis or factor analysis (Hoyle & Duvall, 2004, pp. 301-302).

(3) Quantitative-confirmatory studies are suitable when theoretically and empirically sufficiently examined theories and models already exists, defining interrelationships between variables or factors (Haenecke, 2002, p. 175). Then, hypotheses can be enunciated and tested by causal analysis (Haenecke, 2002, p. 173). The empirical analysis is then used to verify the model derived from theory defining presumed relationships. But because quantitative-confirmatory studies can be based on existing

theoretical knowledge and more or less confirmed causal relationships—in contrast to exploratory studies—only a few variables are needed to achieve the research aims (Grünning et al., 1996, p. 11), while exploratory studies often do not assume or describe causal relationships (Raab et al., 2009, p. 282). Instead, quantitative-confirmatory studies aim at the falsification or verification of existing causal models (Sontag, 2012, p. 124).

The decision on the type of research approach depends, as mentioned, on two criteria:

- The state of research: If hypotheses are explored, the quantitative exploratory approach is preferable,
- If hypotheses were already checked in prior research, the quantitative-confirmatory approach is indicated (Rupp, 2013, pp. 520-521).

The case study approach allows an in-depth examination of complex and difficult to define phenomena and allows to develop hypotheses for futher quantitative research (Annacker, 2001, p. 8). However it is not possible to examine causal interrelations; but typical response patterns and characteristic values of observation units can be analysed in detail. The disadvantage of the exploratory case study approach is the only limited generalisability of its results. Consequently, the case study research is of exploratory nature and will not lead to the falsification or verification of models and will not generate representative findings, which can be referred to a basic population. However, the explorative case study approach has become even more firmly established in recent years in management and operations research in explicit contrast to the mainstream of quantitative research with large datasets (Wrona, 2005, p. 1).

Since both research areas (firm growth and internationalisation) have elaborated a multitude of factor models and have found a multitude of different correlations (effects) between a multitude of variables (factors), this study is explorative. This means that this study does not start with a clearly defined research model with only a few isolated factors and an ex-ante idea of the relationships between the selected factors (variables) to confirm or reject an existing model. Instead, the

approach is to include a multitude of factors (variables) available through the financial data of companies to explore effects between these variables (factors).

Concerning the data collection, two approaches can be identified in both research areas (firm growth and internationalisation) regarding the research approach and the data collection method:

(1) Direct data collection (collecting primary data) asks for the success of influencing variables in expert interviews, discussion, participatory observations, surveys or other forms of data collection conducted by the researcher (primary data) to be used for qualitative research (Sreejesh et al., 2014, p. 11).
(2) Indirect data collection (collecting secondary data) in the context of firm performance and internationalisation research attempts to find empirical evidence for firm characteristics as predictors for firm performance based on qualitative and quantitative data not collected by the researcher or drawn from information recorded for purposes other than scientific research (secondary data). This approach allows both qualitative and quantitative data analysis (Sreejesh et al., 2014, p. 12).

This study uses only financial data from financial annual reports. Consequently, the data are not collected for this study by the researcher and for the purposes of scientific research; thus, for example, accounting data are collected for stakeholder information and not for research reasons. Consequently, this study follows the indirect data collection approach. Regarding the data analysis, the indirect approach can be subdivided into the following two approaches (Sreejesh et al., 2014, p. 29):

(1) The qualitative data analysis is an explorative approach based on the methods of qualitative data analysis instead of statistical methods because qualitative factors are not quantifiable particularly in the form of business case studies. Another typical realisation of this approach is the qualitative content analysis in the context of generating a grounded theory using corporate documents. A typical implementation of this approach can be found in the context of managerial firm growth theories.

(2) When it is attempted to measure statistical cause–effect relationships between variables, a quantitative data analysis approach is applied for the purpose of conducting a statistical analysis. For quantitative indirect studies, also soft factors can be used, which must be, however, operationalised numerically. A typical implementation of this approach can be found in the context of stochastic and deterministic firm growth theories (see Section 2.5.3 and 2.5.5).

This study follows an indirect quantitative-explorative approach. As mentioned, both research areas have found a multitude of factors generating a multitude of factor models; this study does not develop a clearly defined, ex-ante research model examining only a few factors to confirm or reject an existing model. This study includes a multitude of factors (variables) available through the financial data of companies to explore effects between these variables (factors). The data are structured numerical data from financial statements. Such kind of data are standardised by international accounting standards (IFRS) and, therefore, highly comparable. Furthermore, the use of standardised numerical data from financial data databases allows larger samples, so that the instruments of statistical data analysis can be used without the problem of insignificant results due to a small sample or undersized groups. The data analysis is carried out generally in two steps as follows:

(1) Step 1: Descriptive analysis of the total sample and of distinct groups to describe the total sample to find first indications of differences between groups distinguished by firm performance and internationalisation indicators.
(2) Step 2: Examination of cause–effect relationships in the context of internationalisation to explain firm growth in several dimensions (for example qualitative and quantitative growth or external and internal growth).

Consequently, this study is an indirect explorative quantitative study examining a given set of company data from three countries (Germany, Switzerland and Austria) with highly comparable external factors, such as highly internationalised companies, comparable interest rates, corporate governance and other

regulations, growth rates, M&A activities, productivity and other economic structure characteristics (Havlik & Leitner, 2012, p. 219; Schmitt, 2009, p. 123; Ruigrok & Georgakakis, 2012, p. 449; Schmidt, 2014, p. 19).

Finally, the question of data preparation arises. This study can be built on a larger data set of 569 companies, for which time series data of a ten-year period are available. However, the question arises of how to perform the data collection. According to Saunders and Tosey (2012, p. 59), two approaches are possible: (1) the cross-sectional approach and (2) the longitudinal (panel) approach (Woolridge, 2002, pp. 3-5). The cross-sectional approach collects data at one point in time, the longitudinal approach collects data at several points in time.

In business research, a longitudinal (panel) research design aims on examining causal relationships between a multitude of variables on the firm-level over time. Such an approach requires that the researcher has some knowledge about the temporal order of causal effects (Rindfleisch et al., 2008, p. 275). However, even in the case that the temporal order of the effect of an independent variable on the dependent variable can be determined more or less exactly, so that, for example, a time series regression can be performed with dummy variables as an indicator variable for the occurrence of changes in a process, other problems, such as time-selection bias or autocorrelation between independent variables, can occur. Then, the result is that cause–effect interpretations of the statistical analysis results can be incorrect, because, for example, predictor variables are excluded in the time series multiple regression or other tests due to collinearity or other effects (Rindfleisch et al., 2008, p. 264). This is a specific problem particularly in corporate finance research, for example in the framework of M&A effects on firm performance (Dickersond et al., 1997, pp. 344-346). Petersen (2009, p. 435) states that the time series regression is inappropriate to be used in many corporate finance research settings because the problem of time-series autocorrelation gets increasingly stronger with a growing observation periods.

The panel regression analysis is perceived sometimes to be superior in economic research (Erdogan, 2016, p.316). Frees (2004), for example, suggests that the panel approach can be seen as a more valid approach particularly in the search for causal effects due to a higher number of observations (Frees, 2004, p. 10) so

that, according to Erdogan (2016, p. 10), multicollinearity problems should be controlled. However, Wintoki et al. (2012, pp. 581-583), for example, criticise that the panel analysis, which is a repeated cross-sectional study (Frees, 2004, p. 7), analysing variables of the same year does not provide valid evidence for causal effects, due to the time lag between financially measurable behaviour and firm performance parameters. Furthermore, some researchers postulate for a valid panel study that the time series for each variable should comprehend at least 30 years (Frees, 2004, p. 7).

Considering these arguments, this study's research design prefers the analysis of aggregated cross-sectional data. However, the research period is reduced to 10 years because the global standardisation of accounting practices has taken place in 2001 (IFRS, 2014, p. XIV) so that accounting data of the previous years are not standardized and, therefore, not comparable. Additionally, time-lag issues (time-selection biases) can be excluded by using average values for a longer period, which is, in the case of this study, ten years.

Rindfleisch et al. (2008, p. 275) compared the data analysis results of time-series data with data aggregating the change in the data over the total observation period concluding that the temporal separation between initial and follow-up data may not necessarily enhance research validity (Rindfleisch et al., 2008, p. 275). Therefore, Chudik et al. (2009, pp. 5-6) criticise time series statistical analysis in the framework of longitudinal research, which should be only applied in the case that the number of cases is smaller than the observation period. In the case of this study, the number of cases is higher than the number of years (N = 596; observation period = ten years). To avoid autocorrelation problems between independent variables, the data are calculated as change rates over the observation period, such as, for example, 10-year average annual growth rate, which is explained in more detail in Section 3.4.

Finally, the interpretation of the calculated data is based on the financial analysis literature, which can be seen as solid ground of a decades-long cumulation of interpreting financial data (Debarshi, 2011, p. 18; Golin & Delhaise, 2013, pp. 16-20).

3.2 Data Model

As mentioned in Section 3.1, this research follows the accounting model of the firm (see Figure 2) considered as financial model of the firm. It is assumed that every business-relevant activity is reflected in the accounting data and can, thus, be analysed by the means of financial analysis as the output of decision-making. Managers, stockholders, employees and suppliers contribute to the firm development through decision making on different levels of business operations (Cyert & March, 1963). This research investigates the results of the interactions between different stakeholders by measuring changes in the accounting numbers over a longer observation period whereby

(1) the income statement reflects the firm's activities on the business level (Stolowy & Lebas, 2013, p. 57) and documents all transactions linked to serving customers in the given accounting period, while the balance sheet and the cash flow statement document the results of investing activities and financing activities (Stolowy & Lebas, 2013, pp. 491, 508),
(2) and the cash flow statement indicates the firm's cash creation and consumption in framework of operations, financing and investing activities (Stolowy & Lebas, 2013, p. 57).

Accounting information are based on an implicit model of the interaction of business activities (Stolowy & Lebas, 2013, p. 2). This research considers firm performance as the result of multiple decisions observable by analysing accounting information. Thus, decision making can be observed as fluctuations in the stock variables and flow variables included in the financial reporting and the financial model of the firm, reflecting the firm's operating activities, investing activities and financing activities in a defined observation period (McMenamin, 1999, pp. 29-30). For example, operating activities are observable by cash flow changes arising from normal business activities, such as sales in the form of cash received from customers for goods and services and the cash paid to suppliers; investing activities are observable changes the balance sheet and the cash flows for investing activities; financing activities are observable by changes in the cash inflow from financing activities such as issuing long-term debts or shares and cash outflows associated with, for example, finance leases and repayments of loans.

3.3 Sample and Raw Data Variables

The Thomson Reuters One database provides the financial data including 1,741 Austrian, Swiss, and German non-active and active companies covering the period from 1995 to 2013. Due to the incompleteness of the financial data in the years before, the observation period for this study is reduced to the period from 2003 to 2013. However, the ten-years period fulfils the requirements of a longitudinal studies while most studies in business research included smaller observation periods (Blazejewski, 2011, p. 251). The selected observation period allows to observe 569 companies – after excluding non-active firms as well as companies with incomplete time series – in a longer business cycle beginning with the 2003 upwards cycle following the 9/11 and the dot.com Bubble decline, and the second upwards cycle following the 2008 Subprime Crisis.

The following variables are collected from the Thomson Reuters One financial database (see Table 6). The total sample is divided, by internationalisation degree, into two groups: high-internationalised companies (more than 25% of the total revenue abroad) and low-internationalised companies (less than 25% of the total revenue abroad). Both groups are examined concerning the differences in capital structure, growth rates, investment behaviour and financial management activities. The selected variables (see Table 6) represent the standard set of the financial statement analysis, which provides a standardised research instrument in quantitative empirical business research (DeFusco et al., 2007, pp. 215-218).

Banks and other financial service companies are excluded due to differences in the accounting standards resulting in the non-comparability of essential financial (Choudhry, 2011, pp. 11-12). Furthermore, all non-active companies were excluded, such as insolvent or delisted companies were taken over in the observation period. Additionally, all companies showing incomplete data over the research period regarding the performance variables (revenue growth, profitability, and income growth) within the research period were excluded to avoid distorting effects. Eleven companies are excluded with extreme outliers in their revenue and income growth rates (within a range of 4,705% and 807%) which are considered as the result of one-off effects, such as group consolidation effects and other effects typical for small companies particularly in the biotech or pharmaceutical industry were also excluded. Finally, 569 companies remained in

the sample (see Appendix I) for which 19 ratios and financial statement items (see Table 6) are sourced from Thomson Reuters One database

Table 6. List of Variables Selected from the Thomson Reuters One Database

Variable
% of Revenue Abroad
Asset Turnover
Capital Expenditures
Debt in % Capital
Intangible Assets
Net Assets from Acquisitions
Number of Employees
Operating Expenses
Operating Income
Operating Income/Capital
Property, Plant & Equipment (PPE)
R&D Expenditures
Retaining Earnings
Return on Assets (ROA)
Return on Equity (ROE)
Return on Invested Capital (ROIC)
Revenue
Total Assets
Working Capital

Source: Author's presentation.

The selection of these variables is discussed in the following section as well as data preparation details and the calculation of additional ratios based on the raw data set.

Moreover, it is to mention, that – in contrast to several studies discussed in Chapter 2 – this study has not collected industry class codes because of two reasons. According to the financial analysis research, industry classes are useful for comparing individual companies (Lee & Lee, 2016, pp. 38-40). However, this research examines the sample through the lens of the theory of the firm. The firm is considered as a rational decision-making entity allocating resources to maximise profit by selecting the markets with the best business and profit

opportunities, independent of its existing business. This business may be their existing business, but this business is–in terms of the theory of the firm–only one of several options to allocate the capital of the firm to generate a return on capital, which should be shifted to other markets and business models in case of decreasing profits (Friebel & Raith, 2006, pp. 1-2). Consequently, almost all stock-companies are multi-business firm (Lee & Lee, 2016, pp. 38-39). A company's business is its current business, but the business is not the firm. On the contrary, a firm is a capital allocator in search for business opportunities independent of its existing business. the theory of the firm considers the firm as portfolio of businesses, which can always change because of decreasing profitability and new profitable business opportunities (Friebel & Raith, 2006, pp. 1-2; Klier, 2009, p. 51).

3.4 Variables and Data Preparation

As mentioned, 19 out of the 316 variables provided by the database as raw data are selected as raw data. Based on this raw data, additional ratios (variables) are calculated following prior research of both discussed research areas.

This study includes two distinct types of variables: (1) accounting figures, and (2) ratios. Both type of figures is used as 10-year average mean or 10-year average growth rates whereby growth rate calculated as follows (Morningstar, 2016, pp. 25, 30):

$$\text{10-Year AAGR} = \frac{\text{Growth Rate in Period A (Year 1/Year2) + ... + Growth Rate in Period K (Year 9/Year10)}}{\text{10 (Number of Periods)}}$$

Although the compound average growth rate (CAGR) is often applied in firm growth research and financial analysis. However, this research prefer the AAGR concept, because CAGR is extremely sensitive to extreme outliers, because it is based only on calculating the growth rate between the base year and the ending year of the observation period; particularly smaller companies show an extreme volatility in annual revenue time series, so that the AAGR straightens the results of extraordinary account events.

Furthermore, in the case of, for example, the calculation R&D expenses change rates, where approximately 15% of the companies included in the sample provide only four or five accounting data in the observation period–smaller companies do not invest each year in R&D – the calculation of a ten-year average provides a comparability of data. The same applies for M&A even in the case of larger companies, because even larger companies do not acquire other companies each year. Therefore, the change rates are calculated as the average of all given data on the 10-years period.

40 variables are included in the variable set following prior empirical research in the research field (see Table 7).

Table 7. Variable Set

Variable Name	Indicator/Variable Type	Type of Measure/Variable
Revenue 10y-Growth	Firm Performance Variable	Ratio (10-year average)
Revenue 10y-Average	Firm Output Variable	Absolute Number (10-year average) - Firm Size (EUR in thousand)
R&D Expenditure	Firm Input Variable	Ratio (10-year average)
R&D Expenditure in % Revenue	Firm Input Variable	Ratio (10-year average)
Operating Expenditure 10y-Average	Firm Input Variable	Absolute Number (10-year average) (EUR in thousand)
Operating Expenditure/ Revenue Ratio	Firm Efficiency Ratio	Ratio (10-year average)
Operating Income 10y-Growth	Firm Performance Variable	Growth Rate (10-year average)
Operating Income 10y-Average	Firm Output Variable	Absolute Number (10-year average) (EUR in thousand)
PPE 10y-Growth	Firm Input Variable	Growth rate (10-year average)
PPE 10y-Average	Firm Input Variable	Absolute Number (10-year average) (EUR in thousand)
Intangible Assets 10y-Growth	Firm Input Variable	Growth rate (10-year average)
Intangible Assets 10y-Average	Firm Input Variable	Absolute Number (10-year average) (EUR in thousand)
Total Assets 10y-Growth	Firm Input Variable	Growth rate (10-year average)

Variable Name	Indicator/Variable Type	Type of Measure/Variable
Total Assets 10y-Average	Firm Input Variable	Absolute Number (10-year average) (EUR in thousand)
Total Assets/Revenue	Firm Input Ratio	Ratio Change Rate (10-year average)
Working Capital 10y-Growth	Firm Input Variable	Growth rate (10-year average)
Working Capital 10y-Average	Firm Input Variable	Absolute Number (10-year average) (EUR in thousand)
Retained Earnings 10y-Growth	Firm Output Variable	Growth rate ((10-year average)
Retained Earnings 10y-Average	Firm Output Variable	Absolute Number (10-year average) (EUR in thousand)
Net Acquisitions 10y-Average	Firm Input Variable	Absolute Number (10-year average) (EUR in thousand)
M&A-Group	Group Variable	Dichotomous Variable
Capital Expenditure 10y-Growth	Firm Input Variable	Growth Rate (10-year average)
Capital Expenditure 10y-Average	Firm Input Variable	Absolute Number (10-year average) (EUR in thousand)
Debt % Capital 10y-Growth	Firm Capital Structure Indicator	Ratio Change Rate 10-years average)
Debt % Capital 10y-Average	Firm Performance Variable	Ratio (10-years average)
ROE 10y-Average	Firm Efficiency Indicator	Ratio (10-years average)
ROA 10y-Growth	Firm Efficiency Indicator	Ratio Change Rate (10-year average)
ROA 10y-Average	Firm Efficiency Indicator	Ratio (10-year average)
Operating Income/Capital 10y-Aver.	Firm Efficiency Indicator	Ratio (10-year average)
ROIC 10y-Growth	Firm Performance Variable	Ratio Change Rate 10-year average)
ROIC 10y-Average	Performance Variable	Ratio (10-year average)
Asset Turnov. 10-y Growth	Firm Efficiency Variable	Ratio Change Rate 10-years average)
Asset Turnov. 10y-Average	Firm Efficiency Variable	Ratio (10-years average) (EUR in thousand)
Operating Margin 10y-Average	Firm Output Variable	Ratio (10-years average)
> 25% International Revenue	Grouping Variable	Dichotomous Variable

Variable Name	Indicator/Variable Type	Type of Measure/Variable
Revenue Abroad 10y-Average	Firm Output Variable	Absolute Number (10-year average)
Employees 10y-Average	Group Variable	Absolute Number (10-year average)
Revenue per Employee 10y-Average	Firm Characteristic	Ratio (10-year average) (EUR in thousand)
Acquisition/Revenue 10y-Average	M&A Intensity Variable	Ratio (10-year average)
Acquisition/Capital Expenditures 10y-Average	M&A Intensity Variable	Ratio (10-year average)

Source: Author's presentation

Note: See the third paragraph of this section for the calculation formula for change rates and growth rates .

As mentioned, 40% of the studies in firm performance research apply operating revenue and/or income growth as performance indicator while other studies use profitability indicators such as the ROA, ROE or ROIC as firm performance measures (Achtenhagen et al., 2010, p. 293; Luo & Chung, 2005; Tan & Mahoney, 2005; Shaw et al., 2005Westphal & Bednar, 2005; Rochina-Barrachina et al., 2010; Urgal et al., 2013). This study uses three firm performance indicators which are calculated based on the raw data (see Table 6) provided by the Thomson Reuters One database:

- Revenue Growth: Some firm growth studies discussed in the theoretical framework chapter have questioned the meaningfulness of revenue growth as firm performance indicator (e.g. Shepherd & Wiklund, 2009). But although companies cannot grow in the longer term without being profitable, revenue is the prerequisite for operating income growth, because margins could not be increased indefinite. Therefore, revenue growth remains a meaningful basis for performance measuring, as it is also applied, as mentioned, in the majority of firm performance studies. Therefore, this study applies 10-year revenue growth as indicator for quantitative firm growth indicating that a company can extend its market shares or to establish new markets by new products.

- Operating Income Growth: Operating income is generally calculated as revenues less cost of revenue, business operations expenses and depreciation. In this research, operating income growth is applied as indicator for qualitative growth because increasing profit is a basic qualitative purpose of companies.
- Return on Invested Capital: The ROIC is generally calculated as net income less the dividends divided by the total capital indicating the capital allocation efficiency (Hill, 2003, p. 378). As mentioned, revenue growth does not necessarily result in firm value creation and can sometimes lead even to firm-value destruction, ROIC is a value creation indicator (Carrado-Bravo, 2003, p. 259). Moreover, other profitability indicators are included, such as the ROA and ROE, but rather as control variables because ROA and ROE can be manipulated through accounting policies (Palepu & Healy, 2007, p. 200).

The following accounting indicators and ratios are used as independent variables or control variables following Gruenwald and Wehrmann (2014):

- Firm Size: Revenue can be considered as standard indicator in business research to determine firm size (Hirschey, 2009, p. 408). Beck et al. (2005) as well as other researcher find evidence that firm growth is related to firm size because larger firms could externalise funding much more than small firms by using the financial markets allowing to disproportionally benefit more from external capital than small firms. Consequently, firm size is an important controlling variable particularly because, as mentioned, stochastic firm growth research finds evidence that growth depends on size. Moreover, some researchers explain the size effect on growth by that larger companies are more diversified than smaller (Impink, 2011). Therefore, the 10-year average is an important variable to control for size effects.
- R&D Expenses: R&D expenditures are considered as strategic growth catalyser increasing the competitive advantage (Holtzmann, 2008, pp. 1037-1038). But although some studies question the growth-determining effect of R&D expenses (Hsiao & Li, 2012, p. 8), R&D expenses are considered in this research as growth predictor in because of the

relevance of intangible assets as firm growth predictor whereby intangible assets growth can be explained by R&D expenses growth.

- R&D Expenses in % of Revenue: The share of R&D expenses in revenue is an indicator to measure R&D intensity and as such also an often-used predictor (e.g. Capasso et al., 2015).
- Operating Expenses: Operating expenses represents the sum of all costs for the maintenance of business operations (fixed costs) independent from output fluctuations. Consequently, operating expenses do not account for investment activities (expenses) to expand production. Prior research, such as the study of Levine & Warusawitharana (2014), has found evidence for a positive correlation between firm growth and operating expenses which is self-explanatory because operating expenses increase with increasing output to realize revenue growth. Furthermore, the operating expenses is applied as size controlling variable.
- Operating Expenses to Revenue Ratio: This ratio (also known as cost-income ratio) is applied as cost efficiency indicator by relating operating expense to the revenue. The ratio decreases, for example, due to increasing revenues while keeping expenses stable or cost cutting activities in the context of a stable revenue. Therefore, the ratio is a good indicator for management activities in the context of operations management and marketing (Krause & Arora, 2010, p. 57.)
- Property, Plant & Equipment (PPE): PPE growth is not often applied as firm growth research. However–as mentioned–internationalisation research uses this indicator in the context of determining the internationalisation degree as the ratio of total assets to foreign assets. Furthermore, there is some evidence that PPE growth is an appropriate predictor for revenue growth indicator, since revenue growth requires operations output increase and thus the expansion of production capacities (Warusawitharana, 2008).
- Intangible Assets and Intangible Assets in % of Total Assets: Recent studies (e.g., Chen, 2014) find hat intangible assets are not firm growth determinant but a reason for firm growth limits. If the ratio between total assets and intangible asset falls below a certain level, sustainable growth

is unlikely. Therefore, the ratio between total assets and intangible assets is also included as variable.

- Total Assets: This balance sheet includes all non-current and current assets such as inventory, cash and accounts receivable. The growth of total asset is often applied as a performance indicator (Impink, 2011).
- Total Assets/Revenue Ratio: To measures the company's efficiency in asset management, the assets-revenue ratio is calculated . A higher efficiency of the use of assets resulting in a higher business profitability is indicated by a lower ratio.
- Working Capital: Working capital is an indicator for both its operational efficiency and the company's short-term financial health. Calculated as current assets less the current liabilities. Consequently, working capital represents the cash amount available for operations. Therefore, working capital is a prerequisite for firm growth because the higher the efficiency of current assets management, the higher is the cash flow from operations, resulting in a higher amount of capital available for investments in assets to sustain firm growth (Palepu & Healy, 2007, p. 221).
- Net Assets from Acquisitions: M&A activities are often executed in the context of growth strategies to increase the existing operations capabilities or market shares or to buy-in into new markets or market segments. M&A is found in prior research as source for disproportionate firm growth (e.g., Burghardt & Helm, 2015)
- Retained Earnings: Retained earnings are the share of net income that is not paid out as dividends to shareholders but retained to be reinvested. Prior research (e.g., Davidsson & Wiklund, 2013) identified retained earnings as appropriate future growth predictor, because of the internal funding capabilities for financing growth.
- Operating Income to Total Capital Ratio: This ratio reflects the efficiency a company in employing its total capital (equity and debt capital) in relation to the income from ordinary business operations. Applying the operating income as performance indicator allows to exclude the effects from tax optimization, interest expenses or others, so that the ratio indicates how efficiently the capital is employed in business operations.

- Capital Expenditures: CAPEX are funds which can be deployed in acquiring or upgrading the tangible assets. High-growth companies, for example, show a higher ratio of capital expenditures to net income compared to low-growth companies (Damodaran, 2012, p. 351).
- Debt in % of Total Capital: The capital structure theory assumes that an increase in the debt-to-capital ratio determines with firm growth. Prior research has found a positive relation of debt capital growth and productivity growth as long as costs of capital are below the return which should be expected from the capital structure theory (e.g. Levin & Warusawitharana, 2014).
- Return on Assets (ROA): The ratio between net income to total assets is another indicator for total assets efficiency. Margins and asset turnover have a statistically significant impact on the ROA (Dickie, 2006, p. 136). Moreover, multi-product and multi-market companies show generally a higher ROA (Impink, 2011).
- Operating Margin: The operating margin is calculated as revenue less the cost of goods sold and operating expenses in percent of revenue. The operating margin is – according to (Mishra, 2015, p. 180) – a main ROI predicator and is, moreover, an appropriate indicator for an existing competitive advantage (Mishra, 2015, p. 177).
- Asset Turnover: A higher asset turnover indicates a higher efficiency in the employment of the assets. The turnover ratio, however, depends sometimes on the industry. Yet asset turnover is sometimes determined by industry-specific effects due the industry-specific high sales volume (Saxena, 2009, p. 479). Nonetheless, asset turnover is an appropriate indicator to determine the change in the efficiency of business operations in the long-term trend but has only limited value because of its dependence on the business model. Thus, the asset turnover is rather an indicator of the business model performance compared to other the business model of other companies.
- Internationalisation Degree: Multinational enterprises are defined as companies with a foreign revenue of more than 25% of the total revenue (Baharin et al., 2012, p. 50). This definition is applied as an independent

variable as well as a grouping variable to distinguish between MNE and non-MNE.

- Factor Intensity (Specialisation): Factor intensity as a macroeconomic concept has its origin in international trade theory and reserach. Some recent business studies have used the concept to examine firm specialisation. Croizet and Trionfetti (2011), for example, state that factor intensity is a good specialisation indicator showing a strong correlation with firm performance. Therefore, the concept of factor intensity is also introduced in this research:
    - Labour Intensity: Labour intensity is calculated as revenue divided by number of employees. This study uses the reciprocal of this ratio, which is the standard productivity ratio in business research (Sullivan, 2004, p. 84) which also allows to apply this ratio as a specialisation indicator provided that a higher ratio indicates a lower labour intensity.
    - Knowledge Intensity: Knowledge intensity has become a widely-used determinant for excessive firm growth (Rylander & Peppard, 2005). However, a generally accepted concept for measuring knowledge intensity does not exist (Autio et al., 2000; Toften & Olsen, 2003). The included companies are ranked according to their R&D-expenses/revenue ratio indicating the revenue share spend for R&D indicating knowledge intensity.
    - Capital Intensity: Capital-intensive companies are characterised by a higher share of capital costs (imputed interest and depreciation) compared to other costs. Increasing automation increases the company's capital intensity. The capital intensity ratio is calculated as total assets divided by revenue.
- Competitive Positioning (Competitive Strategy): Two different competitive advantages can be deduced from the industrial economics literature. Porter (1982) identifies the production advantage as well as the customer advantage as sources for competitive advantages (Carlisle, 2014, p. 72). A production advantage "*allows a company to deliver goods or services more cheaply than its competitors*" (Mauboussin & Callahan, 2015, p. 47).

However, there is no common indicator for determining a competitive advantage (Barney et al., 2012, p. 128; Mauboussin & Callahan, 2013, p. 41; 2015, p. 47). A production advantage is indicated by low margins and a high asset turnover. Consequently, companies with a lower consumer advantage should have lower margins, but higher turnover rate due to their positioning in the mass market. Therefore, this research measures a customer advantage by the operating margin and a production advantage in terms of asset turnover.

When determining both the specialization indicator and positioning indicator, in the case of many companies the results would have allowed to assign them–in the case of determining the positioning classification–to both groups. To get a clear differentiation, the companies are assigned to one of both groups by ranking the sample by the asset turnover and by margins. The top-10% of the companies from both rankings are than qualified as companies having production or customer advantage resulting in 58 companies that could be categorized unambiguously. Consequently, two variables are introduced: (1) asset turnover top-10%, and (2) operating margin top-10%. The group assignment is coded as 1 if the company belongs to the top-10% group or as 0 if a company was not included in to the top-10% group. Consequently, 56 companies are identified as companies with an unequivocal customer advantage, 56 companies with a production advantage.

The same procedure was applied concerning the specialisation classification. Similar to the procedure in classifying the competitive positioning, the companies are ordered by the values in the area of capital intensity, labour intensity, and knowledge intensity. To avoid that a company are include in more the only one group only the top-10% companies of each group are selected. Consequently, 56 knowledge-intensive companies, 56 capital-intensive companies and 56 labour-intensive companies are identified.

3.5 Data Analysis Methods

In this study, three distinct statistical analysis methods are applied: (1) descriptive statistics, (2) the multiple regression analysis, (3) the t-test for testing group differences. The multiple regression analysis examines the relationship between

several independent variables and a dependent variable. The t-test aims at analysing group differences. The descriptive statistics describes frequencies, ranges and averages of firm characteristics. The applied statistical tests (see tables below) are standards in business research (Burns & Burns, 2008).

3.5.1 Regression Analysis

The bivariate correlation is the simplest approach to measure the relationship between variables. However, bivariate correlations are only a first evidence for causal effects. However, a significantly strong relation between a variable A and a variable B implies only a relationship but not the direction of the effect (Holtmann, 2010, pp. 13, 17). Therefore, other methods must be introduced.

The multiple regression determines the explanatory power of several independent variable on the variance of the dependent variable (Holtmann, 2010, pp. 75-76, 84). Thus, the multiple regression analysis enables to examine complex cause-effect relationships (Holtmann, 2010, p. 84). Therefore, the multiple regression is frequently used in social sciences and economics in particular (Schulze & Porath, 2012, p. 475).

The multiple regression is not only an instrument to determine the effect of several variables but allows to control collinearity effects among the predictors (Milsap & Maydeu-Olivares, 2009, p. 302). Consequently, the multiple regression approach allows to include several explanatory variables that may be correlated with each other; and it allows to control such effects resulting in models for better predictions of the dependent variable (Wooldridge 2016, p. 60). Therefore, multiple regression analysis can be seen as a standard approach in econometrics (Mertel & Reinhart, 2017, p. 175). According to Wooldridge (2016), this approach is "*still the most widely used vehicle for empirical analysis in economics and social sciences*" (p. 61), which may even be true for astronomical data analysis with its large amounts of data and variables (Chattopadhyay & Chattopadhyay, 2014, pp. 137-138).

The methodological basis of multiple regression analysis is the principle of the ordinary least squares (OLS) (Wooldridge, 2016, p. 69). The regression model can be described by using so-called regression coefficients like in simple

regression; but, in multiple regression, an additional regression coefficient is added for each independent variable (e.g. β_2, β_3) so that the model takes the following form (Tarpey 2011, pp. 87-89):

$$y = \beta_0 + \beta_1 \cdot x_1 + \beta_2 \cdot x_2 + ... + \beta_k \cdot x_k + \varepsilon_i$$

with

y = estimator of the dependent variable
x_k = independent variable k
β = regression coefficient of the variable x_k
ϵ_i = error term of the subject (case) I
β_0 = intercept or constant.

Before executing regression analysis, it must be decided in which order the independent variables should be included in the regression. Assuming that all independent variables will be completely uncorrelated, the order in which they are inserted into the regression does not matter. However, in social sciences, variables are rarely completely uncorrelated. Thus, the method of variable inclusion, of which there are four, is relevant (Meyers et al. 2013, pp. 357-363; Mertler & Reinhard 2017, p. 175):

- Inclusion: This method inserts all predictors into the model at the same time. This method is used when the model is based on theoretical considerations. This means, it is suitable for testing theories, while the other methods are more likely to be used in explorative studies.
- Forward stepwise selection: The bivariate correlations among all variables are calculated. The variables are added sequentially to the model. The independent variable most correlated to the dependent variable is introduced first in the regression. It is assessed in terms of its contribution (in terms of r^2) to the explanation of the dependent variable. The next variable to be entered is the independent variable that contributes most to the prediction of the depending variables with the largest partial correlation. This process is repeated until the model quality (in terms of r^2) has not significantly increased or not excluded all variables due to low or non-significant contribution to the explanatory power.

- Backward stepwise elimination: First, all predictors are included in the regression and, subsequently, removed sequentially. The predictor, which has the smallest partial correlation with the dependent variable, is excluded step by step until either none fulfils the used exclusion criteria or no more variables are in the model.
- ‘Automated’ stepwise selection: This method is similar to the forward selection, but it also tests at each step to remove the least useful predictor. Stepwise multiple regression ‘automates’ the selection, keeping and dropping x variables from a user-specified variable list. However, the automated stepwise selection should be rejected due to methodological issues (Baltes-Götz 2018, pp. 124-126).

This research approach is explanatory, which means that not a given model and its selected set of factors (variables) are tested with other different or larger samples to confirm or reject it. On the contrary, the aim of this research is hypothesis generation. Consequently, the forward or backward stepwise selection approach should be considered, while automated selection is excluded due to its methodological problems.

Exploratory studies aim to identify those potential predictor variables that make a useful contribution to the overall prediction model in the case that theory in a specific research area is not well developed and/or number of explanatory variables is larger than usual, as is typical for exploratory research questions (Menard 2002, p. 64; Menard 2010, p. 117; Mertler & Reinhart 2017, p. 175). Forward regression is a recommended approach for finding exploratory data models from a multitude of variables in the context of searching for causal–effect relationships to identify independent variables with a lack of explanatory power (Pearsons 2015, p. 677; Mertler & Reinhart 2017, pp. 175-176).

Forward stepwise regression is used to identify a single or a group of independent variables, which should be included in the regression model to develop research models that are supported by data (Mertler & Reinhart 2017, pp. 175-176). However, selecting the best or most robust regression model (final model), respectively, requires (1) the controlling of collinearity or multicollinearity

(variance inflation factor (VIF) and tolerance (TOL) test), and (2) the autocorrelation (Durbin-Watson) test (Meyers et al. 2013, pp. 363-365; Baltes-Götz 2018, pp. 44-46, 99, 134-136).

For selecting a robust model from the models generated by forward stepwise regression, the variance inflation factor (VIF) and the tolerance (TOL) as the reciprocal of VIF measure the impact of collinearity or multicollinearity among regression predictors (independent variables). Both indicators refer to the degree to which collinearity or multicollinearity among the predictors degrades the precision of an estimate and, thus, the quality of a regression model. Though there is no universally agreed cut-off point for VIF values, most researchers consider a VIF below 5 as an indicator for the non-existence of collinearity or multicollinearity problems (Pedhazur 1997, p. 298; Bonate 2011, p. 69); some a VIF below 3 (Hair et al., 2014, p. 200). Some researchers even suggest that multicollinearity is not a significant problem if the value of VIF is below 10 (Mertler & Reinhardt, 2017, p. 174).

The tolerance describes how much of the variance of one independent variable can be explained by other independent variables, while the VIF value implies the strength of variance increase due to multicollinearity (Hair, 2014, p. 197). A VIF of 1.0, which is equal to the tolerance (TOL) of 1.0, indicates the absence of multicollinearity, so that the standard error is unaffected. However, a tolerance of 0.25 (VIF = 1/TOL = 1/0.25 = 4) implies very high multicollinearity because 75% of the variable's variance can be explained by other independent variables (Hair, 2014, p. 197). Consequently, accepting independent variables with a TOL of < 0.1 (VIF < 10) means that more than 90% of this variable's variance can be explained by other independent variables. On the contrary, following the recommendations of finance researchers like Zimmermann (1997, p. 303) and Scheld (2013, p. 237) with a particular focus on predictive models (Schlegel, p. 203), which do not accept more than a 20 % collinearity effect between independent variables, this research follows a very strict cut-off threshold. This means that a model generated by forward stepwise regression including an independent variable with a tolerance of below 0.8 (TOL < 0.8) leads to the exclusion of the model. Consequently, the final model for each firm performance indicator of this research show very low collinearity effects.

Generally, OLS-based regression is not robust against outliers in the case of small samples (Wooldridge, 2016, p. 302). A single outlier can be the reason for a particularly high or low regression coefficient (Backhaus et al., 2016, p. 99). However, for a larger sample, the normality assumption loses significance (central limit theorem), since, with increasing sample, the coefficients become independent from the distribution form of the residuals of a normal distribution (Backhaus et al., 2016, p. 99). Only extreme deviations can lead to estimation problems and distorted regression coefficients (Cleves et al., 2010, p. 2). The central limit theorem determines that observations for a variable can be assumed as normally distributed even in the case of a certain deviation from the normal distribution curve, if the number of observations is sufficiently large (Wooldrigde, 2016, p. 155). According to Backhaus (2016, p. 99), this is justified by the fact that, in reality, there are many random phenomena resulting from the superimposition of numerous random effects. In reality, in the best case, only approximately normally distributed observations can be expected (Wooldrigde, 2016, p. 155). Baltes-Götz (2018, p. 64) states that normal distribution assumption is almost always violated. However, in most cases, multiple linear regression is sufficiently robust against normal distribution assumption violations. The central limit theorem provides the justification for assuming that, in these cases, at least approximately one normal distribution is given. Thus, according to the central limit theorem, a sample size of N = 10 with a symmetrically distributed population, i.e. an equivalent mean and median, is very similar to the distribution of a normal distribution (Treyer, 2003, p.103).

To sum up the multiple regression procedure as applied in this research: (1) The regression is performed a forward stepwise regression; (2) based on the results, the final model is selected based on the tolerance values of the independent variables excluding models including variables with TOL values below 0.8 (TOL < 0.8); (3) the final model is analysed concerning multicollinearity and autocorrelation effects. Based on this procedure, the final model for each test is defined.

3.5.2 T-Test

The t-test is used in statistics in the context of group comparison comparing mean differences. Two different t-tests can be conducted for this purpose: (1) the one-sample t-test and (2) the two-sample t-test. The one-sample t-test is used to compare a sample to its population or different groups of the same sample (Sirkin, 2006, p. 272). The t-test assumes that samples from a given population are characterised by the same standard deviation expressing by how much the cases of a group differ from the group's mean value (Sirkin, 2006, pp. 201, 272).

The requirements for comparing a sample with its basic population or two groups using a t-test is that the dependent variable is interval-scaled, which allows to calculate the mean value and the standard variance from the mean value of each group or of the basic population and the sample, respectively (Sirkin, 2006, p. 272). Statistical significance indicates that the likelihood of a relationship between two variables is very high (Sirkin, 2006, p. 201).

Concerning the sometimes-mentioned assumption that the t-test is only valid in the case of normal distribution, it can be stated, Wenzelburger et al. (2014, p. 58) as well as Bortz and Schuster (2010, p. 122) do not support this passed-on assumption due to 'testing the test' concluding that particularly in the case of equal group sizes the t-test is also valid. Braunecker (2016, p. 287) even notes that non-parametric tests were increasingly substituted by the t-test in the recent past. Consequently, the normal distribution of data is not required.

3.6 Research Procedure

As a consequence, from selecting an explorative approach, this study does not define a set of hypotheses following from existing models or an individual model derived from existing research findings and literature. The general assumption is that a specific firm behaviour can be identified by measuring management activities in terms of changes in the financial indicators. Consequently, this research explores the given accounting data regarding the general concept of generic growth strategies, whereupon companies grow through R&D, M&A, internationalisation and the extension of production capacities.

Based on this approach, different tests are conducted to explore the total sample or sub-samples defined by specific group characteristics to find possible explanatory between measurable management activities or firm characteristics and firm performance, whereas the main focus is on the effect of internationalisation on firm performance. Consequently, the research process follows a general line and examines in detail the test results following from the overall research questions. In this context, the multiple regression analysis is, as discussed in Section 3.5.1, the main instrument for exploring the total sample or distinct groups to find variables indicating management activities and effects of such activities determining firm growth and the effects of internationalisation, whereas the t-test allows to find group differences between groups with distinct characteristics, such M&A activities, research intensity, internationalisation degree and other characteristics.

Chapter 4. Results of the Data Analysis

Following the discussion in the research framework of this study in Chapter 2, four ‘generic’ management activities, which are measurable with the instruments of the financial analysis, can be identified as sources of firm growth:

(1) Innovation in terms of R&D expenditure and intangible assets generation or acquisition, whereby R&D can lead to new products or process innovation, contributing to organic growth (internal growth),
(2) Investment in capital assets can lead to process optimisation generating a cost advantage, new abilities to produce new products or provide new services enabling to grow into new markets or in existing markets (internal growth),
(3) M&A activities (external growth),
(4) Intensification of the internationalisation process.

All mentioned ‘generic’ management activities become apparent in company’s financial data, because they produce costs, changes in stock data and performance indicators.

Section 4.2 analyses the total sample by presenting and discussing its descriptive statistics. Section 4.3 investigates cause–effect relationships to find predictors qualitative and quantitative growth by applying the multiple regression. Section 4.3 analyses group differences between the high-growth group and non-high-growth companies of the sample, the R&D-intensive and non-R&D-intensive companies as well as between knowledge-intensive and non-knowledge-intensive companies. Section 4.4 investigates the differences between the MNEs and non-MNEs.

Several analyses are carried out to examine the meaning of internationalisation in the firm’s growth process organised in 8 steps:

(1) Descriptive analysis of the sample,
(2) Descriptive analysis of the sample’s largest 20 companies,
(3) Analysis of growth determinants among the sample,
(4) Analysis of growth determinants among the high-growth group,

(5) Descriptive analysis of the top-20 companies with the highest productivity and R&D expenditures,
(6) Analysis of performance difference between knowledge-intensive and research-intensive companies compared to the other companies of the sample,
(7) Analysis of performance differences between MNE and non-MNE,
(8) Analysis of the determinants explaining growth among the MNE group and the non-MNE group.

From these 8 tests, further questions arise leading to additional data analysis steps, which are:

(1) The examination of the relationship of the debt-to-capital ratio and the productivity with the degree of internationalisation,
(2) The analysis of performance differences and differences in other firm characteristics between M&A- and non-M&A companies among the MNE group.

4.1 Total Sample Descriptive Statistics

The total sample includes 569 companies (see Appendix I):

(1) The sum of the 10-year average revenue of all companies accounts for EUR 1,824bn. The German GDP in 2015 amounts to 3,353bn, the Swiss GDP for 670bn and the Austrian GDP for 376bn (World Bank, 2017).
(2) The sample's companies invested EUR 55bn in R&D per year in the 10-year observation period. The Balance Sheet value of the PPE accounts for EUR 664bn, while the total assets amount to 2,316bn (see Table 8).
(3) The sample includes 394 German companies, 134 Swiss companies and 41 Austrian companies (see Figure 2).

Table 8. Amount of Revenue, R&D Expenditure, and Assets (in EUR)

	N	Sum
Revenue 10y-Aver.	569	1,824,164,509.51
R&D 10y-Aver.	568	55,358,281.88
PPE 10y-Aver.	569	644,043,742.06
Tot.Ass. 10y-Aver.	569	2,316,101,492.48

N = 569.

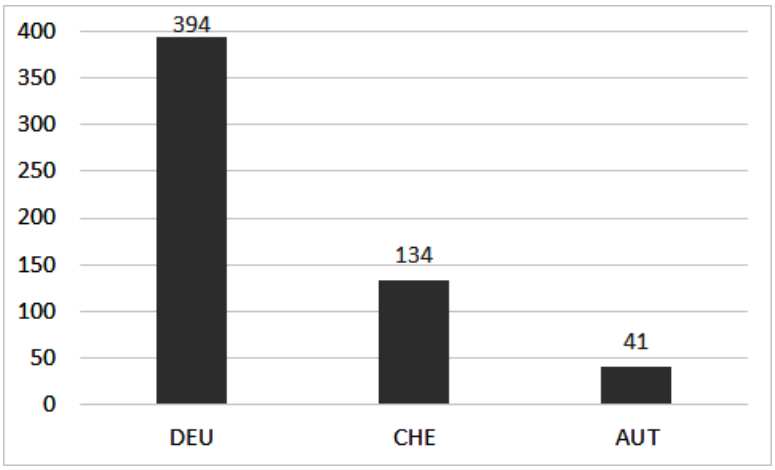


Figure 2. Number of Companies per Country included in the Sample

N = 569.

Concerning the financial performance and other firm characteristics, an 'average company' in the sample can be described as follows (see Table 9):

- The average annual revenue growth rate in the 10-year observation period is 12.2%.
- The average annual operating income growth rate accounts for 10.1%.
- The average annual revenue by firm size in the 10-year observation period is EUR 3.2bn. The smallest company shows an average revenue of EUR 0.1m, the largest company EUR 125.7bn.
- The average annual share of intangible assets is 13.89% of the total assets.
- The average company invests 97m per year which is 4.2% of the revenue in the average. R&D expenditure has increased in the 10-year research period by 4.6% per annum (p.a.).

- The average annual operating income is EUR 244m, which is 7.6% of the average revenue (EUR 3.2bn).
- The average company generates 34.9% of its total revenue abroad.
- The Balance Sheet of the ‘average company’ shows retained earnings of EUR 959m in the 10-year average.
- The average company has invested 2.1% of the revenue in M&A activities and EUR 70m in average per year.
- The average company’s ROIC accounts for 6.1%, while the average profitability in terms of ROA (-19.6%) and ROIC (-9.5%) decreased in the research period.

Compared to the S&P 500, the differences concerning the key performance indicators are very small:

- J.P. Morgan (2014, p. 1) finds that the average S&P 500 company generates an ROIC of 6.7%. Furthermore, the growth rate of the average S&P 500 company is below the average growth rate of the sample.
- According to S&P (2017), the revenue growth rate mean of the S&P 500 companies accounts for 3.04% p.a. over the period 2002 to 2015.
- The average S&P 500 company shows an operating income growth, 8.93% (CIS Markets, 2017).

Table 9. Total Sample's Descriptive Statistics (in EUR 1,000; %)

	N	Minimum	Maximum	Median	Mean
Revenue 10y-Growth	569	-33.3	308.7	5.9	12.2
Revenue 10y-Aver.	569	100.5	125,713,545.5	213,839.0	3,205,913.0
R&D 10y-Aver.	568	0.0	7,523,545.5	945.6	97,461.8
R&D 10y-Growth	434	-23.9	695.1	0.0	4.6
R&D%Rev.	569	-0.1	347.9	0.3	4.2
Op. Exp. 10y-Aver.	560	-82,247.5	121,947,000.0	221,090.8	3,010,630.2
Op.Exp./Rev. Ratio	569	-89.5	5,540.8	95.8	112.5
Op.Inc. 10y-Growth	557	-5,854.7	11,247.8	11.7	10.1
Op.Inc. 10y-Aver.	569	-150,879.4	12,758,090.9	8,486.8	244,014.7
PPE 10y-Growth	559	-38.6	4,946.2	5.1	29.2
PPE 10y-Aver.	569	0.0	50,680,090.9	57,461.0	1,131,887.1
Intang.Ass. 10y-Growth	537	-41.9	1,006.3	18.0	57.3
Intang.Ass 10y-Aver.	568	0.0	50,070,545.5	17,481.6	745,333.4
Tot.Ass. 10y-Growth	569	-20.1	465.9	6.2	11.6
Tot.Ass. 10y-Aver.	569	1,294.7	186,382,000.0	218,616.2	4,070,477.1
Work.Cap. 10y-Growth	519	-953.7	1,951.9	9.1	1.7
Work.Cap. 10y-Aver.	537	-32,144,363.6	19,305,272.7	33,824.2	275,461.2
Ret.Earn. 10y-Growth	545	-2,184.5	2,608.0	15.0	12.3
Ret.Earn. 10y-Aver.	569	-17,196,363.6	63,503,000.0	37,819.8	959,491.7
Net. Acqui. 10y-Aver.	569	-1,051,000.0	4,568,208.2	1,010.0	70,961.0
Cap.Exp. 10y-Growth	523	-39.2	3,546.8	15.7	47.5
Cap.Exp 10y-Aver.	569	0.0	13,536,090.9	9,728.1	202,250.2
Debt%Cap. 10y-Growth	527	-152.8	461.0	1.1	10.4
Debt%Cap. 10y-Aver.	569	0.0	352.2	30.9	32.7
ROA 10y-Growth	515	-846.3	685.1	0.9	-19.6
ROA 10y-Aver.	569	-59.0	30.1	4.5	3.7
Op.Inc./Cap. 10y-Aver.	569	-16,460.0	95.7	7.5	-28.4
ROIC 10y-Growth	511	-865.5	1,482.6	2.1	-9.6
ROIC 10y-Aver.	569	-175.9	365.7	6.8	6.1
Ass.Turnov. 10-y Growth	567	-41.4	177.5	0.9	4.0
Ass.Turnov. 10y-Aver.	569	0.0	6.6	1.1	1.1
Int.Rev%Rev	488	0.0	100.0	32.5	34.9
Employee.10y-Aver.	565	0.2	455,848.1	984.7	11,117.4
Rev.p.Employ.10y-Aver.	565	18.4	31,948.5	222.2	463.1
Acqui%Rev	569	-7.2	77.5	0.3	2.1
Intang.Ass.%Tot.Ass.	569	0.0	89.4	8.9	13.9
Valid N (listwise)	155				

N = 569.

If the mean and median values of the sample are compared, six characteristics are evident (see Table 9):

(1) 50% of the companies show growth rates (Revenue 10y-Growth) of almost half of the ‘average company’ (< 5.9% vs. 12.2%).
(2) 50% of the companies generate less than EUR 213,8m in the annual average (total sample: EUR 3,2bn).
(3) 50% of the companies are significantly smaller than the ‘average company’ in terms of revenue and numbers of employees (less than 985 employees vs. 11,117 employees).
(4) According to the larger number of companies with a below-average firm size, several other size-dependent indicators, such as PPE, total assets, and retained earnings, also show below-average values.
(5) The profitability indicators (ROA, ROIC) as well as the share of foreign revenue are almost equal.
(6) 50% show no growth in their R&D expenditures and invest less than 1% in R&D than the ‘average company’.

Consequently, it can be concluded that small companies dominate the sample. However, examining the 20 largest companies of the sample, it becomes apparent that the largest companies are no statistical outliers distorting the sample’s average (see Table 10). Their revenue growth rates fluctuate within the range of -0.2% and 21% with a mean value of 5.1% (total sample median: 5.9%). Furthermore, as discussed in the research design section, firm size is included in each data analysis performed by the regression analysis as control variable.

Other indicators, such as R&D in % of revenue or the internationalisation degree, are significantly higher leading to a preliminary conclusion that internationalisation degree and R&D intensity affect firm size. The ROA and ROIC average are only slightly higher than the sample median. Consequently, the influence of the sample’s biggest companies in terms of firm size can be considered as rather moderate. However, as it is noted in the introduction to this chapter, the key indicator averages of this sample are highly comparable with the S&P 500. Furthermore, at least western economies are dominated by small and medium-sized companies (Wallau & Haunschild, 2007, p. 69).

Table 10. Top-20 Companies in Terms of Firm Size (Revenue)

Company	Revenue 10y-Growth (in %)	Revenue 10y-Aver. (EUR 1,000)	R&D 10y-Aver. (EUR 1,000)	R&D % Rev.	Op.Inc. 10y-Aver. (EUR 1,000)	ROA 10y-Aver.	ROIC 10y-Aver.	Int. Rev % Rev	Employees 10y-Aver.
VOLKSWAGEN AG	8.6	125,713,545	4,502,273	3.6	3,766,545	3.4	5.3	81.7	401,479
DAIMLER AG	-0.2	117,333,091	4,288,273	3.7	4,902,455	2.3	3.4	65.4	306,643
NESTLE SA	0.9	95,901,727	1,539,364	1.6	12,758,091	12.2	16.4	85.9	284,818
E.ON SE	11.7	81,908,909	43,111	0.1	5,012,091	4.4	8.3	12.0	78,899
SIEMENS AG	0.5	76,569,727	4,335,636	5.7	4,845,727	4.7	9.4	47.2	411,864
METRO AG	1.5	62,353,653	44,834	0.1	392,634	2.8	6.2	34.0	277,386
DEUTSCHE TELEKOM AG	0.8	60,260,455	295,209	0.5	5,780,818	2.9	3.8	47.6	241,459
BASF SE	9.1	57,024,791	1,402,591	2.5	6,414,409	7.7	12.3	41.5	97,987
BAYER. MOTOREN WERKE	6.5	56,692,273	3,034,091	5.4	4,196,727	3.3	4.4	83.9	103,498
DEUTSCHE POST AG	4.1	51,583,455	6,333	0.0	1,367,273	2.8	6.5	45.2	455,848
RWE AG	2.0	45,812,636	137,909	0.3	5,159,000	3.3	8.8	24.0	78,074
NOVARTIS	5.2	45,746,378	7,274,875	15.9	9,348,751	11.3	14.7	79.5	104,806
THYSSENKRUPP AG	1.2	43,185,455	655,818	1.5	983,818	1.1	2.4	53.1	182,636
ROCHE HOLDING AG	4.4	42,102,636	7,523,545	17.9	11,248,636	13.6	18.6	93.5	76,597
AUDI AG	8.3	34,680,456	2,134,147	6.2	2,255,561	8.7	20.9	79.2	57,292
BAYER AG	3.7	32,969,818	2,624,455	8.0	3,413,455	5.2	8.7	51.9	108,927
ABB LTD	4.6	32,464,449	1,110,713	3.4	3,495,344	7.0	15.1	86.0	120,218
ADECCO	0.5	27,261,495	0	0.0	1,023,343	6.4	11.6	49.1	32,383
OMV AG	21.3	23,456,108	16,373	0.1	2,118,754	6.4	10.3	36.3	34,668
DEUTSCHE LUFTHANSA	6.8	23,330,000	5,909	0.0	-70,727	3.1	6.7	32.3	106,687
Ø	5.1	56,817,553	2,048,773	3.8	4,420,635	5.6	9.7	56.5	178,109

Additionally, it can be stated:

(1) Based on the standard definition of the multinational enterprise (MNE) with 25% share of foreign revenue (Baharin et al., 2012, p. 50), the average company in the sample is a multinational enterprise with 32.5% of foreign revenue.
(2) Concerning the average firm size in terms of average annual revenue, this sample's average company is 2.5-fold larger than the average US-listed company with USD 1.2bn average annual revenue (Artmann, 2011, p. 64). However, this difference can be explained by the fact that corporate financing in the US prefers more capital market funding than European firms (Vernardakis, 2016, p. 198), so that a larger number of small companies in the US are stock-listed.

Therefore, it can be summarised that the 'average company' of this sample belongs to the group of larger corporations compared to US-listed 'average company' and is a multinational firm. Furthermore, it is noticeable that the internationalisation degree of the top-20 companies in terms of firm size is significantly higher with an average of 56.5% of the revenue generated abroad, while the average company shows an average of only 34.9%.

4.2 Qualitative and Quantitative Growth—Total Sample

4.2.1 Revenue Growth Regression Analysis—Total Sample

To examine quantitative growth, multiple regression analysis is performed on the total sample (N = 569) and all variables, reflecting investment and financing activities including M&A activities, PPE investment, leverage, R&D intensity, operations efficiency, positioning variables (labour-intensity, knowledge-intensity and capital-intensity) and the degree of internationalisation. The multiple regression analysis is provided in Table 11; Model 3 emerges as the final model that includes asset turnover growth, capital intensity, and total assets growth as business model indicator.

Table 11. Multiple Regression Models for Quantitative Growth (Total Sample)

Model	R	R Square	Adjusted R Square	Change Statistics		Durbin-Watson
				R Square Change	Sig. F Change	
1	.526[a]	.277	.273	.277	.000	
2	.638[b]	.407	.401	.130	.000	
3	.662[c]	.438	.429	.030	.002	2.015

a. Predictors: (Constant), Tot.Ass. 10y-Growth

b. Predictors: (Constant), Tot.Ass. 10y-Growth, Ass.Turnov. 10-yGrowth

c. Predictors: (Constant), Tot.Ass. 10y-Growth, Ass.Turnov. 10-yGrowth, Cap.Intens.Top10%

d. Dependent Variable: Revenue 10y-Growth

N = 569.

The Durbin-Watson value indicates a very low autocorrelation between the variables included with d = 2.0 (see Table 11), which is in the range between the critical values of 1.5 < d < 2.5 (Treyer, 2003, p. 137). Furthermore, the collinearity statistics show a high tolerance value and as well as a VIF value of almost 1 (see Table 13) indicating a low level of collinearity and, therefore, high robustness of Model 3 as the final model. The ANOVA analysis gives high statistical significance of the final model (Model 3) with p < 0.01 (see Table 12).

Table 12. ANOVA of the Multiple Regression for Quantitative Growth (Total Sample)

Model		df	F	Sig.
1	Regression	1	69.768	.000[b]
	Residual	182		
	Total	183		
2	Regression	2	62.231	.000[c]
	Residual	181		
	Total	183		
3	Regression	3	46.741	.000[d]
	Residual	180		
	Total	183		

N = 569.

The beta coefficients are all positive, indicating the positive effect of all three independent variable on the dependent variable (see Table 13), which means that an increase in asset turnover and total asset has a positive effect on revenue growth. The positioning in industries with capital-intensive business models also has a positive but weak effect on quantitative growth.

Table 13. Coefficients of the Multiple Regression for Quantitative Growth (Total Sample)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	6.196	1.968		3.149	.002		
	Tot.Ass. 10y-Growth	.517	.062	.526	8.353	.000	1.000	1.000
2	(Constant)	5.033	1.796		2.803	.006		
	Tot.Ass. 10y-Growth	.381	.060	.388	6.338	.000	.872	1.146
	Ass.Turnov. 10-yGrowth	.678	.108	.387	6.310	.000	.872	1.146
3	(Constant)	3.740	1.802		2.075	.039		
	Tot.Ass. 10y-Growth	.361	.059	.367	6.100	.000	.861	1.161
	Ass.Turnov. 10-yGrowth	.659	.105	.375	6.261	.000	.869	1.151
	Cap.Intens.Top10%	17.992	5.763	.177	3.122	.002	.976	1.024

N = 569.

Consequently, the final model shows high significance, with no collinearity or autocorrelation problems and, therefore, the final model (Model 3) is considered as statistically valid indicating that the three variables included explain 43.8% (r^2 adj. = 0.429) of the variation in the dependent variable.

The dominant independent variable is total assets growth (r^2 adj.= 0.273), which can be interpreted by referring to Penrose's resource-based theory of firm Growth discussed in the research framework of this study. The building up of firm-specific resources is the necessary first step to market growth and to increasing revenue levels by satisfying rising demand. However, total assets include cash and equivalents, all gross investments, receivables as well as other tangible and intangible assets, so that it is questionable which of these factors represents the driver of total asset growth. Therefore, total asset growth is examined by including all growth variables of the variable set, which represent any type of balance-sheet-relevant assets, for example PPE growth, working capital growth (current assets minus liabilities), capital expenditure growth and intangible assets growth. Model 3 is the valid final model, with VIF and tolerance values of almost 1, and a significance of $p < 0.01$ (see Table 15). The Durbin-Watson value indicates a very low autocorrelation with $d = 1.9$, which is in the range of critical values $1.5 < d < 2.5$ (see Table 14).

Table 14. Multiple Regression Models for Total Assets Growth (Total Sample)

Model	R	R Square	Adjusted R Square	Change Statistics			Durbin-Watson
				R Square Change	F Change	Sig. F Change	
1	.211[a]	.044	.042	.044	22.267	.000	
2	.282[b]	.080	.076	.035	18.272	.000	
3	.308[c]	.095	.089	.015	8.121	.005	1.932

a. Predictors: (Constant), PPE 10y-Growth

b. Predictors: (Constant), PPE 10y-Growth, Intang.Ass. 10y-Growth

c. Predictors: (Constant), PPE 10y-Growth, Intang.Ass. 10y-Growth, Work.Cap.

d. Dependent Variable: Tot.Ass. 10y-Growth

N = 569.

The final multiple regression with total asset growth model (Model 3) implies that the growth of PPE is the most relevant explanatory variable (r^2 adj. = 0.042; $p < 0.01$) (see Table 14). All variables included in the final model show positive beta values indicating positive correlations (see Table 15).

Table 15. Coefficients of the Multiple Regression for Total Assets Growth (Total Sample)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	10.825	1.335		8.108	.000		
	PPE 10y-Growth	.028	.006	.211	4.719	.000	1.000	1.000
2	(Constant)	8.415	1.428		5.894	.000		
	PPE 10y-Growth	.026	.006	.198	4.496	.000	.995	1.005
	Intang.Ass. 10y-Growth	.043	.010	.188	4.275	.000	.995	1.005
3	(Constant)	8.469	1.417		5.975	.000		
	PPE 10y-Growth	.026	.006	.199	4.551	.000	.995	1.005
	Intang.Ass. 10y-Growth	.041	.010	.181	4.137	.000	.992	1.008
	Work.Cap. 10y-Growth	.021	.007	.124	2.850	.005	.997	1.003

N = 569.

In the context of the Resource-Based Theory of Firm Growth, the effect of two of the three explanatory variables (predictors) included in the final model is intuitively logical: The investment in expanding production capacities (PPE growth) is the precondition for satisfying rising demand and the increase in

current assets (working capital growth) is the necessary pre-condition for producing more goods.

Table 16. ANOVA of the Multiple Regression for Total Assets Growth (Total Sample)

Model		Sum of Squares	F	Sig.
1	Regression	18772.953	22.267	.000[b]
	Residual	403834.198		
	Total	422607.150		
2	Regression	33641.833	20.671	.000[c]
	Residual	388965.317		
	Total	422607.150		
3	Regression	40153.242	16.693	.000[d]
	Residual	382453.908		
	Total	422607.150		

N = 569.

The final model (Model 3) is highly significant ($p < 0.01$; see Table 16). However, the explanatory power of the final model is very modest with r^2 adj. = 0.089 (see Table 14). Furthermore, the increase of the explanatory power provided by the variable intangible assets growth ($r^2 = 0.035$) can be seen as of only limited value. Therefore, other variables not included in the variable set considered as more relevant than the included, such as cash and equivalents, equity capital or long-term assets must be seen as explaining variables with a possible higher effect on explaining the variance of the dependent variable (total assets growth).

4.2.2 Operating Income Growth Regression Analysis—Total Sample

To examine qualitative growth, the sample is examined including the same variables, such as in the case of examining quantitative growth. The multiple regression analysis generates three models and Model 3 is evidently valid and, therefore, the final model. The Durbin-Watson value indicates a very low autocorrelation of $d = 1.9$, which is in the range critical values of $1.5 < d < 2.5$ (see Table 17).

Table 17. Multiple Regression Models for Operating Income Growth (Total Sample)

Model	R	R Square	Adjusted R Square	Change Statistics			Durbin-Watson
				R Square Change	F Change	Sig. F Change	
1	.108[a]	.012	.009	.012	4.490	.035	
2	.150[b]	.023	.017	.011	4.200	.041	
3	.181[c]	.033	.025	.010	3.998	.046	1.963

a. Predictors: (Constant), Intang.Ass.%Tot.Ass.

b. Predictors: (Constant), Intang.Ass.%Tot.Ass., Labor-Intens.Top10%

c. Predictors: (Constant), Intang.Ass.%Tot.Ass., Labor-Intens.Top10%, Ass.Turnov.

d. Dependent Variable: Op.Inc. 10y-Growth

N = 569.

The ANOVA indicates high statistical significance of the final model, with $p < 0.01$ (see Table 18). The collinearity statistics show high tolerance values and a low VIF value of both with almost 1 (see Table 19) indicating a low level of collinearity and, therefore, high validity of the final model (Model 3).

Table 18. ANOVA of the Multiple Regression for Operating Income Growth (Total Sample)

Model		Sum of Squares	df	F	Sig.
1	Regression	1741822.231	1	4.490	.035[b]
	Residual	147015624.730	379		
	Total	148757446.960	380		
2	Regression	3357248.563	2	4.364	.013[c]
	Residual	145400198.398	378		
	Total	148757446.960	380		
3	Regression	4882921.564	3	4.265	.006[d]
	Residual	143874525.396	377		
	Total	148757446.960	380		

N = 569.

The beta coefficients are all positive indicating a positive effect of all predictors on the dependent variable (see Table 19). Consequently, this indicates that, the higher the share of intangible assets in total assets, the higher the operating income growth; the same conclusion applies to asset turnover growth. The third

factor is labour-intensive industries positioning indicating that the positioning in labour-intensive industries has a positive effect on operating income growth.

Table 19. Coefficients of the Multiple Regression for Operating Income Growth (Total Sample)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-52.364	43.440		-1.205	.229		
	Intang.Ass.%Tot.Ass.	4.498	2.122	.108	2.119	.035	1.000	1.000
2	(Constant)	-76.342	44.812		-1.704	.089		
	Intang.Ass.%Tot.Ass.	4.688	2.116	.113	2.216	.027	.998	1.002
	Labor-Intens.Top10%	220.668	107.679	.104	2.049	.041	.998	1.002
3	(Constant)	-93.323	45.436		-2.054	.041		
	Intang.Ass.%Tot.Ass.	4.813	2.108	.116	2.283	.023	.997	1.003
	Labor-Intens.Top10%	218.840	107.259	.103	2.040	.042	.998	1.002
	Ass.Turnov. 10-yGrowth	3.819	1.910	.101	1.999	.046	.999	1.001

N = 569.

The conclusion from these findings is that, a higher share of intangible assets in total assets is a relevant factor for increasing operating growth. However, the explanatory power of this variable is low at only 0.9% (see Table 17), and this is also the case for the final model, which has an explanatory power of just 2.5%.

In summary, the results of examining the total sample demonstrate that innovation (R&D intensity), internationalisation and M&A activities all fail to explain quantitative or qualitative growth because they are excluded in the regression analysis as non-significant or as a function of another variable because they show collinearity with a variable with a higher correlation with the dependent variable. However, to examine the effect of these other growth sources, a second test series examines a more homogenous group in terms of growth rates by examining subgroups presented in the following sections.

4.3 Analysis of Different Groups

4.3.1 Analysis of the High-Growth Group

According to Schultz (2011, p. 45), advanced technology companies show the highest average annual revenue growth of 10.47% compared to companies in all other industry sectors; but only a small number of these companies exhibit excessively high growth rates. Therefore, this study examines the sample, grouped by their growth rates, representing the group of high-growth companies. The definition of the high-growth group follows the OECD's high-growth definition of an AAGR revenue growth of 25%, but uses a 10-year period instead of the OECD's 3-year period so that this research applies a higher benchmark

The descriptive statistics of the high-growth group show that 55 companies meet the high-growth definition requirement (see Table 20). Compared with the 'average company' of the total sample, the following differences become obvious (see Table 20 and Table 9):

- The revenue growth rate is significantly higher with an annual growth rate of 73% (total sample: 12.2%) as is the operating income growth rate (high-growth group: 67%; total sample: 10.1%).
- The average high-growth group company is significantly smaller with an annual revenue of EUR 201m (total sample: 3,2bn).
- The average high-growth company has spent less in R&D (high-growth group: EUR 2bn; total sample: EUR 97,5bn), which may be a firm size effect; but shows a moderately higher increase in R&D expenditure (high-growth group: 2.1%; total sample: 0.0).
- Strong differences exist concerning intangible assets. The high-growth group shows an intangible assets growth of 162% (total sample: 18%). However, comparing the ratio of intangible assets to total assets, no difference can be identified (high-growth group: 13.6%; total sample: 13.9%).
- Another difference can be stated concerning M&A activities. The high-growth groups show lower M&A activities in terms of the 10-year average of acquisitions. The 'average company' of the total sample invests EUR 70.9m annually in M&A activities, while high-growth companies invest only

EUR 11.5m. This must be interpreted also as a firm size effect because the acquisitions/revenue ratio shows that the high-growth firm invests more in M&A activities in proportion to its firm size (5.3% vs. 0.3%).

– The internationalisation degree is lower in the high-growth group (22.5% vs. 34.9%), which may also be a firm size effect. Larger companies cannot grow only in their domestic market.

Table 20. Descriptive Statistics of the High-Growth Group (in EUR 1,000; in %)

	Mean	N
Revenue 10y-Growth	73.0	55
Revenue 10y-Aver.	201,776.4	55
R&D 10y-Aver.	2,640.8	55
R&D 10y-Growth	2.1	36
R&D%Rev.	11.9	55
Op.Inc. 10y-Growth	67.0	55
Op.Inc. 10y-Aver.	6,524.6	55
Intang.Ass. 10y-Growth	161.6	44
Intang.Ass 10y-Aver.	17,537.7	55
Net. Acqui. 10y-Aver.	11,539.1	55
Debt%Cap. 10y-Aver.	32.6	55
ROIC 10y-Aver.	5.4	55
Ass.Turnov. 10-y Growth	24.7	53
Ass.Turnov. 10y-Aver.	0.9	55
Int.Rev%Rev	22.5	50
Acqui%Rev	5.3	55
Intang.Ass.%Tot.Ass.	13.6	55

n = 55.

The regression analysis generates only one model with only moderate explanatory power (r^2 adj. = 0.19) and high statistical significance ($p < 0.05$) (see Table 21 & 22). However, since this final model includes only one single variable (asset turnover growth), whereby the final model's explanatory power is relatively high with 19.2% of the variation in the dependent variable explained by just one variable.

Table 21. Multiple Regression Model for Revenue Growth (High-Growth Group)

Model	R	R Square	Adjusted R Square	Change Statistics			Durbin-Watson
				R Square Change	F Change	Sig. F Change	
1	.492[a]	.243	.192	.243	4.802	.045	2.222

a. Predictors: (Constant), Ass.Turnov. 10-y Growth

b. Dependent Variable: Revenue 10y-Growth

n = 55.

It is also evident that the final model is statistically valid. The Durbin-Watson value indicates a very low autocorrelation with d = 2.2, which is in the critical value range of 1.5 < d < 2.5 (see Table 21). The collinearity statistics with both values equal to 1 confirm the absence of autocorrelation issues (see Table 23).

Table 22. ANOVA of the Multiple Regression for Revenue Growth (High-Growth Group)

Model		Sum of Squares	df	F	Sig.
1	Regression	16459.089	1	4.802	.045[b]
	Residual	51408.280	15		
	Total	67867.369	16		

n = 55.

Table 23. Coefficients of the Multiple Regression for Revenue Growth (High-Growth Group)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	52.127	17.095		3.049	.008		
	Ass.Turnov. 10-y Growth	.845	.386	.492	2.191	.045	1.000	1.000

n = 55.

The asset turnover ratio indicates the company's efficiency in deploying assets to generate revenue and is calculated by dividing revenue by total assets. A low ratio indicates inefficiencies in inventory, receivables or fixed assets management. Consequently, one interpretation of this finding could be that companies that increase their asset turnover ratio grow as a result of increasing

effectiveness in the management of inventories, receivables or fixed assets. Another, more strategic interpretation in the context of Porter's concept of competitive advantage is based on Mauboussin and Callahan (2015, p. 47), who proposed that three indicators for a company's competitive advantage exist:

(1) The company dispose on a production advantage resulting from and resulting in a high asset turnover.
(2) The company dispose on a customer advantage resulting from and resulting in a high operating margin.
(3) The company dispose neither on a production nor a customer advantage and, consequently, no competitive advantage exists.

Production advantage leads to cost leadership, customer advantage is based on higher product quality, quality leadership leads to a higher benefit for the customer, which enables the company to take a price premium. Consequently, companies investing in effective asset turnover, which generates asset turnover growth, are assumed to realise production advantage and high growth. From the result of multiple regression analysis, which examined qualitative firm growth in the total sample (Table 11), a preliminary conclusion could be that above-average quantitative growth is simply building up capacities, while high-growth, which is quantitative growth per definition, requires not only production capacity but also the increase of operations efficiency leading to a production advantage resulting in cost leadership. However, again, factors like M&A, innovation intensity or internationalisation degree have no explanatory power, although high-growth companies show a higher intangible assets growth and a higher M&A intensity.

Table 24. Multiple Regression Model for Operating Income Growth (High-Growth Group)

Model	R	R Square	Adjusted R Square	Change Statistics			Durbin-Watson
				R Square Change	F Change	Sig. F Change	
1	.682[a]	.465	.430	.465	13.050	.003	2.276

a. Predictors: (Constant), Debt%Cap. 10y-Growth

b. Dependent Variable: Op.Inc. 10y-Growth

n = 55.

A very strong relationship can be found in analysing the determinants for explaining operating income growth (qualitative growth). The regression analysis generates only one model, so that Model 1 is the final model indicating that the debt-to-capital ratio explains operating income growth by an explanatory power of 46.5% (p = 0.003) (see Table 24 and Table 25). The beta of the regression equation is positive (Table 26) indicating that the higher the debt capital in percent of equity capital growth, the higher is the operating income ratio.

Table 25. ANOVA of the Multiple Regression for Operating Income Growth (High-Growth Group)

Model		Sum of Squares	F	Sig.
1	Regression	2651535.539	13.050	.003[b]
	Residual	3047675.718		
	Total	5699211.257		

a. Predictors: (Constant), Debt%Cap. 10y-Growth

b. Dependent Variable: Op.Inc. 10y-Growth

n = 55.

Table 26. Coefficients of the Multiple Regression for Operating Income Growth (High-Growth Group)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-98.114	118.499		-.828	.421		
	Debt%Cap. 10y-Growth	7.186	1.989	.682	3.613	.003	1.000	1.000

a. Dependent Variable: Op.Inc. 10y-Growth

n = 55.

The question arises which variable explains the debt-to-capital ratio. The regression analysis with debt capital in percent of equity capital growth as independed variable reveals that the variance of ratio can be explained by 53.6% (p = 0.001) by the R&D intensity measured by R&D expenditures in percent of revenue with the Durbin-Watson value within the range of critical values 1.5 < d < 2.5 indicating a low autocorrelation (see Table 27 and Table 28).

Model 1 is considered as the final model because Model 2 shows a tolerance value that is significantly smaller than 1 (see Table 29).

Table 27. Multiple Regression Models for Debt-in-%Capital (High-Growth Group)

Model	R	R Square	Adjusted R Square	Change Statistics			Durbin-Watson
				R Square Change	F Change	Sig. F Change	
1	.752[a]	.565	.536	.565	19.499	.001	
2	.975[b]	.951	.944	.386	111.211	.000	1.79

a. Predictors: (Constant), R&D%Rev.

b. Predictors: (Constant), R&D%Rev., Op.Exp./Rev. Ratio

c. Dependent Variable: Debt%Cap. 10y-Growth

n = 55.

Table 28. ANOVA of the Multiple Regression for Debt-in-%Capital (High-Growth Group)

Model		Sum of Squares	F	Sig.
1	Regression	29024.652	19.499	.001[b]
	Residual	22327.538		
	Total	51352.190		
2	Regression	48855.728	136.990	.000[c]
	Residual	2496.462		
	Total	51352.190		

a. Dependent Variable: Debt%Cap. 10y-Growth

b. Predictors: (Constant), R&D%Rev.

c. Predictors: (Constant), R&D%Rev., Op.Exp./Rev. Ratio

n = 55.

The beta of R&D in percent of revenue is positive indicating that, the higher the share of R&D investments, the higher is the debt-capital ratio (see Table 29). However, the operational expenditure/revenue ratio shows a very small (< 1) but negative beta. The ratio reflects the share of the operational expenditure of the revenue; the higher the operational expenditures are in relation to the revenue, the higher is the ratio. The negative beta signals a negative effect on the debt-to-capital ratio. This finding may point to differences in financing behaviour. The cost for production is paid by the incoming cash flow, while R&D expenditures are

considered as investment in future business and are financed more with debt capital because they are handled as expansion investment.

Table 29. Coefficients of the Multiple Regression for Debt-in-%Capital (High-Growth Group)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	12.890	9.632		1.338	.201		
	R&D%Rev.	.851	.193	.752	4.416	.001	1.000	1.000
2	(Constant)	56.126	5.284		10.621	.000		
	R&D%Rev.	1.411	.085	1.247	16.550	.000	.612	1.635
	Op.Exp./Rev. Ratio	-.325	.031	-.795	-10.546	.000	.612	1.635

a. Dependent Variable: Debt%Cap. 10y-Growth

Source: Researcher's calculation; Table: SPSS output; n = 55.

In conclusion, it can be said that qualitative growth in the high-growth group depends on the investment in R&D as the key driver for the competitive advantage of high-growth companies. This key driver can be leveraged by increasing the debt-capital share, which is in line with the capital structure theory explaining that companies with business opportunities with higher return than the costs of capital should choose to increase their debt capital ratio. However, it can be stated that internationalisation is not a factor explaining the performance and the financing behaviour of high-growth companies.

4.3.2 Analysis of the R&D-Intensive and Knowledge-Intensive Groups

The results of the data analysis have so far indicated that the building up of (1) production capacities, (2) the efficiency of operations in terms of asset turnover and (3) intangible assets are factors explaining firm growth. The selection of a generic strategy, positioning, may also be a factor; but was not identified as a decisive factor in this sample in terms of exerting more than minimal effect on the different performance variables. However, R&D expenditures were not identified as a factor driving growth, instead, the intangible assets to total assets ratio was found to have a very weak effect on growth. The growth effect of R&D, based on the analysis of this sample, was zero, in terms of both qualitative and quantitative growth, and the effect of intangible assets on qualitative high growth was

marginal. Some researchers perceive that advanced technology companies are high-growth companies, as the theoretical framework and the analysis of the high-growth group demonstrated (Schultz, 2011, p. 45), therefore, the effect of R&D and of intangible assets on firm growth is investigated. This is conducted by grouping the data set by the variables, which characterise the companies in terms of their R&D intensity and share of intangible assets.

In contrast to the previous tests, the following analyses do not search for causal explanations by applying regression analysis. Instead, the group differences are examined by applying the t-test. The first analysis classifies the data set by their R&D intensity, which is indicated by three variables:

(1) Intangible assets growth in relation to R&D growth indicating a high transformation rate of R&D expenditure to intangible assets,
(2) Intangible assets in % of total assets indicating companies with an excessive share of intangibles,
(3) R&D in % of revenue indicating companies with a disproportional share spent for R&D.

Companies with values above the total sample's average are coded by using dummy variables (0 = below average; 1 = above average). Consequently, companies are coded as:

- R&D-intensive if R&D expenditure in % of revenue is greater than 4.2%,
- Knowledge-intensive if intangible assets in % of total assets greater than 13.9%,
- Excessive intangible assets generator with an intangible assets growth to R&D growth ratio of greater than 5.9%.

a) Differences by R&D Intensity

Statistically significant differences of $p < 0.05$ can be found in the area of PPE growth, capital structure (Debt % Cap.), asset turnover, internationalisation degree (Int. Rev. % Rev.) and employee productivity (Rev. p. Employ) (see Table 30). All other ratios and growth rates are not statistically significant, for instance revenue growth, operating income growth, ROIC, retained earnings growth and firm size.

Significant differences were found in four cases (see Table 30):

- The R&D expenditures of EUR 315m in the above-average R&D expenditure group substantially exceeds the expenditures of the below-average R&D expenditure group (EUR 41m), which proves that both groups are significantly different in their R&D activities. This is also supported by the R&D in % of revenue with 17.7% (above-average R&D expenditure group) vs. 0.7% (below-average R&D expenditure group).
- The below-average R&D expenditure group show significantly higher growth in PPE expenditures indicating that research-intensive companies are rather non-industrial companies.
- The differences in asset turnover may be statistically significant but they are not strong.

Further strong differences can be found in the area of internationalisation degree (R&D-intensive companies: 54%; non-R&D-intensive companies: 30%) and revenue per employee (R&D-intensive companies: EUR 216,900; non-R&D-intensive companies: EUR 526,700).

Table 30. Significant Differences in the Above/Below-Average R&D Expenditure Groups (Total Sample; in EUR 1,000; in %)

RD_Rev_Intensive; 0 = below average; 1 = above average.		N	Mean	Sig. (2-tailed)
R&D 10y-Aver.	0	452	41,620.4	
	1	116	315,053.7	.011
R&D%Rev.	0	453	0.7	
	1	116	17.7	.000
PPE 10y-Growth	0	443	34.8	
	1	116	7.9	.028
Debt%Cap. 10y-Growth	0	422	7.9	
	1	105	20.4	.024
Debt%Cap. 10y-Aver.	0	453	34.4	
	1	116	25.9	.019
Ass.Turnov. 10y-Aver.	0	453	1.2	
	1	116	1.0	.000
Int.Rev%Rev	0	388	29.9	
	1	100	54.3	.000
Rev.p.Employ.10y-Aver.	0	449	526.7	
	1	116	216.9	.000

N = 569; Significance Level: p < 0.05.

Three of the mentioned findings need further discussion: (1) the differences in PPE growth, (2) the internationalisation degree and (3) the revenue per employee. All other differences are self-explanatory or very small. The differences in PPE growth can be explained by the fact that R&D-intensive companies are not necessarily industrial companies. This becomes even more evident in examining the top-20 companies of the R&D-intensive group, in which only Roche is an industrial company (see Table 31). Instead, the majority of companies are information, communication, technology (ICT) or biotech companies, with a size of less than EUR 1bn (18 companies). Accordingly, they are relatively small, but fast-growing companies characterised by an average revenue growth rate of 30.9%; Roche is the largest company in this group and the only industrial and mature company in the group. Hence, the main operational activities of 19 of the top-20 companies do not require large quantities of assets in the form of PPE.

Table 31. Top-20 Companies in the Above-Average R&D Expenditure Groups (Total Sample)

Company	Revenue 10y-Growth (in %)	Revenue 10y-Aver. (in EUR 1,000)	R&D 10y-Aver. (in EUR 1000)	R&D % Rev.
4SC AG	66.16	2,454.91	8,540.55	347.90
EPIGENOMICS AG	-8.27	4,279.18	7,119.09	166.37
SYGNIS AG	6.44	4,783.09	7,545.82	157.76
PAION AG	292.31	8,656.82	8,979.80	103.73
MOLOGEN AG	96.99	874.18	877.78	100.41
MORPHOSYS AG	22.47	59,647.82	24,581.82	41.21
EVOTEC AG	4.72	65,533.73	18,782.91	28.66
LS TELCOM AG	17.62	16,245.64	4,400.00	27.08
TEMENOS GROUP AG	9.30	346,450.27	89,345.00	25.79
ITN NANOVATION AG	15.22	3,821.00	962.91	25.20
ACTELION AG	20.95	1,290,119.82	319,144.00	24.74
KUDELSKI SA	9.48	815,929.55	189,438.67	23.22
MYRIAD GROUP	18.58	53,328.36	11,876.18	22.27
ATOSS SOFTWARE AG	4.44	27,044.55	5,218.18	19.29
P&I PERSONAL & INFO	8.08	57,400.64	11,017.00	19.19
DIALOG SEMICOND	28.00	238,115.73	44,922.00	18.87
MICRONAS SEM	-11.99	509,882.82	93,053.91	18.25
MAGIX AG	6.17	30,805.55	5,551.55	18.02
ELMOS SEMICONDUCTOR	6.18	163,240.27	29,247.27	17.92
ROCHE HOLDING AG	4.44	42,102,636.36	7,523,545.45	17.87

Much more interesting is the difference concerning the internationalisation degree. Here, the interpretation is discerning. In one respect, it may be assumed that R&D-intensive companies cannot grow sufficiently solely by activities in their domestic markets because their products are highly specialised and, therefore, the global market is required for continual growth. However, the conflicting interpretation is also intuitively logical: a company operating globally competes with other global companies. Therefore, both arguments may provide an explanation; a technology company must operate in the global market for continuous growth, which intensifies its competitive situation, forcing the company into a self-enforcing cycle: the higher the internationalisation degree, the higher is the level of competition.

The finding relating to the revenue per employee is unexpected because it is lower than in the below-average R&D expenditure group, whereas productivity would be expected to be higher in high-tech industries compared to low-tech industries. However, in this sample, this is obviously not the case. Again, the examination of the top-20 companies in terms of productivity (revenue per employee) gives some indications (see Table 32).

The majority of the top-20 companies are real-estate companies, such as (1) Deutsche Euroshop, (2) Bastfaserkontor, (3) Züblin, (4) Mobimo, (5) Hasen-Immobilien, (6) Amira, (7) PSP Swiss Property, (8) Warteck Invest, (9) ALLREAL and (10) Hahn-Immobilien. Consequently, at least 50% of the top-20 companies in terms of revenue per employee are capital-intensive but not research-intensive companies. The conclusion is, therefore, that research-intensive companies are highly internationalised and innovative; but are forced to be innovative, while other business models grow faster and are more profitable.

Table 32. Top-20 Companies in Terms of Productivity (Total Sample)

Company	Revenue 10y-Growth (in %)	Revenue 10y-Aver. (in EUR 1,000)	R&D 10y-Aver. (in EUR 1,000)	R&D % Rev.	Rev.p.Employ.10y-Aver. (in EUR 1,000)
DEUTSCHE EUROSHOP AG	12.47	127,793.82	0.00	0.00	31,948.45
CUSTODIA HLD AG	22.94	17,823.91	0.00	0.00	17,823.91
BASTFASERKONTOR	12.22	1,456.27	0.00	0.00	8,737.64
ZUBLIN IMMOBILIEN	-3.02	100,606.64	0.00	0.00	5,244.90
INTERSPORT PSC HLDG	4.73	211,059.09	0.00	0.00	3,099.25
MOBIMO HOLDING AG	27.46	181,038.55	0.00	0.00	3,026.48
REPOWER AG	24.42	1,665,906.55	0.00	0.00	2,868.21
HASEN-IMMOBILIEN AG	84.13	45,086.64	0.00	0.00	2,801.99
DELTICOM AG	27.75	280,778.36	0.00	0.00	2,750.03
AMIRA VERWALTUNGS AG	31.58	5,977.64	0.00	0.00	2,561.84
ALSO HOLDING AG	20.16	4,345,835.73	0.00	0.00	2,371.83
PSP SWISS PROPERTY	5.01	272,908.91	0.00	0.00	2,270.80
WARTECK INVEST AG	2.28	24,537.36	0.00	0.00	2,268.16
INTERSHOP HOLDING AG	2.95	96,561.27	0.00	0.00	1,927.72
ADM HAMBURG AG	-9.16	1,146,029.45	2,030.33	0.18	1,917.60
ALLREAL HOLDING AG	35.82	532,381.82	0.00	0.00	1,905.69
HAHN IMMOB	96.45	115,770.64	0.00	0.00	1,751.69
AURUBIS AG	24.63	7,631,729.18	6,472.27	0.08	1,685.66
MEDION AG	-4.40	1,873,532.45	0.00	0.00	1,621.21
ALLGEM GOLD & SILBER	13.85	892,349.55	1,608.73	0.18	1,592.45

The analysis of the research-intensive companies reveals that high-tech or research-intensive business models may be regarded as important by economic policy and public funding but are characterised by low per capita productivity and high costs, induced by the specific business economics of their industries, whilst other business models are more profitable while showing fewer risks. The conclusion appearing from these findings is that, on the one hand, some companies are forced to be research-intensive, which is a result of their market positioning in R&D-intensive industries or industries with a high level of competition. This means, on the other hand, that companies do not actively select such an industry because they expect high returns.

Instead, companies have rather a defined business purpose, which they have pursued since they were established, and do not adhere to the textbook concept of the firm as a profit maximiser, which selects the most profitable business projects and finds new business opportunities to generate income growth. These firms do not allocate their shareholders' funds in identifying the best business opportunities inside and outside their industry; but aim at maximising firm

profitability and income growth within the boundaries of their chosen industry, in a manner described by Thommen et al. (2017):

> "While business economics has long assumed that companies are aiming at maximum goals, the tendency now is to assume that firms pursue satisfying goals. Thus, business economics achieve greater consistency with business reality." (p. 48)

This business reality is also reflected by the discussed findings regarding group differences concerning R&D intensity.

b) Differences by Knowledge Intensity

In a second step, the above/below-average intangible assets groups are compared. The difference between the previous test and this one is that not the group of research-intensive companies, but the group of knowledge-intensive companies is examined. R&D expenditures do not necessarily lead to marketable knowledge that is reported in the balance sheet. However, this does not imply that research-intensive companies and knowledge-intensive companies are placed in different groups; but it is relatively likely that research-intensive companies also generate higher rates of increase in intangible assets than companies with lower R&D intensity. The R&D-intensive group includes 116 companies (see Table 30), whereas the knowledge-intensity group comprises 205 companies (see Table 33).

The set of variables with significant group differences is very similar to that of R&D intensity groups, indicating high similarity between groups; but one of the few differences applies to firm size. Whilst the firm size differences between research- and non-research-intensive companies are not statistically significant, the average knowledge-intensive company (Revenue 10y-Aver.: EUR 4.8bn) is more than double the firm size of the average non-knowledge-intensive company (EUR 2.3bn) (see Table 33)**.** The interpretation of this finding is that the share of intangible assets in % of total assets increases with firm size, whereas R&D intensity is less dependent on firm size.

Table 33. Significant Differences in the Above/Below-Average Intangible Assets in % of Total Assets Groups (Total Sample; in EUR 1,000; in %)

Intang_totassets_intensiv (0 = below average; 1 = above average)		N	Mean	Sig. (2-tailed)
Revenue 10y-Aver.	0	364	2,282,367.9	
	1	205	4,845,768.7	.023
R&D%Rev.	0	364	2.2	
	1	205	7.7	.010
Op.Inc. 10y-Aver.	0	364	106,586.2	
	1	205	488,034.2	.001
Intang.Ass 10y-Aver.	0	363	199,233.9	
	1	205	1,712,329.1	.000
Ret.Earn. 10y-Aver.	0	364	589,012.1	
	1	205	1,617,318.8	.044
Net. Acqui. 10y-Aver.	0	364	23,565.8	
	1	205	155,116.3	.001
Debt%Cap. 10y-Aver.	0	364	34.8	
	1	205	29.0	.005
Int.Rev%Rev	0	309	29.5	
	1	179	44.2	.000
Rev.p.Employ.10y-Aver.	0	360	580.1	
	1	205	257.5	.003

N = 569; Significance Level: $p < 0.05$.

The significant differences concerning operating income, retained earnings and M&A activities may also be interpreted as a consequence of the firm size effect. The per-capita productivity is lower in the knowledge-intensive group, but the internationalisation degree is significantly higher, also supporting the interpretation made in the previous section, that research intensive companies are highly internationalised and innovative; but they are forced to be innovative, whilst other business models grow faster und are more profitable with a possibly higher productivity. A possible explanation may be that highly innovative companies show continuous changes in the operations processes, so that they tend to be less effective than less innovative companies.

Therefore, most of the differences identified can be attributed to the firm size effect but, as in the case of research-intensive companies, knowledge-intensive companies also fail to exhibit significant differences in revenue and operating

income growth as well as in terms of profitability. Again, neither R&D-intensive nor knowledge-intensive companies show effects on firm growth, profitability, and the operating margin.

Concerning the internationalisation degree, it can be stated that knowledge-intensive companies show a higher internationalisation degree of 44% compared to 30% for the non-knowledge-intensive companies (see Table 26). This finding can be interpreted in two different directions: (1) knowledge-intensive companies are more competitive than other companies; or (2) knowledge-intensive companies have to internationalise for global sourcing of scarce knowledge resources. The fact that knowledge-intensive companies show an average revenue twice as high as other companies points more to the first assumption, which is further supported by the high differences in intangible assets. However, this presupposes vice versa also a higher need for additional knowledge in the company and, thus, the pressure for global sourcing and the global provision of knowledge. Consequently, the cause–effect relationship cannot be clearly determined. Moreover, it can be assumed that being a knowledge-intensive company also means being caught in a self-reinforcing process in a competitive market pressuring to continuous innovation.

c) Differences by Excessive Intangible Assets Growth

In the last analysis, two groups are distinguished by their intangible asset growth to R&D growth ratio, in the context of examining the effects of R&D and intangible assets on firm growth. As discussed in this study's introduction and research framework, R&D expenditures and intangible assets are linked to each other. Independent from the fact that R&D expenditures are an income statement category and intangible assets a balance sheet category, the difference between both is that the accounting variable R&D expenditure includes all costs spend for each activity generating innovation, whilst intangible assets reflect the value of all results of R&D activities leading to marketable products in the form of intellectual property, such as patents, trademarks and other assets.

A company's main source for generating intangible assets are R&D and acquisition of intangible assets (Vanderpal, 2015, p. 136). And one of the principal

goals of cross-border M&A activities, which is also another form of internationalisation in the form of Foreign Direct Investment (FDI), is the acquisition of intangible assets (Baker & Kiymaz, 2011, pp. 191-192). R&D expenditure may also result in process innovation or marketing innovation, which do not increase the value of intangible assets (Hogg, 2005, pp. 62-64). Consequently, an increase in R&D expenditure does not necessarily correspond to an increase of intangible assets (Sandner, 2009, p. 51), the difference between R&D and intangible asset growth indicates that the value of capitalised intangible assets is far more important than the value of internally generated intangible assets. Consequently, the group with above-average values, in this sample the companies with a ratio of greater than 5.9, are companies showing extraordinary intangible asset growth because the growth of intangible assets cannot be explained purely by the company's R&D expenditures. Consequently, such companies must be regarded as having excessively high focus on intellectual capital, which is reflected in recent research as indicator with a higher explanatory power for explaining the growth rates of national economies. Therefore, Li and Li (2012) propose to also use the R&D-to-intangible-asset ratio in business research to explain the relationship between a firm's growth and its investment in intellectual capital to examine the disproportionate accumulation of intellectual capital as a possible explanation for excessive firm growth.

The data subset examined comprised just 202 companies because all the companies with zero R&D expenditure and, therefore, no R&D expenditure growth, are excluded. The t-test, which included all variables, shows statistically significant differences for two variables: (1) intangible assets growth and (2) internationalisation degree (see Table 34).

Table 34. Significant Differences in the Above/Below-Average Intangible Assets Growth to R&D Growth Groups (R&D-Intensive Group)

Intanggrowth_RDgrowth_intensiv (0 = below average; 1 = above average)		N	Mean	Sig. (2-tailed)
Intang.Ass. 10y-Growth	0	161	32.5222	
	1	38	70.9318	.017
Int.Rev%Rev	0	146	48.1877	
	1	38	67.5034	.044

n = 202; Significance Level: p < 0.05.

The significant difference related to intangible assets growth is self-explanatory, because the grouping variable categorises companies with exceptional intangible asset growth from other companies. However, the second finding is more revealing, the degree of internationalisation is linked to disproportionate intangible asset growth because companies with an above-average intangible asset growth to R&D-growth ratio are internationalised to a significantly higher degree (67.5% vs. 48.1%; see Table 34).

However, this does not explain a causal relationship because three relationships are possible:

(1) The internationalisation degree is a result of the exceptional increases in intellectual capital by means of leveraging international competitiveness, in other words, variable A has an effect on variable B.
(2) Increased internationalisation and subsequent firm growth enables accumulation of more intangible assets, which would be a firm size effect, such that variable B would have an effect on variable A.
(3) Both variables are linked by a mediating third variable, specifically, variable A and variable B interact through a third variable C, such that the three variables would create a self-reinforcing effect.

In order to examine a possible causal relationship between both variables, multiple regression analysis is performed on all variables regarding internationalisation, R&D activities and M&A activities (intangible asset growth, revenue growth, R&D growth, R&D expenditure, revenue, international revenue in % of total revenue, net acquisitions and acquisition in % of revenue) and the

10-year annual average revenue to control firm size effects. The dependent variable is intangible asset growth.

Two variables explain the growth in intangible assets: (1) R&D growth and (2) acquisition in % of revenue. The explanatory power of the final model is high with r^2 adj. = 0.37 (p = 0.00) (see Table 35 and Table 36).

Table 35. Multiple Regression Models for Intangible Assets Growth (R&D-Intensive Group)

Model	R	R Square	Adjusted R Square	Change Statistics			Durbin-Watson
				R Square Change	F Change	Sig. F Change	
1	.546[a]	.299	.279	.299	15.327	.000	
2	.635[b]	.403	.369	.105	6.132	.018	1.644

a. Predictors: (Constant), R&D 10y-Growth

b. Predictors: (Constant), R&D 10y-Growth, Acqui%Rev

c. Dependent Variable: Intang.Ass. 10y-Growth

n = 38.

Table 36. ANOVA of the Multiple Regression for Intangible Assets Growth (R&D-Intensive Group)

Model		Sum of Squares	df	F	Sig.
1	Regression	82061.281	1	15.327	.000[b]
	Residual	192746.772	36		
	Total	274808.053	37		
2	Regression	110795.844	2	11.822	.000[c]
	Residual	164012.209	35		
	Total	274808.053	37		

n = 38.

Consequently, the 37% of the variance in the intangible asset growth can be explained by both variables, the tolerance value is acceptable, whilst the VIF value is almost 1; the Durbin-Watson coefficient is within the critical value range of $1.5 < d < 2.5$ (see Table 35). Both variables show a positive relationship with the dependent variable, as indicated by positive beta coefficients (see Table 37).

Table 37. Coefficients of the Multiple Regression for Intangible Assets Growth (R&D-Intensive Group)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	22.251	17.190		1.294	.204		
	R&D 10y-Growth	9.614	2.456	.546	3.915	.000	1.000	1.000
2	(Constant)	26.421	16.170		1.634	.111		
	R&D 10y-Growth	12.982	2.670	.738	4.862	.000	.740	1.351
	Acqui%Rev	6.453	2.606	.376	2.476	.018	.740	1.351

n = 38.

The number of cases is small (n = 38), and this may be considered a problem, which restricts the validity of the model; but the collinearity statistics, the high significance levels and the Durbin-Watson value of almost 1 indicate that the final model can be considered statistically valid and the multiple regression results appear to be plausible:

(1) The increase in R&D expenditure generates intangible asset growth.
(2) A higher investment in M&A activities in proportion to the company's revenue also generates a positive effect on intangible asset growth.
(3) Therefore, both the t-test and multiple regression support the research findings of Vanderpal (2015), Baker and Kiymaz (2011) and Sandner (2009), which are that a company's main sources for generating intangible assets are R&D and the acquisition of intangible assets.
(4) Cross-border M&A activities are often related to the acquisition of intangible assets.
(5) R&D expenditures are not the only but often the main source for increasing the company's intellectual capital.

The internationalisation degree seems to be a differentiator for companies with exceptional intangible asset growth but does not explain the disproportionate growth and, although the internationalisation degree is not directly linked to intangible asset growth, it can be assumed that the internationalisation degree is indirectly linked by means of M&A activities. Therefore, the final conclusion regarding the explanation of firm growth, in the context of R&D expenditures and

intangible assets, is that internationalisation, exceptional intangible asset growth, R&D activities and (cross-border) M&A actitivities are interrelated but none of the factors or factor groups explains the qualitative and quantitative firm growth. Internationalisation, instead, seems to be a pull factor for increased efforts to innovate, and for R&D and/or M&A activities for acquiring intangible assets; and intangible asset increase is not an instrument or strategy for generating excessive growth, respectively, but only a defence strategy. On the contrary, these three factors are solely the means to average qualitative and quantitative growth because they help to retain the company's competitiveness at a certain level, while every stage in the internationalisation process intensifies the competitive situation. However, this preliminary conclusion requires additional support by further data analysis, which examines differences between, and causal relationships among, groups which are distinguished by their internationalisation intensity.

4.4 Analysis of the MNE Group

4.4.1 Differences between MNE and Non-MNE

As mentioned, multinational companies (MNE) are defined, according to international standards, as companies with more than 25% revenue abroad. This group of companies includes 277 companies; that is, almost 50% of the total sample (see Table 38). However, the data set to examine performance differences between MNE and non-MNE includes 488 companies because of missing values for 81 companies. Comparing both groups, many significant differences can be stated. However, the list of variables showing no statistically significant differences (at the 0.05 significance level) is also revealing, including (1) R&D in % of revenue, (2) operating income growth, (3) debt in % of total capital, (4) ROIC and ROIC growth and (5) operating margin.

The differences between MNE and non-MNE can be described in a very comprehensive form (see Table 38). MNEs are significantly larger (EUR 5.38bn vs. EUR 1.34bn annual revenue in the 10-years average) and have correspondingly more intangible assets (EUR 1.26bn vs. EUR 312m), a higher operating income (EUR 415m vs. EUR 106m) and higher investments in M&A

activities (EUR 126m vs. EUR 22m). But the average MNE group company shows a considerably lower revenue growth (9.25% vs. 15.7%), no difference concerning the profitability (ROIC and operating margin) and the operating income growth and a lower per-capita productivity (EUR 289,000 vs. EUR 639,000).

Table 38. Significant Differences between MNEs and Non-MNEs (in EUR 1,000; in %)

MNE =1 Non-MNE = 0		N	Mean	Sig. (2-tailed)
Revenue 10y-Growth	0	211	15.75	
	1	277	9.26	.012
Revenue 10y-Aver.	0	211	1,341,837.24	
	1	277	5,383,327.64	.000
R&D 10y-Aver.	0	210	3,300.99	
	1	277	195,101.86	.000
R&D 10y-Growth 10y-Aver.	0	171	0.25	
	1	210	5.01	.000
Op.Inc. 10y-Aver.	0	211	105,853.89	
	1	277	415,129.98	.001
Intang.Ass 10y-Aver.	0	210	312,063.19	
	1	277	1,267,940.08	.003
Ret.Earn. 10y-Aver.	0	211	414,623.12	
	1	277	1,630,242.10	.004
Net. Acqui. 10y-Aver.	0	211	22,062.03	
	1	277	126,773.92	.001
Debt%Cap. 10y-Aver.	0	211	35.75	
	1	277	29.88	.024
Ass.Turnov. 10-y Growth	0	209	2.09	
	1	277	6.56	.009
Int.Rev%Rev	0	211	5.50	
	1	277	57.32	.000
Employee.10y-Aver.	0	208	3,435.50	
	1	277	19,613.60	.000
Rev.p.Employ.10y-Aver.	0	208	639.83	
	1	277	289.44	.033

n = 488; Significance Level: $p < 0.05$. MNEs are coded as “1”.

To sum up, MNEs are underperforming companies: less profitable and low-growing but with the need of a higher R&D spending growth (5% vs. 0.25%),

which supports the preliminary conclusion from the previous section stating that R&D activities are only a reactive strategy to the increasing intensity of competition with each step in the internationalisation process. The only positive business economics difference can be found in the lower debt-to-capital ratio (29.8% vs. 35.7%) (see Table 38).

4.4.2 Descriptive Statistics of the MNE Group

The question arises which kind of companies is included in the MNE group. Here, again, the analysis of the top-20 companies may reveal some first insights. The top-20 MNEs are a mix of companies with different firm sizes belonging to different industries and headquarters in all three countries (see Table 39).

The top-20 group defined as the group of companies with the highest internationalisation degree includes companies of the real estate industry, such as UBM, life science companies like Stratec Biomedical or Siegfried Holding, technology companies, such as Plan Optik, AT&S, GFT and others, software companies and fintech companies, such as SAP, Wirecard, automotive and special vehicle companies, such as Grammer, Rosenbauer; and an international event marketer (Highlight Event & Entertainment).

Compared to the other top-20 groups examined in this study so far, it can be stated that this is the most heterogeneous group. In contrast, the top-20 largest companies group includes almost exclusively ‘old-industry’ companies. The group of the top-20 companies with above-average R&D spending is composed of ITC or biotech companies, while, in the group of the top-20 companies, in terms of productivity, the majority of companies are real-estate companies.

Table 39. Top-20 MNE

Company	Country	Revenue 10y-Growth	Revenue 10y-Aver. (in EUR 1,000)	R&D % Rev.	Op. Inc. 10y-Growth	Intang. Ass. 10y-Growth	ROIC 10y-Aver.	Ass. Turnov. 10-y Growth	Ass. Turnov. 10y-Aver.	Op. Marg. 10y Aver.	Int.Rev %Rev
DIALOG SEMICOND	DEU	28.0	238,115.7	18.9	-81.4	103.6	-0.4	6.2	1.2	-4.6	100.0
UBM REALITAET	AUT	23.1	139,227.5	0.0	160.3	-7.0	6.0	15.2	0.3	20.0	100.0
SIEGFRIED HOLDING AG	CHE	0.7	330,999.9	8.5	25.1	100.6	3.5	2.5	0.6	-0.3	100.0
STRATEC BIOMEDICAL	DEU	16.1	78,619.3	6.1	24.1	346.5	16.5	-0.8	1.1	9.9	100.0
PALFINGER AG	AUT	13.3	659,298.9	1.9	-15.5	25.1	12.7	0.3	1.2	23.0	100.0
SNP SCHNEIDER	DEU	16.4	17,708.3	11.0	18.0	83.1	15.6	0.0	1.4	-2.7	100.0
LS TELCOM AG	DEU	17.6	16,245.6	27.1	102.8	3.4	1.8	10.3	0.8	-1.3	100.0
PANKL RACING SYSTEMS	AUT	8.3	97,597.7	2.5	-18.6	13.6	3.5	2.6	0.8	8.2	100.0
PLAN OPTIK AG	DEU	14.6	5,562.5	1.8	47.1	318.2	6.8	5.0	0.8	-12.6	100.0
HIGHLIGHT EVENT & ENTERTAIN	CHE	3.8	7,930.0	0.0	-14.6		-2.7	5.8	0.3	-72.0	100.0
AT&S AUSTRIA	AUT	10.1	299,241.3	1.2	-139.0	43.5	-0.7	-0.6	1.1	53.3	100.0
GFT TECHNOLOGIES AG	DEU	8.4	207,269.9	1.5	-50.2	18.0	5.0	-2.2	1.9	2.5	99.9
ROSENBAUER INT AG	AUT	9.0	482,212.6	1.8	12.2	23.4	14.8	-0.5	1.8	12.9	99.8
NEMETSCHEK AG	DEU	7.4	136,856.5	15.5	28.1	30.6	16.7	2.9	1.0	14.6	99.7
DUFRY AG	CHE	18.7	2,028,909.5	0.0	-21.4	100.2	6.8	-3.1	1.2	-2.9	99.5
SAP AG	DEU	9.3	11,333,422.8	13.9	10.5	54.9	24.3	-5.3	0.8	8.9	99.3
WIRECARD AG	DEU	107.9	200,740.0	17.4	-113.4	88.8	19.1	0.8	0.4	2.7	98.0
LEWAG HOLDING AG	DEU	6.4	46,164.7	0.0	21.8	6.1	7.8	1.8	1.1	14.3	96.3
DESIGN HOTELS AG	DEU	12.7	8,387.7	0.0	-214.5	12.6	13.3	1.0	1.8	-9.5	96.0
GRAMMER	DEU	5.9	956,023.9	3.4	-39.4	8.1	7.3	-1.5	1.9	-8.3	95.7
FIRST SENSOR AG	DEU	29.4	46,453.8	8.1	-44.5	185.9	3.3	7.7	0.7	-23.1	95.6
Ø		17.5	825,570.9	6.7	-14.4	78.0	8.6	2.3	1.1	1.6	99.0

Consequently, another assumption concerning the reasons for a high internationalisation degree is not firm size or the industry but rather a result of specialisation, which is also a result of the born globals research and the hidden-champions research; both research approaches were discussed in the research framework of this study. Such companies are forced to internationalise fast because their market segments are too small, so that companies outgrow their domestic markets much earlier in their corporate lifecycle, which is indicated by companies like Plan Optik, Highlight Event & Entertainment, Design Hotel, LS Telecom and SNP Schneider, with an average annual revenue in the 10-years observation period in the range between EUR 5m and EUR 20m. As such, these companies belong to the smallest companies in the total sample. In total, nine companies of the top-20 MNEs generated an average annual revenue of below EUR 100m.

However, these companies should not be seen as the ‘average company’ of the MNE group. The comparison between the total sample’s ‘average company’ and the ‘average MNE’ results in the following main findings (see Table 9 and Table 40):

- The ‘average MNE’ shows a lower growth in terms of revenue (9.26% vs. 12.2%), operating income (-7% vs. 10.1%), PPE, asset turnover and total assets as well as almost no difference concerning the ROIC (7.0% vs. 6.1%).
- The ‘average MNE’ shows a higher working capital growth (17.4% vs. 1.7%).
- The ‘average MNE’ shows slightly higher values concerning the intangible assets in % of the total assets and the acquisition to revenue ratio.
- The number of employees of the ‘average MNE’ is almost 76% higher but the per capita productivity is significantly lower than that of the total sample’s average company (EUR 289,400 vs. EUR 463,100) indicating a labour-intensive business model.
- The ‘average MNE’ invests 80% more in M&A activities, although the acquisition to revenue ratio is only slightly higher than that of the total sample’s average company indicating a firm size effect.

Table 40. Descriptive Statistics of the MNE Group (in EUR 1,000; in %)

	N	Minimum	Maximum	Mean
Revenue 10y-Growth	277	-9.04	107.91	9.26
Revenue 10y-Aver.	277	2,454.9	125,713,545.5	5,383,327.6
R&D 10y-Aver.	277	0.0	7,523,545.5	195,101.9
R&D 10y-Growth 10y-Aver.	210	-17.2	46.0	5.0
R&D%Rev.	277	0.0	347.9	5.7
Op. Exp. 10y-Aver.	277	5,079.1	121,947,000.0	4,967,364.9
Op.Exp./Rev. Ratio	277	70.8	647.2	101.3
Op.Inc. 10y-Growth	274	-2,231.0	792.9	-7.0
Op.Inc. 10y-Aver.	277	-70,727.3	12,758,090.9	415,130.0
PPE 10y-Growth	276	-38.6	179.4	9.6
PPE 10y-Aver.	277	49.5	49,056,272.7	1,576,274.1
Intang.Ass. 10y-Growth	269	-14.7	1,006.3	51.5
Intang.Ass 10y-Aver.	277	96.2	50,070,545.5	1,267,940.1
Tot.Ass. 10y-Growth	277	-9.7	97.9	9.5
Tot.Ass. 10y-Aver.	277	3,897.6	186,382,000.0	6,554,937.3
Work.Cap. 10y-Growth	271	-851.3	1,572.8	17.4
Work.Cap. 10y-Aver.	276	-32,144,363.6	19,305,272.7	441,794.6
Ret.Earn. 10y-Growth	270	-2,184.5	2,608.0	20.8
Ret.Earn. 10y-Aver.	277	-17,196,363.6	63,503,000.0	1,630,242.1
Net. Acqui. 10y-Aver.	277	-1,051,000.0	4,568,208.2	126,773.9
Cap.Exp. 10y-Growth	265	-17.4	935.9	33.5
Cap.Exp 10y-Aver.	277	24.8	13,536,090.9	328,177.0
Debt%Cap. 10y-Growth	262	-152.8	147.0	6.4
Debt%Cap. 10y-Aver.	277	0.0	97.9	29.9
ROE 10y-Aver.	277	-643.9	239.0	6.1
ROA 10y-Growth	252	-475.6	410.9	-16.7
ROA 10y-Aver.	277	-59.0	30.1	4.9
Op.Inc./Cap. 10y-Aver.	277	-576.6	54.8	6.4
ROIC 10y-Growth	251	-521.6	1,482.6	-7.9
ROIC 10y-Aver.	277	-175.9	37.9	7.0
Ass.Turnov. 10-y Growth	277	-11.1	93.4	6.6
Ass.Turnov. 10y-Aver.	277	0.1	4.7	1.2
Int.Rev%Rev	277	26.6	100.0	57.3
Op. Marg. 10y-Aver.	277	-123.8	152.2	2.2
Employee.10y-Aver.	277	12.7	455,848.1	19,613.6
Rev.p.Employ.10y-Aver.	277	22.2	2,750.0	289.4
Acqui%Rev	277	-7.2	43.6	2.3
Intang.Ass.%Tot.Ass.	277	0.0	89.4	16.3
Valid N (listwise)	125			

n = 277.

To summarise, the ‘average MNE’ is a not very profitable, slow-growing company in terms of quantitative and qualitative growth with labour-intensive business models, which may be one reason for internationalising to benefit from comparative cost advantages intending to hold the low level of operating margin with 2.2% (see Table 40) below zero.

Comparing the top-20 companies with the ‘average MNE’, the conclusion may be that the ‘average MNE’ is a company with no competitive advantage, struggling year by year to keep the operating margin above break-even, while the top-20 MNE is growing fast, with 17.6% average annual revenue growth (see Table 39). However, the price for higher growth rates is a negative operating income growth. Consequently, it is concluded that MNEs must internationalise further if the company pursues a growth strategy. However, this strategic choice is not driven by searching for high gains but by low costs, in contrast to the top-20 companies, which seem to be pushed searching for high-margin and fast-growth opportunities based on niche products resulting in major competitive advantage leading to excessive growth rates compared to the average MNE.

4.4.3 Quantitative Growth of MNE

To explain the revenue growth of MNEs, a multiple regression analysis is conducted with the 10-years average annual growth rate as dependent variable including every variable of the variable set.

Model 3 is determined as the final model as the following models (see Table 43) show tolerance values significantly below 1. As discussed in the research design, this study uses a very strict limit excluding models below the 0.8 TOL threshold to increase the validity of the final model. The Durbin-Watson coefficient of Model 3 is in the range of the critical values of $1.5 < d < 2.5$ ($d = 2.007$; see Table 41) indicating a very low autocorrelation between the included variables. All three variables show positive beta values indicating positive correlations. Consequently, the final model is statistically valid and significant with $p = 0.00$ (see Table 42).

The main explanatory variables are the growth rates in asset turnover and total assets. Total assets growth is, one the one hand, the precondition of revenue

growth. Tangible assets are necessary to expand production capacities. On the other hand, revenue growth leads to an increase of inventory, cash and other assets, which can be considered as a self-enforcing cycle explaining also the final model's high explanatory power of the with r^2 adj. = 0.841 (see Model 3, Table 41). Consequently, the final model explains revenue growth by 84%.

Table 41. Multiple Regression Models for Revenue Growth (MNE Group)

Model	R	R Square	Adjusted R Square	Change Statistics			Durbin-Watson
				R Square Change	F Change	Sig. F Change	
1	.777[a]	.603	.601	.603	208.502	.000	
2	.895[b]	.801	.798	.198	135.327	.000	
3	.919[c]	.844	.841	.043	37.313	.000	2.007
4	.934[d]	.873	.869	.028	29.824	.000	

a. Predictors: (Constant), Tot.Ass. 10y-Growth

b. Predictors: (Constant), Tot.Ass. 10y-Growth, Ass.Turnov. 10-y Growth

c. Predictors: (Constant), Tot.Ass. 10y-Growth, Ass.Turnov. 10-y Growth, Cap.Exp. 10y-Growth

d. Predictors: (Constant), Tot.Ass. 10y-Growth, Ass.Turnov. 10-y Growth, Cap.Exp. 10y-Growth,

i. Dependent Variable: Revenue 10y-Growth

n = 277.

Table 42. ANOVA of the Multiple Regression for Revenue Growth (MNE Group)

Model		Sum of Squares	df	F	Sig.
1	Regression	11498.578	1	208.502	.000[b]
	Residual	7555.338	137		
	Total	19053.917	138		
2	Regression	15266.878	2	274.132	.000[c]
	Residual	3787.038	136		
	Total	19053.917	138		
3	Regression	16086.931	3	243.989	.000[d]
	Residual	2966.986	135		
	Total	19053.917	138		
4	Regression	16627.067	4	229.518	.000[e]
	Residual	2426.850	134		
	Total	19053.917	138		

n = 277.

However, the second predictor is more revealing. Revenue growth of MNEs obviously depends on increasing the operational efficiency because asset

turnover growth increases operations efficiency, which is also supported by the third variable. Capital expenditure includes all costs for upgrading the company's tangible assets, such as PPE. Therefore, the MNE growth model is based on the analysis of this sample: The 'average MNE' expands by building up its tangible assets step by step and optimising the operations efficiency. However, as the descriptive statistics of the average MNE has shown, this growth process is always critical with an operating margin of 2.2% (see Table 40).

Table 43. Coefficients of the Multiple Regression for Revenue Growth (MNE Group)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.755	.817		2.149	.033		
	Tot.Ass. 10y-Growth	.787	.054	.777	14.440	.000	1.000	1.000
2	(Constant)	.474	.591		.803	.424		
	Tot.Ass. 10y-Growth	.789	.039	.779	20.373	.000	1.000	1.000
	Ass.Turnov. 10-y Growth	.604	.052	.445	11.633	.000	1.000	1.000
3	(Constant)	.000	.531		.001	.999		
	Tot.Ass. 10y-Growth	.744	.035	.734	21.127	.000	.955	1.047
	Ass.Turnov. 10-y Growth	.519	.048	.382	10.765	.000	.916	1.091
	Cap.Exp. 10y-Growth	.032	.005	.221	6.108	.000	.879	1.137
4	(Constant)	-1.254	.534		-2.351	.020		
	Tot.Ass. 10y-Growth	.752	.032	.743	23.516	.000	.953	1.049
	Ass.Turnov. 10-y Growth	.631	.048	.465	13.056	.000	.749	1.334
	Cap.Exp. 10y-Growth	.032	.005	.220	6.677	.000	.879	1.138
	Work.Cap. 10y-Growth	.135	.025	.188	5.461	.000	.305	1.242

n = 277.

4.4.4 Qualitative Growth of MNE

To examine the reasons for qualitative growth, the determinants of operating income growth are examined by a multiple regression generating only one model (see Table 44). ROA growth explains operating income growth by 4.9% (r^2adj. = 0.049) and a statistical significance of p = 0.005 (see Table 44 and Table 45). With only one variable, also the collinearity statistics fulfil the requirements of valid model as well as the Durbin-Watson coefficient within the range of critical values of in the range of the critical values of 1.5 < d < 2.5 (see Table 44 and

Table 46). However, the explanatory power of the final model is weak, hence, the discussion of the finding is not very knowledge-enhancing.

Table 44. Multiple Regression Models for Operating Income Growth (MNE Group)

Model	R	R Square	Adjusted R Square	Change Statistics			Durbin-Watson
				R Square Change	F Change	Sig. F Change	
1	.236[a]	.056	.049	.056	8.057	.005	2.050

a. Predictors: (Constant), ROA 10y-Growth

b. Dependent Variable: Op.Inc. 10y-Growth

n = 277.

Table 45. ANOVA of the Multiple Regression for Revenue Growth (MNE Group)

Model		Sum of Squares	F	Sig.
1	Regression	348342.427	8.057	.005[b]
	Residual	5922810.222		
	Total	6271152.649		

Source: Own calculation; Table: SPSS output; n = 277.

Table 46. Coefficients of the Multiple Regression for Revenue Growth (MNE Group)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.502	17.888		.084	.933		
	ROA 10y-Growth	.508	.179	.236	2.839	.005	1.000	1.000

n = 277.

The ROA is defined as *profit margin x asset turnover*. Consequently, two options follow from that formula: (1) the increase of the profit margin by increasing the price premium or decreasing the cost of goods sold (COGS, respectively, variable costs) or (2) the increase of asset turnover. Since the profit margin of the 'average MNE' is extremely low with 2.2% (see Table 40), the second option may be considered as a possible explanation because it should be assumed that an MNE has a certain scope to reduce the COGS by using comparative cost advantages.

Therefore, it can be assumed that a company, as a rational agent, has tried to reach the maximum of cost reduction possible in the framework of its firm-specific cross-country value chain.

Concerning the asset turnover, the data set allows examining the bivariate correlation between asset turnover and the ROA revealing that neither the asset turnover growth nor the asset turnover level is significantly correlated at the 0.05 significance level. Furthermore, the correlations are very low with r = 0.052, respectively, r = 0.035 (see Table 47).

Table 47. Bivariate Correlations between ROA Growth, Asset Turnover, and Asset Turnover Growth (MNE Group)

		ROA 10y-Growth	Ass.Turnov. 10y-Aver.	Ass.Turnov. 10-y Growth
ROA 10y-Growth	Pearson Correlation	1	.052	.035
	Sig. (2-tailed)		.412	.582
	N	252	252	252

n = 277.

It can be assumed that the moderate effect of ROA growth on the operating income growth is the result of a maximum use of competitive cost advantages available for MNEs without resulting in a solid effect on the operating margin.

4.4.5 Quantitative and Qualitative Growth of Non-MNEs

To contextualise the results, the non-MNE group is also examined concerning the determinants of qualitative and quantitative growth. Total assets and asset turnover growth explains quantitative growth among the non-MNE group (see Table 48). Model 2 as the final model shows an explanatory power of 39% with a high significance of p = 0.00 in explaining the variance of revenue growth (see Table 48 and Table 49).

Table 48. Multiple Regression Models on Revenue Growth (Non-MNE Group)

Model	R	R Square	Adjusted R Square	Change Statistics			Durbin-Watson
				R Square Change	F Change	Sig. F Change	
1	.566[a]	.321	.300	.321	15.117	.000	
2	.654[b]	.428	.391	.107	5.820	.022	1.908

a. Predictors: (Constant), Ass.Turnov. 10-y Growth

b. Predictors: (Constant), Ass.Turnov. 10-y Growth, Tot.Ass. 10y-Growth

c. Dependent Variable: Revenue 10y-Growth

n = 211.

Table 49. ANOVA of the Multiple Regression for Revenue Growth (Non-MNE Group)

Model		Sum of Squares	F	Sig.
1	Regression	13657.104	15.117	.000[b]
	Residual	28908.856		
	Total	42565.960		
2	Regression	18226.523	11.607	.000[c]
	Residual	24339.437		
	Total	42565.960		

n = 211.

The tolerance and VIF values for both variables are close to one indicating low collinearity among the included variables (see Table 50). Consequently, Model 2 as the final model is highly valid showing a high explanatory power for explaining quantitative growth among the non-MNE group. The final model indicates that the increase of operations efficiency in terms of asset turnover is the driver of quantitative growth. The growth of total assets can be seen as one of the preconditions to realise asset turnover advances.

Table 50. Coefficients of the Multiple Regression for Revenue Growth (Non-MNE Group)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	10.035	5.360		1.872	.070		
	Ass.Turnov. 10-y Growth	.871	.224	.566	3.888	.000	1.000	1.000
2	(Constant)	7.024	5.150		1.364	.182		
	Ass.Turnov. 10-y Growth	.644	.229	.419	2.813	.008	.832	1.203
	Tot.Ass. 10y-Growth	.284	.118	.359	2.412	.022	.832	1.203

a. Dependent Variable: Revenue 10y-Growth

n = 211.

In the case of qualitative growth, the examination of the non-MNE group generates almost the same result as the examination of the high-growth group. R&D intensity is the growth driver. However, the main driver is not the increase of R&D expenditures in the observation period but the R&D budget size. Consequently, it can be concluded that qualitative growth of non-internationalised companies (with zero foreign revenue) or non-MNE companies requires a higher R&D intensity because growth, in domestic markets, presupposes continuous innovation to create new or refined products, while the expansion to foreign markets enables the company to sell existing products to new customers in new markets. However, the explanatory power of the Model 2 as the final model with the collinearity statistics and the Durbin-Watson value in the critical range, is weak with 9% (p = 0.029) (see Table 51, Table 52 and Table 53).

Table 51. Multiple Regression Models for Operating Income Growth (Non-MNE Group)

Model	R	R Square	Adjusted R Square	Change Statistics			Durbin-Watson
				R Square Change	F Change	Sig. F Change	
1	.287[a]	.082	.078	.082	17.996	.000	
2	.322[b]	.104	.095	.022	4.827	.029	2.024

a. Predictors: (Constant), R&D%Rev.

b. Predictors: (Constant), R&D%Rev., Revenue 10y-Growth

c. Dependent Variable: Op.Inc. 10y-Growth

n = 211

Table 52. ANOVA of the Multiple Regression for Operating Income Growth (Non-MNE Group)

Model		Sum of Squares	F	Sig.
1	Regression	5776669.127	17.996	.000[b]
	Residual	64520427.082		
	Total	70297096.210		
2	Regression	7297119.580	11.583	.000[c]
	Residual	62999976.629		
	Total	70297096.210		

n = 211.

Table 53. Coefficients of the Multiple Regression for Operating Income Growth of (Non-MNE Group)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-27.693	40.501		-.684	.495		
	R&D%Rev.	11.339	2.673	.287	4.242	.000	1.000	1.000
2	(Constant)	-62.370	43.114		-1.447	.150		
	R&D%Rev.	9.570	2.767	.242	3.458	.001	.915	1.092
	Revenue 10y-Growth	2.525	1.149	.154	2.197	.029	.915	1.092

a. Dependent Variable: Op.Inc. 10y-Growth

n = 211.

A preliminary interpretation of the non-MNE group analysis may be that non-MNE, which, on average, are much smaller compared to MNEs (see Table 38), are either (1) companies operating in a mass market allowing them to grow a longer time in their home country, so that they can grow without taking the risks of internationalisation; or they are (2) companies with a business model based on country-specific opportunities, so that the business model cannot be transferred to other countries. A third interpretation may be that non-MNEs are (3) companies that are just before the first internationalisation step. All three possible strategies may explain why these companies are not or will not become MNEs; but it must be noted that the trade-off for lower risks associated with becoming an MNE are lower quantitative growth rates (see Table 38).

4.5 Further Effects in the Context of Internationalisation

Further tests will investigate the differences concerning the debt-to-capital ratio as well as the per-capita productivity. Concerning the debt-to-capital ratio, a significant difference was found indicating that MNEs use less debt capital for corporate financing (see Table 38). Therefore, the correlation between internationalisation and the debt capital ratio is examined in the following section.

Concerning the per-capita productivity, a significant difference was found indicating a considerably lower productivity among the MNEs. Whilst the difference regarding the debt ratio may indicate a cash flow advantage resulting from internationalisation, the latter finding may indicate that MNEs are rather labour-intensive companies, which is in line with the internationalisation research, stating that labour costs are a main motivation for internationalisation. A last test examines M&A activities in the MNE group for better understanding the internationalisation process.

4.5.1 Debt-Capital Ratio and Productivity (Total Sample)

Investigating the relationship between the capital structure and the internationalisation degree reveals no correlation between both variables (see Table 54).

Table 54. Relationship between Internationalisation and Capital Structure (Total Sample)

		Debt%Cap. 10y-Aver.	Int.Rev%Rev
Debt%Cap. 10y-Aver.	Pearson Correlation	1	-.085
	Sig. (2-tailed)		.061
	N	569	488

N = 569.

Consequently, it is concluded that internationalisation does not influence the ‘pecking order’ in the context of capital structure decision making. On the contrary, as the examination of operating income growth determinants among the high-growth companies group has shown, the opportunities for profitable growth

through innovation seem to be a better explanation for capital structure differences.

The investigation of the relationship between internationalisation, positioning and productivity shows a moderately positive correlation with R&D intensity and labour intensity but a weak correlation with capital intensity (see Table 55). Furthermore, moderate negative relationship between productivity and internationalisation degree is found. Both results conform to internationalisation research. Companies do not only internationalise to expand but to benefit from comparative cost advantages or because of knowledge not available in their domestic market. Furthermore, operating in labour-intensive product markets is often related to comparably lower per-capita productivity. However, the question remains whether R&D is the internationalisation driver or the result of increasing competition as the result of internationalisation.

Table 55. Relationship between Internationalisation, Positioning and Productivity (Total Sample)

		Int.Rev%Rev	R&D-Intens.Top10%	Labor-Intens.Top10%	Cap.Intens.Top10%	Rev.p.Employ.10y-Aver.
Int.Rev%Rev	Pearson Correlation	1	.224**	.380*	.083**	-.204*
	Sig. (2-tailed)		.000	.050	.000	.022
	N	488	488	488	488	485

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

n = 488.

4.5.2 M&A and Non-M&A Companies in the MNE Group

A further in-depth investigation examines the meaning of M&A activities in the internationalisation process. Therefore, the MNE group is formed according to the companies' acquisition activities. Companies with no or negative net acquisition values are coded as non-M&A companies. The t-test shows no difference or no significant differences concerning (see Table 56):

- Revenue growth (M&A group: 9.5% vs. 8% in the non-M&A group)
- R&D growth (M&A group: 5.4% vs. 3%)

- Operating income growth (M&A group: -10 vs. 5%; however, the difference is not significant with p = 0.7).
- PPE growth (M&A group: 9% vs. 11%)
- Total assets growth (M&A group: 9.5% vs. 9.5%)
- Working capital growth (M&A group: 18.3% vs. 13.5%)
- Retained earnings growth and capital expenditures growth (31% vs. 43%)
- Debt-to-equity ratio growth (M&A group: 7.5% vs. 1%, but with p = 0.75) and debt-to-equity ratio (M&A group: 30% vs. 27.8%)
- Asset turnover growth (1.6 vs. 3.6) and asset turnover (M&A group: 1.1% vs. 1.1%)
- Per-capita productivity (M&A group: EUR 305K vs. EUR 224K)
- Internationalisation degree (M&A group: 57% vs. 57%)

However, significant differences can be found in terms of:

- Firm size (M&A group: 6.5bn vs. 763m) and, corresponding to this, concerning the number of employees
- R&D expenditures (M&A group: 4% vs. 12.5%)
- Operating expenditures are a firm size effect in sum; but considering the operating-income-to-revenue ratio, it becomes visible that M&A companies spend less for maintaining operations in relation to their revenue
- Operating income, PPE, retained earnings, capital expenditures and total assets as firm size effect
- Intangible assets growth (M&A group: 44.7% vs. 78.5%)
- ROE (M&A group: 10% vs. -12%), ROA (M&A group: 5.8% vs. 1.2%) and ROIC (M&A group: 9% vs. -1.3%) and operating margin (M&A group: 4.1% vs. -5.7%)

The significant difference in terms of the acquisitions-to-revenue ratio as the grouping variable is self-explaining.

Table 56. T-Test of M&A and Non-M&A Companies (MNE Group)

No M&A Actitivies = 0 M&A Activities = 1		N	Mean	Sig. (2-tailed)
Revenue 10y-Aver.	0	56	763,167.4	.000
	1	221	6,554,047.0	
R&D%Rev.	0	56	12.6	.000
	1	221	3.9	
Op. Exp. 10y-Aver.	0	56	735,979.3	.000
	1	221	6,039,571.2	
Op.Exp./Rev. Ratio	0	56	125.0	.000
	1	221	95.3	
Op.Inc. 10y-Aver.	0	56	29,848.9	.000
	1	221	512,757.8	
PPE 10y-Aver.	0	56	258,732.3	.001
	1	221	1,910,130.8	
Intang.Ass. 10y-Growth	0	54	78.6	.002
	1	215	44.8	
Intang.Ass 10y-Aver.	0	56	104,588.1	.001
	1	221	1,562,726.1	
Tot.Ass. 10y-Aver.	0	56	834,951.3	.000
	1	221	8,004,345.5	
Ret.Earn. 10y-Aver.	0	56	203,809.7	.002
	1	221	1,991,691.0	
Net. Acqui. 10y-Aver.	0	56	-18,770.1	.001
	1	221	163,653.9	
Cap.Exp 10y-Aver.	0	56	55,984.9	.005
	1	221	397,148.7	
ROE 10y-Aver.	0	56	-12.1	.000
	1	221	10.7	
ROA 10y-Aver.	0	56	1.3	.000
	1	221	5.9	
Op.Inc./Cap. 10y-Aver.	0	56	-16.8	.000
	1	221	12.3	
ROIC 10y-Aver.	0	56	-1.4	.000
	1	221	9.1	
Op.Marg. 10y Aver.	0	56	-5.8	.002
	1	221	4.2	
Employee.10y-Aver.	0	56	2,906.7	.000
	1	221	23,847.0	
Acqui%Rev	0	56	-0.1	.000
	1	221	2.9	

n = 277; Significance Level: $p < 0.05$.

The most important findings from the data analysis are that international M&A activities does not explain quantitative and qualitative growth but only to pure size in terms of the number of employees or revenue and other firm-size-related variables. However, the differences in the profitability ratios (ROE, ROIC, ROA and operating margin) must be seen as the complementary finding. M&A in the context of internationalisation obviously generates synergy effects in terms of higher efficiency and scale effects. Both findings support the interpretation of the result in investigating MNE growth drivers finding that, on the one hand, revenue growth determinants are total asset and asset turnover growth, and, on the other hand, the ROA is the driver of operating income growth. Obviously, M&A activities support the efficiency in the asset turnover and the return on assets and leads to total assets growth as a consequence of M&A activities. In this respect, it could be concluded that M&A activities accelerate but do not explain qualitative and quantitative growth as the multiple regressions analyses have revealed in both cases.

To sum up, M&A activities in the internationalisation process does not result in quantitative and qualitative growth. Instead the profitability decreases, although the operations efficiency (measured as asset turnover) increases. Consequently, the conclusion is that M&A may accelerate, but do not determine significantly qualitative and quantitative firm growth.

4.6 Discussion of Results

The examination of above-average growth achieved by analysing the total sample revealed that innovation activities, internationalisation and M&A activities could not explain quantitative or qualitative growth in a diverse sample of companies from different industries and different sizes. Instead, qualitative growth was found to be a consequence of many different factors, none of which was dominant and, therefore, seems to confirm the Stochastic Theory of Firm Growth. However, quantitative growth seems to be a much simpler process; systematic escalation of firm-specific resources, particularly in terms of production capacity expansion and the optimisation of asset turnover, seems to confirm the Resource-Based Theory of Firm Growth.

The investigation of the qualitative and quantitative growth among the total sample's companies has revealed:

(1) Quantitative growth (revenue income growth) depends, first, on the continuous expansion of the production capacities and marketable innovation because total asset growth as the main predictor of revenue income growth can be explained by PPE growth and the increase of the intangible assets growth.
(2) The examination of qualitative growth (operating income growth) has not generated a strong explanatory model. Only a low relationship was found with a higher share of intangible assets of the total assets, a labour-intensive business model and asset turnover growth.

The examination of the high-growth companies group has revealed that quantitative high growth results from asset turnover growth indicating an increasing production advantage. Qualitative high growth was not examined because high-growth companies are defined as companies with excessive revenue growth. However, internationalisation degree and knowledge intensity have not shown any explanatory power.

The examination of the qualitative and quantitative growth of knowledge-intensive companies has revealed:

(1) R&D intensive companies differ from non-R&D-intensive companies in that they have a higher asset turnover rate, internationalisation degree and debt capital share; but a lower per capita productivity. However, no difference was found concerning qualitative and quantitative growth and profitability.
(2) The same applies to the group of knowledge-intensive companies, which do not show significant differences in terms of the selected performance indicators (profitability, revenue growth and operating income growth).
(3) In the group of companies with an excessive intangible assets growth, the only significant difference was identified in the internationalisation degree. This relationship was explained by the following findings: Main sources for generating intangible assets are R&D activities and the cross-border acquisition of intangible assets.

The examination of the qualitative and quantitative growth among MNEs has revealed:

(1) Comparing MNEs and non-MNEs, it was found that the average MNE grows much slower and shows no differences concerning their operating income growth or their profitability. However, the top-20 companies have shown a very high revenue growth rate.
(2) It was further concluded that the ‘average MNE’ is a company with no competitive advantage struggling year by year to keep the operating margin above break-even. Internationalisation is rather a reactive strategy to continue firm growth than a deliberate strategy to use profitable business opportunities.
(3) The examination of quantitative MNE growth has shown that the ‘average MNE’ expands by building up its tangible assets step by step and optimising the operations efficiency. However, the growth process is always critical with a very low operating margin.
(4) The examination of qualitative MNE growth has not shown statistically significant results. However, it can be assumed that this is, at least partially, the result of the fact that MNEs are not very profitable, so that qualitative MNE growth is more or less just a coincidence.
(5) The examination of qualitative and quantitative growth among the non-MNE group has shown that such companies are mainly R&D intensive, which was explained by their positioning in niche markets or being on the leap to internationalisation. However, internationalisation avoidance leads to lower growth rates in terms of quantitative growth but not in terms of qualitative growth.

To summarise the findings, MNEs are more pulled than pushed into internationalisation. At a certain firm size level, the only way to grow further is to internationalise, however, at the cost of profitability. Beside this, the acquisition of intangible assets through M&A activities should be seen as further driver of internationalisation. Yet, internationalisation in general is not a high-growth strategy. The same applies to R&D intensity and knowledge intensity, respectively. Therefore, it appears that, even in the age of information technology and globalisation, the ‘old-fashioned’ development of firm-specific resources, the

steady optimisation of operations efficiency and the step-by-step internationalisation are the main options for companies with a weak competitive advantage. Only for companies with an innovation advantage (born globals), fast internationalisation should be considered as a veritable option to profitable high growth.

Chapter 5. Discussion of the Findings and Implications

To sum up data analysis results, qualitative and quantitative growth is not determined by the internationalisation intensity. In the context of this general finding, the following Section 5.1 discusses the findings on a general level concerning generic growth strategies, while Section 5.2 develops two growth models: (1) a general model of quantitative and qualitative growth and (2) a specific model explaining high growth in both dimensions.

Section 5.3 discusses the relevance of internationalisation in the growth process by referring to the theoretical framework developed in Chapter 2 and answers the research question in referring to the 3-stage theory which was discussed in Section 2.3 as new model in internationalisation research. Section 5.4 and 5.5 develops management and research recommendations.

5.1 Findings concerning Firm Growth

Following the research framework of this study, four ‘generic’ management activities, which are measurable with the instruments of financial analysis, are examined as growth sources:

(1) Innovation
(2) Investment in capital assets
(3) M&A activities
(4) Intensification of the internationalisation process

Concerning internationalisation as a source of firm growth and excessive (high) growth, it can be stated that:

- The average company of this sample with an average revenue growth rate of 12%, an operating income growth rate of 11%, and an internationalisation degree of 35% grows (in terms of quantitative growth) by expanding mainly its production capacities in terms of PPE investments and its intangible assets, while qualitative growth is reached mainly by expanding the company’ knowledge base in terms of intangible assets to total assets.
- High-growth is different. Here, quantitative growth is not achieved by expanding production capacities but the efficiency of the production

capacity and other processes affecting the asset turnover rate, while qualitative growth is strongly linked to R&D intensity financed by intensive leveraging. This result is also supported by the examination of companies according to their R&D and knowledge intensity, which also supports the finding that R&D does not only create intangible assets ‘convertible’ into new products but also higher efficiency in terms of asset turnover and also an additional competitive advantage in the internationalisation process.

– However, neither high growth nor average growth is associated with internationalisation. On the contrary, the examination of MNEs has shown that quantitative growth is achieved in the same way as in the case of an average company with moderate internationalisation degree by expanding the total assets base but at the price of lower growth rates. The only difference concerning growth determinants was found in the higher efficiency of operations in terms of asset turnover, which may be a result of, at least partly, the positioning of MNEs in labour-intensive product markets, so that internationalisation is both a pull and push factor to benefit from economy of scale effects. Asset turnover may in this context only be an indicator of the industry in which MNEs typically operate.
– However, a real driver of internationalisation success can be seen in the context of M&A activities. Here, it becomes apparent that external growth leverages firm growth resulting in synergies in combination with economy of scale effects, which became apparent in comparing MNEs with and without M&A activities. Other factors, such as R&D expenditures, global sourcing of intangible assets and other possible sources of competitive advantages must be seen in the context of the necessities of global market and its higher competitiveness. They are necessary to keep up with other global competitors but are not the source or the driver for high growth or only average growth. On the contrary, internationalisation is not the ‘winning formula’ for high growth. Rather, internationalisation is a necessary step in the growth process, when a firm has reached the growth limits in domestic markets. Then, firm operations can be expanded only step-by-step and seem to imply a slowdown of firm growth rates, which became apparent in the fact that non-MNEs grow faster and are driven mainly by innovation in terms of significantly higher R&D intensity, while

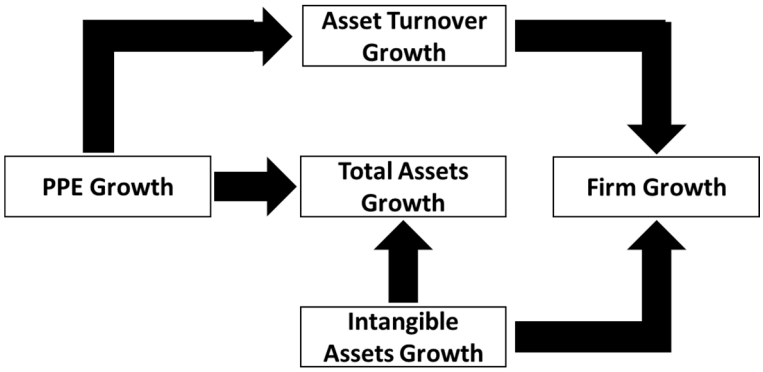
MNE growth rates are lower and cannot be maintained by M&A activities. However, M&A activities of MNEs are the path to profitability and profitable growth, which supports the assumption that non-MNE growth is driven by innovation resulting in organic growth, while internationalisation provides profitable growth opportunities by using debt capital in the context of M&A-driven, external growth, which is further discussed below.

To sum up the findings, MNE as companies in a very late stage of their lifecycle, can only grow on by international M&A activities which is, one the one hand, possible due to longer learning process, while smaller and younger companies with less internationalization experience and skills grow through incremental and market innovation. However, these findings indicate that the corporate lifecycle must be included in further research as a moderating variable which also follows from the recent research based on the 3-stage theory discussed in Section 2.3.

5.2 Firm Growth Models

The examination of the total sample concerning explanatory variables for quantitative growth has yielded that total assets growth and asset turnover growth explain the revenue growth by 40% (see Table 11). Total assets growth can be explained by PPE growth and intangible asset growth by 9% (see Table 14). The examination of the total sample concerning explanatory variables for qualitative growth has identified the ratio of intangible assets to total assets, labour intensity and asset turnover as explanatory variables; although with a low explanatory power of 2.5% (see Table 17). In both tests, innovation, internationalisation and M&A activities have all failed to explain quantitative or qualitative growth because they are excluded in the regression analysis as non-significant or as a function of another variable because they show a correlation with a variable with a higher correlation with the selected dependent variable. Consequently, a general model of qualitative and quantitative growth can be visualised as presented in Figure 3.

Figure 3. General Model of Qualitative and Quantitative Firm Growth



Source: Author's presentation.

PPE growth is the material basis for expanding the production capacities, the intangible assets growth also results in total assets growth but also constitutes the basis for new products. As mentioned, intangible assets are accounted as R&D costs or purchases resulting in marketable products. The examination of above- and below-average intangible assets companies has supported the eminent role of the factor in both quantitative and qualitative growth.

This general model of firm growth is also supported by the results of examining the high-growth companies group indicating also that asset-turnover growth is a very relevant source of quantitative firm growth (see the subsequent paragraph). However, the difference between both growth types can be explained by the differences in the explanatory power of the intangible assets. In the case of general quantitative growth (revenue growth), intangible assets are a secondary factor; in the case of general qualitative growth (operating income growth), intangible assets are the primary factor indicating that constant product innovation could be a growth-relevant fact.

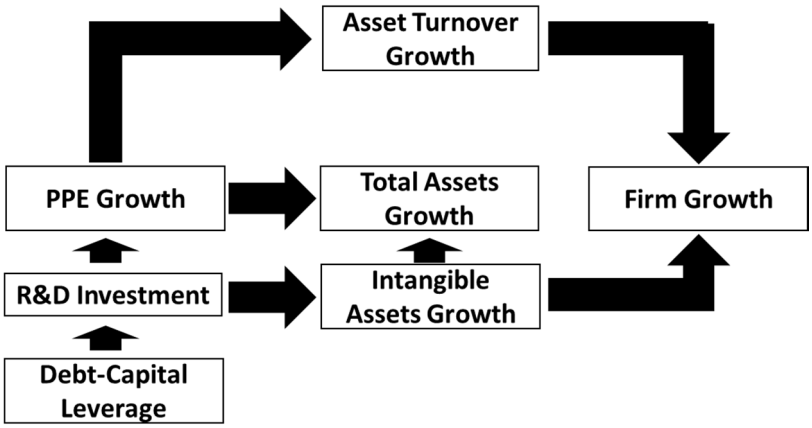
The examination of the high-growth group concerning explanatory variables for quantitative high growth has yielded that asset turnover growth explains revenue growth by 19% (see Table 21). This result was interpreted as an indication that quantitative high-growth is not only building up firm-specific assets, as is the case for quantitative growth in general. Instead, quantitative high growth requires not only production capacity extension but also the increase of operations efficiency

indicated by asset turnover growth, which leads to a production advantage resulting in cost leadership.

The search for explanatory variables for qualitative high growth among of high-growth group has identified the debt-to-capital ratio providing a very strong explanatory power explaining 43% of the variance of the operating income growth as the dependent variable (see Table 24), whereas the debt-to-capital ratio can be explained by the R&D/revenue ratio and the operating income/revenue ratio with both variables explaining 94% of the debt-to-capital ratio (see Table 27). Therefrom, it was concluded that the qualitative high-growth group depends on the leveraged investment in R&D as the key driver for the competitive advantage explaining qualitative high growth.

Consequently, the examination of high-growth companies has contributed two additional factors to the general model of qualitative and quantitative growth, which is the leveraged investment into R&D. According to the international accounting standard IAS 38.56 regulating the reporting of the sample's companies, R&D expenses are defined as all costs from *activities "aimed at generating new knowledge, alternatives for or new materials, products, devices, systems, services or processes*" (International Account Standard (IAS) § 38.56). These costs should be classified as R&D expenditures. This classification does not distinguish between external and internal innovations. However, IAS 38.57 requires that all costs arising from R&D expenditures related to the company's marketable products should be accounted for as increase in intangible assets. R&D accounting does not distinguish between internal innovation in terms of process optimisation, new knowledge and product-related innovation. Therefore, the investment of R&D can lead to both PPE growth in terms of the increase of tangible assets as well as to the increase of intangible assets (see Figure 4).

Figure 4. Model of Qualitative and Quantitative High-Growth



Source: Author's presentation.

In the context of the general model of quantitative and qualitative growth, the high-growth model can be considered as more specific because it explains excessive growth. The general process of growth can be considered as similar to general growth, whereas the difference can be seen in the leveraged financing of R&D activities to profit from a multitude of business opportunities, which cannot be realised only by internal funding. This pattern is also identified by Coleman and Robb (2012) in examining the pecking order in financial decision-making among technology-based firms which prefer debt capital over equity capital to grow faster.

Finally, it should be mentioned that both models have treated total asset growth as a residual with no effect on firm growth. The reason is that total assets as an accounting variable include not only investments but also receivables, cash and other assets. However, only for PPE and intangible assets, an effect on firm growth was measured. PPE growth and intangible asset growth increases the amount of total assets, but the simple increase of revenue also increases total assets, so that total assets are not treated as an independent variable in the models but as a stock indicator. Furthermore, it is to mention that internationalisation is not a variable explaining quantitative and qualitative growth. Therefore, internationalisation is not included in either model, whereas the relevance of internationalisation in the growth process is discussed in the following section.

5.3 Internationalisation and Firm Growth

As mentioned, internationalisation was not found as an explanatory variable for quantitative and qualitative growth in the exploratory analysis of both the total sample and the high-growth group. Therefore, internationalisation cannot be considered as a high-growth strategy in general. However, the relevance of internationalisation in the growth process appears rather in the analysis of the R&D-insensitivity groups in Section 4.3.2. Here, it was concluded from the data analysis results that R&D-intensive companies are forced into the global market because, the more specific the products and the higher R&D costs are, the higher is the need for larger markets to refinance R&D investments, which is also one of the explanations for the born globals phenomenon. However, this necessity of increased internationalisation leads to a higher competitive intensity and, thus, vice versa, to the necessity of continuously growing R&D investments, which were described in Section 4.3.2 as a self-enforcing cycle. But also innovation as a result of R&D cannot be considered as a generic growth strategy because R&D-intensive or knowledge-intensive companies have not shown excessive growth rates.

This assumption of the self-enforcing cycle was supported by the examination of the MNE group discussed in Section 4.4. It was stated that MNEs are underperforming companies: the ‘average MNE’ is a slow-growing company in terms of quantitative and qualitative growth and struggling year by year to keep the operating margin above the break-even point. It was concluded that MNEs are more pulled into internationalisation instead of pushing this process, which was explained by the assumption that, at a certain firm size level, the only way to grow further is to internationalise at the cost of profitability.

However, it was found in Section 4.3.2 that the internationalisation degree is an identifier for companies with exceptional intangible asset growth in the context of M&A activities. Therefrom, it was concluded that internationalisation, exceptional intangible asset growth, R&D intensity and cross-border M&A are interrelated, whereby none of the factors or factor groups explain qualitative and quantitative firm growth. Consequently, it was stated that the acquisition of intangible assets through M&A activities should be seen as an additional driver of internationalisation. Yet, this finding was also not interpreted as growth strategy

but as defensive strategy in the context of retaining the company's competitiveness at a certain level, whereas every stage in the internationalisation process intensifies the competitive situation, with the result of declining margins.

To sum up, internationalisation was not identified as a relevant instrument of strategic management but as an emerging strategy in the course of the corporate lifecycle, which leads to the process view of internationalisation. Although this research has not examined process patterns of internationalisation in terms of the process theories (see Section 2.1), some findings can be interpreted in this theoretical context. First of all, it became apparent that internationalisation is, as mentioned, not the key factor to excessive growth. On the contrary, it can be assumed that business models not being successful in their home markets will most likely not work in other countries. This became also apparent in the hidden champions research (see Section 2.5). Consequently, not every company is a born global, which are assumed to be mainly technology companies (see Section 2.4). However, the results of examining the R&D-intensive and knowledge-intensive groups have revealed that such companies show a higher internationalisation activity; but it remains unclear whether such companies are forced into internationalisation by their positioning or are able to be highly competitive in international markets due to their innovativeness. The examination of the MNEs and non-MNEs (see Section 4.4) supports rather the latter assumption. The low profitability of MNEs indicates a low competitiveness, so that R&D and knowledge intensity are the only ways to stay above the break-even point.

The contribution of this research to the high-growth companies' research is that internationalisation is not a necessary precondition for high growth. Instead, high growth results rather from internal processes in the sense of Penrose's resource-based theory of firm growth (see Section 2.5) by developing and building up firm-specific resources and core competencies by step-by-step learning in terms of managing internationalisation processes and managing increasingly complex operations in terms of the learning theories of firm growth. However, the average company of a smaller country, such as Switzerland or Austria, is forced to internationalise much earlier in the corporate lifecycle than a US or German company. However, also a German or US company will reach the growth limits

of its domestic markets sometimes. Before this, companies should have taken first steps into neighbouring countries for collecting internationalisation experience. This means that companies from small countries should start internationalisation from the moment when they have reached their maximum growth rates in the domestic markets. This assumption can be formulated in the context of the entrepreneurial theories of internationalisation (see Section 2.3): internationalisation should not be left to chance but should be in mind just in the start-up phase in the case that the company has a really new product or a really new business model, respectively. Internationalisation should not be prolonged to the day, business opportunities emerge through customers, suppliers or social networks of the top-management team. Instead, internationalisation experience should be actively wanted in the consolidation phase.

The major contribution of this research can be seen concerning the theory of firm growth, high-growth research and the theory of multinational companies. Concerning the high-growth research and the theory of MNEs, it can be stated that internationalisation will become a necessary step in the lifecycle but requires experience and management competence, while the risks of internationalisation, particularly in the form of low or decreasing margin, must be seen as the quasi-natural destiny of an MNE.

To sum up the discussed findings concerning the performance-internationalisation relationship so far in referring to the research question, it can be stated that this relationship is context-dependent which is also assumed in recent research based on the 3-stage theory. It was noted in Section 2.3 that recent research assumes a change in the relationship over time. If one considers the firm size as a proxy of the corporate lifecycle this research provides some evidence that stage 3 is characterized by a negative slope at the end of this stage resulting from over-expanding beyond the optimal firm growth and firm size level, the trade-off between the benefits of expansion and the rising costs from the complexity of managing operations in different countries, and the problem that finding new profitable markets decreases with the decreasing number of markets entered. Instead, the coordination costs increase with the degree of internationalisation, and the average profitability of the portfolio of markets decreases step by step. Consequently, it can also be stated that the 3-stage

model has to be taken into account which will be discussed in the following section in more detail in the context of the lifecycle concept.

5.4 Research and Management Implications

The findings and conclusions showed that internationalisation cannot be observed as an independent instrument of firm growth. Instead, the results of the empirical analysis proved that internationalisation must be seen in the context of the firm's growth process and not as a general option of strategic management. This conclusion becomes even more obvious in the discussion of research implications in the following section, which prepares the basis for management recommendations developed in the subsequent section.

5.4.1 Theoretical and Research Implications

The resource-based theory, formulated by Penrose (1959), can be considered as the still valid core of explaining firm growth. The empirical findings of this research have supported that the building of firm-specific internal resources in the form of material and immaterial assets are the key drivers to growth. Furthermore, the fact that M&A activities have not contributed to exceptional growth in this research sample underlines that internal (organic) growth is the superior approach to external growth. However, the questions remain which kind of assets should have the higher focus. According to this examination of qualitative and quantitative growth, the extension of material assets allows only quantitative growth, whereas qualitative growth needs intangible assets. Therefore, the first recommendation to future research is to investigate much more the contribution of intangible assets to firm growth beyond the financial data; because annual reports provide data on intangible assets only as an account data without further specifications, so that research following a mixed approach should include the analysis of financial data sets over a longer time supplemented by qualitative interviews with expert such as, for example, investor relations managers to 'dig deeper' into the single number representing intangible assets in the annual report. An alternative to interviews could be the quantitative content analysis of investor conference call and earnings call transcripts, CEO presentations and other kinds of documents.

The second recommendation is the integration of a corporate lifecycle indicator because this research's literature review and the data analysis results have indicated a higher relevance of this factor, such as Kemp and Verhoeven (2002), who point to the requirement of lifecycle differentiation, particularly in the context of the resource-based theory of the firm. This recommendation is also supported by the findings of the data analysis that smaller companies grow faster, while MNEs grow more gradually and show an above-average size. Furthermore, the 3-stage theory as a product of recent internationalisation research has also shown, that lifecycle stages must be included in examining the performance-internationalisation relationship.

Even though the lifecycle theory has traditionally been developed in strategic management, the research in finance has developed an approach to determine the lifecycle as a result of some evidence that the firm's capital structure dynamics depend also on the lifecycle (Myers, 2003; Frank & Goyal, 2009). Most of the empirical research literature integrating the lifecycle perspective determines the lifecycle stage based on the approach introduced by Anthony and Ramesch (1992) and Black (1998). They applied, as four lifecycle stage descriptors, the four variables *sales growth*, *capital expenditures*, *firm age* and *dividend pay-out ratio* resulting in different scores for each firm allowing to classify each firm accordingly by summing the individual indicator scores (Park & Chen, 2006, pp. 79-83).

Different to that complex scoring procedure, the so-called firm lifecycle theory of dividends applies a rather reduced method. The theory assumes a trade-off between distribution and retention of capital corresponding to the different corporate lifecycle stages. Consequently, this theory uses dividend-policy changes to determine the corporate lifecycle stage. First of all, early lifecycle stage firms face high barriers in raising external funds, so that growth companies save capital for future investments and do not pay dividends. Secondly, growth companies are not profitable enough to meet all the financing needs through internal funding in face of relatively abundant investment opportunities. And, thirdly, raising external capital is rather expensive in the growth stage. These limitations result in growth companies not paying dividends because they retain most of their earnings in the firm to finance future growth.

When growth firms gradually reach the maturity stage, they have accumulated larger amounts of profit. Furthermore, the costs of raising external capital decline. At this point, mature firms pay dividends with a much higher probability because they have generally fewer investment opportunities but decreasing costs of raising external capital.

DeAngelo et al. (2006) tested the lifecycle theory of dividends by examining the relationship between the capital mix measured as the ratio of retained earnings to total assets (TA) or total equity (TE) and the probability of paying dividends finding that the earned/contributed capital mix is a good proxy to determine the lifecycle stage.

Firms with relatively high ratios of retained earnings to TA or TE tend to be more mature, with large cumulative profits, whereas firms with low ratios of retained earnings to TA (RE/TA ratio) or total equity (RE/TE ratio) tend to be in the capital infusion stage. Similarly, also Owen and Yawson (2010) found that the RE/TE ratio is a very useful measure to determine the lifecycle stage of companies. Therefore, the lifecycle theory of dividends can be considered a relatively precise measure to determine a firm's lifecycle based on its capital allocation policy of its earned/contributed capital mix, particularly in the case of comparing companies of different firm ages, for example, in the context of larger samples, also including SMEs.

However, a consequential problem could be that the formation of lifecycle groups to examine internationalisation effects and characteristics depending on lifecycle stages leads to small group sizes resulting in statistical insignificance depending on the total sample size. For example, in the case of this research, which is based on a high-expensive investment professionals' database, for which a high data quality could be assumed, the grouping according to lifecycle metrics would have meant group sizes of approximately 100 to 150 companies. If one would further distinguish among the groups between different growth behaviour, positioning, investment behaviour or other factors, the subgroup sizes would decrease to some 50 companies, which must be seen as a critical group size in terms of robustness of the results of the applied tests, particularly in the context of explanatory research including many more variables than, for example, research

that is based on a research model including only a few factors to answer very specific research questions.

Apart from this research practice problem, a third, methodological recommendation can be derived from this research. Accounting theory and the financial analysis should be applied as the main research framework in the context of internationalisation research if the research aim goes beyond a purely descriptive aspiration. The global harmonisation of accounting standards has made available an increasing number of standardised accounting data for business research at low search costs in the last decade (Yrisandi & Puspitasari, 2015, p. 644). An important function of accounting systems is to provide managers with models that evaluate all relevant information needed for rational decision making. Therefore, the finance-based view of the firm may be the best instrument to explore and examine the sources of firm performance (Collis & Hussey, 2009, pp. 131-132). Using this approach and body of knowledge would, therefore, bridge the gap between business research and business practice, as it is discussed in Section 2.7 regarding the issues in the use of firm growth measures. The financial reporting data model (see Section 3.2) can be considered as a well-suited standard model for quantitative business research. The well-documented IFRS standards provide precisely defined variables and the accounting theory and financial analysis research provides a huge body of knowledge concerning smart ratios to gain insights into companies beyond the surface of financial reporting. Even such challenges as lifecycle differentiation as moderating variable can be met by using accounting numbers. However, as mentioned, the problem remains to find data for non-listed companies because they are not required to comply with international standards in financial reporting, so that it is difficult to collect data of younger firms to an amount enabling to find statistically significant results for each lifecycle stage, as it is possible in the case of stock-listed companies.

To sum up, the models and theories discussed in literature review should not be considered as competing but as complementary models describing internationalisation from different perspectives. Particularly, the 3-stage internationalisation theory, but also the lifecycle concept combined with the resource-based view can be considered as core concepts to explain growth and

performance in the context of internationalisation. Therefore, the corporate lifecycle concepts as well as the 3-stage theory of internationalisation provides an adequate framework for modelling firm growth in the internationalisation process and should be supplemented by the resource-based view and its extensions by the learning theory and the core competencies concept.

Regarding firm growth theories, however, it must be stated that internationalisation can be considered generally as a late-stage option, at least for companies with a large domestic market. Thus, internationalisation is not a prerequisite for growth but only the result of growth, whereby the degree of internationalisation depends on the firm's domestic sales market and sourcing market.

5.4.2 Management Implications

The findings from the data analysis and their discussion in the context of research implications showed that the performance-internationalisation relationship is of multi-layered complexity. It must be stated, first of all, that internationalisation is context-dependent, so that no general statement on internationalisation as an instrument of strategic management can be formulated without including the lifecycle stage. Furthermore, the 3-stage theory as provided further evidence for the context-dependency of the performance-internationalisation relationship.

Consequently, the following management recommendations are structured along the corporate lifecycle concept, because, as the discussion of data analysis results as well as the literature review showed, that the corporate lifecycle particularly of stock-listed companies with their higher degree of internationalisation compared to SME, is strongly linked with their internationalisation stage. Therefore, the corporate lifecycle must be considered as an important structural variable.

Younger, above-average growing companies, which may be more likely technology companies, cannot avoid internationalising much earlier in the corporate lifecycle. They should initiate first internationalisation activities at the start-up stage; only very few companies are 'real' born globals. Other companies with a positioning in non-R&D and non-knowledge-intensive industries should stabilise their business and rework their business model in the growth phase

before taking first steps abroad. Instead, their focus should be on developing continuously their firm-specific tangible and intangible assets, as it is described by the resource-based theory of firm growth. Only in respect to positioning the market-based theory of firm growth provides useful insights in terms of market selection and value-chain optimisation. However, global sourcing is not suitable for both types of companies in the start-up stage as well as M&A activities. According to the 3-stage internationalisation theory, younger companies should avoid focussing on a higher number of market entries.

In the growth process, companies should prefer the step-by-step internationalisation starting in neighbouring countries or countries where cultural knowhow exists within the firm to risks in the target country in terms of market risks or legal risks. Thus, they avoid risks and the excessive rising of controlling cost. Moreover, the organization gains time to learn from the first internationalisation steps to organize international business and find the best-fitting market entry strategies.

However, the build-up of internal resources is still the major growth driver, while M&A activities, instead of Greenfield strategies, should be considered after a certain firm size is reached. The major focus should be on operations efficiency, particularly in terms of asset turnover and the further build-up of firm-specific tangible and intangible resources.

Moreover, for R&D- and knowledge-intensive companies, the requirements for global sourcing may be more eminent than for other companies, which automatically leads to internationalisation and the build-up of international networks, which can also be used to increase sales opportunities. Other companies internationalising step-by-step following, first, the waterfall model approach and, later, the sprinkler model approach (many countries at a time), should consider that becoming an MNE usually means decreasing profitability, so that existing qualitative growth can turn into quantitative growth only, which can particularly be the result of M&A activities. In the later corporate lifecycle, the main problem for MNEs results from finding further profitable markets and to coordinate the international business in a portfolio of markets with rising differences in the regulatory, political and cultural environment. The findings of

this research indicate that M&A activities become increasingly important to sustain the firm growth process without sacrificing profitability. M&A activities allow to buy-in country-specific knowledge and skills but increase the risks of excessive controlling costs.

This leads to further recommendation to consider internationalisation not as a panacea for perceived growth limits. Instead, management should prefer step-by-step internationalisation to keep cross-country business risks under control. It appears, as mentioned, that, even in the age of globalisation, the ‘old-fashioned’ development of firm-specific resources, the steady optimisation of operations efficiency and the step-by-step internationalisation are the main options for companies with a weak competitive advantage. Only companies with an innovation advantage (born globals) should consider internationalisation as a high-growth option. The same applies for companies in early growth stages, while, for companies in the maturity stage of their lifecycle, internationalisation is a completely different challenge in terms of keeping profitability and growth abroad in balance.

Chapter 6: Limitations and Conclusion

6.1 Limitations

This research has included 569 companies covering a comparably long research period. As noted in the discussion of prior empirical research in both areas (internationalisation and firm growth), many studies examine datasets with a smaller size of case and research period. As mentioned in Section 4.1, the sum of revenues of all companies accounts for EUR 1,824bn in 2013 which is equivalent to 54%.of the German GDP (EUR 3,353bn; 2013).

A possible issue may be the country-selection bias. This sample includes companies headquartered in three countries. If one assumes that, the domestic market of the included 394 German companies is larger than the domestic market of Austrian and Swiss companies, German firms tend to have much smaller degrees of internationalisation than the Austrian and Swiss counterparts, all other things equal.

This interdependence between the size of a firm's domestic market and the internationalisation degree creates problems that your study must address. Due to this assumed interdependency, one would expect that the relationship between the firms' degree of internationalisation and its performance depends is, among other things, related to the size of the domestic market because firms from different countries face different incentives and opportunities to internationalise depending on the size of their domestic market (Ruigrok et al., 2007). However, at least in the case of the Austrian and German companies this argument is not persuasive. The first question arising is: Which is the domestic market of a company which is headquarter in the European Union as well as in the same currency area? The same applies to Swiss companies because Switzerland is included in European Customs and Trade Union and the Swiss currency was tied to the Euro until 2015. Furthermore, the cultural distance – considered as a main barrier in the discussed theories in Chapter 2 – between Germany as the largest EU market, Switzerland and Austria is almost irrelevant.

Differences on the macroeconomic level casing firm growth differences between the companies from different countries can be excluded. All three countries are linked to the same or similar currency and regulatory area. Austria and Germany are EURO area members since 2002; the Swiss Central Bank has tied its monetary policy to the European Central Bank (ECB) until 2015. Moreover, the regulatory environment in the contest of governance regulations is highly comparable resulting in, for example, convergent effects on risk-taking behaviour (Baker & Anderson, 2010, p. 180).Both facts result in investment incentives, factor intensity and homogeneous inflation rates (Franzese, 2002, p. 247). Moreover, it can be assumed that the included countries are similarly affected by shareholder activities (Bertoneche & Knight, 2001, p. 200). Shareholder value pressure can lead to differences in investment behaviour if one compares samples including "*Teutonic Three*" (Franzese, 2002, p. 247) companies and U.S. companies.

However, this sample covers companies with almost the same external factors in the different dimensions discussed allowing to expand the basic population and thus the qualitative of the data analysis. As mentioned on Chapter 2 and 3, this sample is one of the largest samples in the area of performance research whereby other research with a comparable sample size are cross-country studies except studies based on U.S. samples. In this context, also the issue of sector grouping is to consider. First of all, as discussed in Chapter 3, the industry classes provided in the form of the Global Industry Classification Standard (GICS) cannot be considered as reliable. But even in the case, that they would have provide a higher selectivity the problem would arise that, for example in the case of this sample which should be considered as a larger sample, the number of group members assigned would have been very low resulting in critical issues concerning the robustness of the final models. Even if one neglects the problem of the GICS, this would mean, for example in the case of the car industry, that this industry group would include only four companies.

The operationalization of the performance-internationalisation relationship is another issue to be discussed. The mainstream in international research applies one-dimensional measures such as this research in the form of the degree of internationalization measured as the share of foreign revenue. Other indicators

can be the ratio foreign assets to total assets or the number of foreign subsidiaries. Critics argue that such single-item measures do not capture the multi-dimensionality of internationalisation. Thus, Sullivan (1994), recommends developing a combined indicator measure including foreign revenue, the number of countries, foreign assets, foreign R&D expenditures, and other indicators. However, recent research rejects this approach, because the combination of indicators such as the number of countries does not provide additional information of the degree of internationalization. Thus, for example, Curwen and Whalley (2008, pp. 61-63) argue that the number of countries does not reflect the intensity of internationalization because even small companies may show a higher number of exporting countries while the foreign revenue remains low. Furthermore, it must be mentioned that data on such indicators are not publicly available or defined be an accounting standard so that these data can only be collected by surveys and the subjective statement of respondents (Curwen and Whalley, 2008, pp. 61-63). Others have recommended using entropy-type measures to measure the international spread or diversification of firms' activities such as, for example, Goerzen and Beamish (2003) developing an international asset dispersion indicator. However, recent research using such an indicator provide evidence that– compared to one-dimensional indicators – the differences in measuring the performance-internationalisation relationship on the level of firm performance are low and sensitive to the country of origin of the sample's companies (Gröne, 2019, pp. 33, 129-134).

Another limitation may be the use of accounting data. Although, as discussed, many studies have used accounting data, to examine the relationship between internationalisation and performance, critics argue that ratios can be manipulated. This research has discussed this issue in particular in the context of the such measures as the ROE or the ROA. Therefore, this research has decided to use revenue growth and income growth as main performance parameter and the ROIC and the operating margin as a secondary performance parameter to control if qualitative and quantitative growth are profitable and doe not only indicate the expansion of business operations. Revenue and income cannot be manipulated as simple as return ratios (Hill et al., 2015, pp. 445-448). Furthermore, it can be stated that the international accounting standards have

reduced the possibilities of manipulation by defining in detail the calculation of balance sheet and income and cash flow statements. Moreover, the possibilities of manipulation are further reduced by the selection of longer time period reducing also the one-time effects of accounting policies (Hill et al., 2015, pp. 445-448).

This consideration is also another reason to select the observation period of ten years beside the issue of the availability of complete data sets for each firm ruled by the same international accounting standard which is established since 2002. Here, one could argue that a ten years-average of performance values and firm characteristics does not consider time lag effects. However, in the case of this sample including stock-listed companies, the case is different because such companies are internationalised in general so no starting point for internationalisation can be identified. Instead, these companies show only a certain volatility in their foreign revenue share growth over time whereby the volatility is determined by external factors such as foreign exchange rates and other cyclical factors but do not show time lag effects due to their continuous international business.

Furthermore, the firm size effect issue was addressed several times in the research framework chapter. Here, it was stated that firm growth as well as the degree of organization is moderately affected by firm size. Therefore, this research has used – as mentioned in the research design – in each data analysis firm size as control variable without finding any effect. Moreover, the remove of, for example, the top-20 firms account for 62.29% of total sample's 10-year average revenue and the analysis of this reduced sample of 549 remaining firms would not have provided different results. On the contrary, one could argue here that this sample is rather small-business biased. However, this research has focused on stock-listed companies which includes companies of all size. In this context, it is to mention that the selected sample covers almost all stock-listed companies which are active within the total observation period and represents therefore the almost the basic population of all stock-listed companies in the given countries and observation period.

Finally, the selection of firm performance measures applied as dependent variables should be addressed. This issue is discussed to a considerable degree in Section 2.4. Here, the argument was made that revenue and income growth are the main performance indicators in performance research so far. Therefore, this research as decided for both indicators for measuring quantitative and qualitative growth at least to be comparable with prior research.

6.2 Conclusions

The validity of the data and the reliability of the applied tests should be a sufficient basis for valid conclusions, particularly in the context of the comprehensive discussion of prior theoretical literature and empirical research provided in Chapter 3 as well as in the context of the data analysis in Chapter 4 and the discussion of results in Chapter 5. Based on these sources, it can be concluded that internationalisation is not a ‘generic’ management strategy but a continuous discretionary process. It should be seen as a part of operations management, particularly in the globalised world, in which the distinction between domestic and foreign markets loses its significance. This increasing market complexity, however, questions the simple linear stage-process models, which even Johanson & Vahlne (2015, p. 44), as their ‘inventors’, conceded recently.

Internationalisation is not a linear process, such as stage models of internationalisation or learning theories of internationalisation or academic textbooks suggest, following a linear path starting with exporting, agency representation, overseas licensing, overseas sales subsidiaries and ending with the establishment of overseas production subsidiary (e. g. Thompson & Martin, 2005, p. 553). Instead, internationalisation in its intensity and extension depends not only on the specific lifecycle stage and is not a single strategic decision. Rather, the internationalisation process is characterised by a combination of push and pull factors determined by countervailing developments and self-enforcing processes, which increases the risks of sunk costs, declining margins and increasing level of competition. Therefore, Johanson & Vahlne (2015, p. 51) state that future research must focus more on risk and uncertainty management than on linear growth concepts. Even Johanson and Vahlne (2015, p. 44) conceded recently the low complexity of their stage model, particularly in the context of the

management recommendations of this study, proposing a paradigm shift from the strategic management approach to a view of internationalisation as an issue of dynamic operations management, which increases in its complexity with the progress in the corporate lifecycle.

Nummela (2004, p. 407) stated that the increasing criticism of linear stage theories and market-entry theories has led to an increased pronunciation of more subjectivist approaches aiming on understanding the internationalisation process instead of explaining it. Due to this rising complexity, Glowik (2016, pp. 8-9) recommends also the use of subjective approaches mainly in the form of in-depth case studies focusing more on path dependencies and path breaking as well as the permanent creation of alternative internationalisation paths as the main management task. Therefore, it can be noted that the quantitative (positivist) research approach including numerical and structured data may have reached its limits in describing and exploring internationalisation. The increasing availability of structured numerical data does not necessarily lead to an increase in knowledge if these data and their statistical analysis are not accompanied by subjectivist approaches.

However, this requirement may go beyond the scope of an individual research project and large-scale research (big science) because of the necessary combination of quantitative and qualitative approaches. In-depth data on firm-specific context and decision-making are not publicly available and it must be doubted that this information is available or can be collected in modern companies with their staff fluctuation, which is particularly a characteristic of MNE. Consequently, data collection reflecting the complexity of internationalisation processes is very limited, which leads to a high restriction for external analysis, so that several factors, structures and process may remain a black box for business research.

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Appendix

Appendix I. Sample's Companies ranked by Firm Size

Company	Country	Revenue 10y-Growth (in %)	Revenue 10y-Aver. (in EUR)
VOLKSWAGEN AG	DEU	8.62	125,713,545
DAIMLER AG	DEU	-0.15	117,333,091
NESTLE SA	CHE	0.88	95,901,727
E.ON SE	DEU	11.72	81,908,909
SIEMENS AG	DEU	0.55	76,569,727
METRO AG	DEU	1.54	62,353,653
DEUTSCHE TELEKOM AG	DEU	0.80	60,260,455
BASF SE	DEU	9.06	57,024,791
BAYER. MOTOREN WERKE	DEU	6.53	56,692,273
DEUTSCHE POST AG	DEU	4.08	51,583,455
RWE AG	DEU	2.04	45,812,636
NOVARTIS	CHE	5.20	45,746,378
THYSSENKRUPP AG	DEU	1.22	43,185,455
ROCHE HOLDING AG	CHE	4.44	42,102,636
AUDI AG	DEU	8.33	34,680,456
BAYER AG	DEU	3.66	32,969,818
ABB LTD	CHE	4.60	32,464,449
ADECCO	CHE	0.51	27,261,495
OMV AG	AUT	21.28	23,456,108
DEUTSCHE LUFTHANSA	DEU	6.85	23,330,000
CONTINENTAL AG	DEU	12.29	21,493,527
CELESIO AG	DEU	1.54	21,400,931
HOLCIM LTD	CHE	5.79	20,477,545
TUI AG	DEU	-0.08	18,602,126
HOCHTIEF	DEU	9.53	18,183,870
ENBW ENERGIE BADEN	DEU	7.15	15,191,682
MAN SE	DEU	1.10	14,748,909
EVONIK INDUSTRIES AG	DEU	1.12	14,603,518
KUEHNE & NAGEL	CHE	9.64	14,495,936
HENKEL AG AND	DEU	5.79	13,552,909
FRESENIUS SE	DEU	11.64	13,041,455
LINDE AG	DEU	6.87	12,283,909
SWISSCOM	CHE	-1.65	11,416,727

Company	Country	Revenue 10y-Growth (in %)	Revenue 10y-Aver. (in EUR)
SAP AG	DEU	9.34	11,333,423
SYNGENTA AG	CHE	4.66	11,280,839
ALPIQ HOLDING AG	CHE	7.56	11,104,545
HEIDELBERGCEMENT AG	DEU	8.99	10,829,436
ADIDAS AG	DEU	9.66	10,513,864
STRABAG SE	AUT	11.54	10,213,989
SCHINDLER HOLDING AG	CHE	2.55	9,781,000
SALZGITTER AG	DEU	8.63	8,606,985
VOEST-ALPINE AG	AUT	11.80	8,505,536
BAYWA AG	DEU	11.72	8,463,332
MERCK KGAA	DEU	5.16	8,078,873
COM. FINAN. RICHEMONT	CHE	9.08	7,971,214
BILFINGER SE	DEU	6.92	7,711,509
FRESENIUS MEDICAL CA	DEU	8.77	7,668,948
AURUBIS AG	DEU	24.63	7,631,729
CLARIANT AG	CHE	-2.00	7,493,273
LANXESS AG	DEU	4.05	7,155,636
PANALPINA WEL	CHE	3.55	6,976,185
SUEDZUCKER AG	DEU	6.16	5,754,309
THE SWATCH GROUP	CHE	8.52	5,684,273
KLOECKNER & CO SE	DEU	8.07	5,642,595
BEIERSDORF AG	DEU	2.94	5,486,273
INFINEON TECHNOLOGIE	DEU	-2.23	5,282,182
GEA GROUP AG	DEU	-2.09	4,906,315
TELEKOM AUSTRIA AG	AUT	0.66	4,514,656
BARRY CALLEBAUT	CHE	3.49	4,475,208
KUONI REISEN AG	CHE	6.29	4,427,583
ALSO AG	CHE	20.16	4,345,836
SGS SA	CHE	9.27	4,302,909
SIKA AG	CHE	9.07	3,994,245
RHEINMETALL AG	DEU	1.39	3,981,636
SCHMOLZ&BICKENBACH	CHE	32.85	3,849,508
WACKER CHEMIE AG	DEU	6.81	3,788,509
GEORG FISCHER AG	CHE	2.58	3,714,364
K+S AG	DEU	7.76	3,671,396
GIVAUDAN SA	CHE	5.57	3,640,000

Company	Country	Revenue 10y-Growth (in %)	Revenue 10y-Aver. (in EUR)
ANDRITZ AG	AUT	17.71	3,298,870
HEIDELBERGER DRUCK	DEU	-3.36	3,224,961
VERBUND AG	AUT	3.65	3,157,844
OC OERLIKON CORP	CHE	14.51	3,107,636
SULZER AG	CHE	6.86	3,076,445
VALORA HOLDING AG	CHE	-0.53	2,888,481
GALENICA AG	CHE	2.94	2,813,880
LONZA GROUP AG	CHE	6.02	2,782,545
MVV ENERGIE AG	DEU	9.85	2,780,796
BKW AG	CHE	0.41	2,770,736
AIR BERLIN PLC	DEU	18.39	2,752,241
AXEL SPRINGER AG	DEU	1.71	2,701,161
MTU AERO ENGINES AG	DEU	6.95	2,644,871
FREENET AG	DEU	7.07	2,642,551
HORNBACH HOLDING AG	DEU	6.68	2,597,294
LEONI AG	DEU	15.31	2,527,839
LINDT & SPRUENGLI	CHE	5.20	2,516,164
EMMI AG	CHE	6.01	2,505,430
PROSIEBENSAT.1 MEDIA	DEU	4.42	2,451,963
HORNBACH-BAUMARKT-AG	DEU	6.47	2,443,897
RIETER HOLDING AG	CHE	-5.50	2,419,209
PUMA SE	DEU	9.47	2,389,166
EVN AG	AUT	10.37	2,219,136
BUCHER INDUSTRIES AG	CHE	6.54	2,206,436
FRAPORT AG	DEU	3.60	2,185,318
PORR AG	AUT	6.68	2,138,794
LOGITECH INTERNAT	CHE	2.86	2,134,407
WIENERBERGER AG	AUT	4.69	2,116,174
OSTERREICHISCHE POST	AUT	4.90	2,112,611
KRONES AG	DEU	7.55	2,100,100
RHOEN-KLINIKUM AG	DEU	12.73	2,080,304
WINCOR NIXDORF AG	DEU	5.64	2,072,383
DUFRY AG	CHE	18.70	2,028,910
BELL LTD	CHE	5.84	2,028,543
DRAEGERWERK AG	DEU	5.41	1,927,450
JUNGHEINRICH AG	DEU	5.05	1,878,906

Company	Country	Revenue 10y-Growth (in %)	Revenue 10y-Aver. (in EUR)
MEDION AG	DEU	-4.40	1,873,532
GEBERIT AG	CHE	5.83	1,841,173
AGRANA BETEILIGUNGS	AUT	14.36	1,805,072
KSB AG	DEU	6.84	1,785,804
DUERR AG	DEU	3.59	1,755,434
SIXT SE	DEU	-1.55	1,711,961
HUGO BOSS AG	DEU	8.96	1,679,420
MAYR-MELNHOF KARTON	AUT	4.42	1,679,110
REPOWER AG	CHE	24.42	1,665,907
FORBO HOLDING AG	CHE	-2.06	1,627,464
MAINOVA AG	DEU	7.18	1,615,592
KUKA AG	DEU	-0.60	1,556,078
UNITED INTERNET AG	DEU	21.70	1,531,199
PUBLIGROUPE SA	CHE	-12.25	1,509,285
BECHTLE AG	DEU	11.67	1,505,526
DMG MORI	DEU	9.48	1,480,674
EMS-CHEMIE HOLDING	CHE	5.22	1,480,446
RHI AG	AUT	4.38	1,477,855
PAUL HARTMANN AG	DEU	3.31	1,462,770
BOBST MEX SA	CHE	0.93	1,446,755
STADA ARZNEIMITTEL	DEU	10.88	1,436,872
FUCHS PETROLUB SE	DEU	6.28	1,397,018
SYMRISE AG	DEU	4.81	1,395,132
LENZING AG	AUT	12.79	1,385,109
KOENIG & BAUER AG	DEU	0.03	1,367,600
DEUTZ AG	DEU	4.65	1,324,845
SGL CARBON SE	DEU	4.57	1,322,764
LECHWERKE AG	DEU	13.45	1,308,963
ACTELION AG	CHE	20.95	1,290,120
GIGASET AG	DEU	84.15	1,279,293
CHARLES VOG	CHE	-3.79	1,238,552
ARBONIA-FORSTER-HOLD	CHE	5.27	1,225,725
ZUMTOBEL AG	AUT	0.61	1,200,161
DAETWYLER HOLDING AG	CHE	2.58	1,177,882
CONZZETA AG	CHE	3.88	1,166,140
SONOVA HOLDING AG	CHE	12.86	1,162,954

Company	Country	Revenue 10y-Growth (in %)	Revenue 10y-Aver. (in EUR)
ADM HAMBURG AG	DEU	-9.16	1,146,029
VOSSLOH AG	DEU	4.06	1,144,073
GFK AG	DEU	10.22	1,140,102
SKY DEUTSCHL	DEU	7.36	1,066,817
KABA HOLDING AG	CHE	0.39	1,061,709
BAUER AG	DEU	9.20	1,026,988
JENOPTIK AG	DEU	-4.80	971,592
ENERGIEDIENST HLDG	CHE	9.26	966,338
GRAMMER	DEU	5.87	956,024
STO AG	DEU	6.05	917,105
INDUS HOLDING AG	DEU	6.00	909,470
FIELMANN AG	DEU	4.00	908,013
H&R AG	DEU	24.64	861,825
TAKKT AG	DEU	3.56	851,761
VILLEROY & BOCH AG	DEU	-2.15	828,790
KUDELSKI SA	CHE	9.48	815,930
FLUGHAFEN ZURICH AG	CHE	5.77	800,797
TAMEDIA AG	CHE	7.35	800,583
WMF AG	DEU	6.02	793,902
NORDEX SE	DEU	24.56	792,640
SCHULER AG	DEU	11.51	791,086
NOBEL BIOCARE HLDG	CHE	4.19	784,916
CENTRALSCHWEIZERI	CHE	3.47	763,364
SOFTWARE AG	DEU	9.48	743,792
VBH HOLDING AG	DEU	1.50	743,462
WACKER NEUSON SE	DEU	13.89	736,883
ELRINGKLINGER AG	DEU	11.67	713,565
WALTER MEIER AG	CHE	-1.60	698,127
METALL ZUG AG	CHE	6.90	694,312
KWS SAAT AG	DEU	10.60	678,683
HUBER UND SUHNER AG	CHE	3.93	673,134
PALFINGER AG	AUT	13.31	659,299
ASCOM HOLDING AG	CHE	-9.20	655,700
SOLARWORLD AG	DEU	24.48	653,232
GELSENWASSER AG	DEU	11.83	650,409
SEMPERIT AG HOLDING	AUT	7.24	647,773

Company	Country	Revenue 10y-Growth (in %)	Revenue 10y-Aver. (in EUR)
VTG AG	DEU	0.23	643,745
SWISSLOG HOLDING AG	CHE	-0.08	642,582
ZEHNDER GROUP AG	CHE	1.69	641,660
IMMOFINANZ AG	AUT	36.37	641,510
GRENKELEASING AG	DEU	4.12	636,562
STRAUMANN HOLDING AG	CHE	7.61	627,186
KARDEX REMSTAR INTL	CHE	-1.15	597,238
PHOENIX MECANO AG	CHE	2.61	586,413
EUROKAI GMBH	DEU	4.27	584,559
POLYTEC HOLDING AG	AUT	11.01	584,000
CARL ZEISS MEDITEC	DEU	15.26	563,509
VETROPACK AG	CHE	3.13	562,687
GERRY WEBER AG	DEU	9.57	561,268
VON ROLL HOLDING	CHE	-1.74	546,589
ALLREAL HOLDING AG	CHE	35.82	532,382
VK MUEHLEN AG	DEU	3.57	528,270
ROMANDE ENERGIE	CHE	2.49	523,305
ALNO	DEU	0.03	516,891
MICRONAS SEM	CHE	-11.99	509,883
FLUGHAFEN WIEN AG	AUT	6.16	503,386
BOSSARD HOLDING AG	CHE	4.70	491,812
CPH CHEMIE & PAPIER	CHE	2.37	487,228
ROSENBAUER INT AG	AUT	9.04	482,213
WASGAU PRODUKTIONS	DEU	0.14	481,993
SCHWEITER TECH AG	CHE	61.27	470,329
SAINT-GOBAIN GLASS	DEU	4.18	459,607
FRAUENTHAL HOLDING	AUT	19.98	453,897
FEINTOOL INT HOLDING	CHE	2.71	449,743
BWT AG	AUT	2.60	444,323
CHAM PAPER GROUP	CHE	-12.59	443,805
CEWE STIFTUNG	DEU	2.52	442,479
MEDICLIN AG	DEU	3.91	436,783
VERITAS AG	DEU	7.80	436,380
KONTRON AG	DEU	7.82	427,306
GURIT HOLDING AG	CHE	-3.96	415,277
CLOPPENBURG AUTOMOBIL	DEU	11.80	414,132

Company	Country	Revenue 10y-Growth (in %)	Revenue 10y-Aver. (in EUR)
BERTRANDT AG	DEU	14.67	413,611
CTS EVENTIM AG	DEU	11.32	406,612
RENK AG	DEU	6.98	398,744
MIBA AG	AUT	8.66	394,600
SURTECO SE	DEU	1.57	391,184
CENTROTEC SUSTAIN	DEU	21.95	384,133
CANCOM SE	DEU	12.65	383,989
TECAN GROUP AG	CHE	2.60	370,698
EINHELL GERMANY AG	DEU	4.22	365,248
BELIMO HOLDINGS AG	CHE	7.37	365,069
NORDWEST HANDEL AG	DEU	8.12	363,397
SWISS PRIME SITE	CHE	24.60	357,673
BIOTEST AG	DEU	8.94	356,740
HAWESKO HOLDING AG	DEU	5.33	351,659
TEMENOS AG	CHE	9.30	346,450
FROSTA AG	DEU	4.15	345,628
HOCHDORF HOLDING AG	CHE	2.14	342,239
QSC AG	DEU	15.62	338,623
APG SGA SA	CHE	1.25	331,294
SIEGFRIED HOLDING AG	CHE	0.65	331,000
BIJOU BRIGITTE AG	DEU	8.86	330,939
ADVANCED DIGITAL	CHE	15.55	327,496
RATIONAL AG	DEU	9.76	324,573
OHB TECHNOLOGY AG	DEU	23.29	320,628
DEUFOL SE	DEU	0.12	318,998
ORELL FUESSLI HOLD	CHE	-0.82	318,599
GAG IMMOBILIEN AG	DEU	-1.13	318,171
DRILLISCH	DEU	11.32	317,507
HUEGLI HOLDING AG	CHE	5.75	317,333
AIROPACK TECHNOLOGY	CHE	112.30	313,380
SCHOELLER-BLECKMANN	AUT	15.53	303,940
MCH GROUP AG	CHE	11.98	300,836
MOBILEZONE HOLDING	CHE	0.79	299,968
AT&S	AUT	10.09	299,241
DEUTSCHE WOHNEN AG	DEU	17.23	299,180
DO & CO AG	AUT	21.76	294,478

Company	Country	Revenue 10y-Growth (in %)	Revenue 10y-Aver. (in EUR)
KOMAX HOLDING AG	CHE	7.86	294,279
GESCO AG	DEU	12.18	290,918
SCHLOSS WACHENHEIM	DEU	-0.30	286,783
INTERROLL HOLDING AG	CHE	5.11	286,316
AIXTRON SE	DEU	19.36	285,444
ADVAL TECH HOLDING A	CHE	2.52	283,540
DELTICOM AG	DEU	27.75	280,778
SUDWESTDEUTSCHE	DEU	3.66	279,203
AHLERS AG	DEU	-2.43	273,026
PSP SWISS PROPERTY	CHE	5.01	272,909
SCHALTBAU HOLDING AG	DEU	5.90	272,115
LEIFHEIT	DEU	-3.79	266,525
WASHTEC AG	DEU	2.53	265,829
HERLITZ AG	DEU	-11.32	264,984
PROGRESS-WERK OBERK	DEU	7.82	263,206
SIMONA AG	DEU	6.33	259,343
PFEIFFER VACUUM TECH	DEU	15.93	256,487
STARRAG GROUP HOLD	CHE	11.83	254,629
PHOENIX SOLAR AG	DEU	37.63	252,927
INFICON HOLDING AG	CHE	3.44	252,685
MIKRON HOLDING AG	CHE	-2.95	252,517
ALEO SOLAR AG	DEU	22.60	250,710
COMPUGROUP HLDG	DEU	21.34	248,561
YPSOMED HOLDING AG	CHE	7.23	246,860
DIALOG SEMICOND	DEU	28.00	238,116
KHD HUMBOLDT WEDAG	DEU	17.15	237,772
CURANUM AG	DEU	5.69	237,026
PELIKAN HOLDING AG	DEU	0.60	236,646
R. STAHL	DEU	4.70	226,848
ACINO HOLDING AG	CHE	11.08	226,271
BEATE UHSE AG	DEU	-5.69	225,806
BALDA AG	DEU	-9.45	224,343
ADVA AG	DEU	14.44	223,817
CA IMMOBILIEN AG	AUT	29.47	215,248
KULMBACHER BRAUEREI	DEU	0.48	213,839
SINGULUS TECHNOL.	DEU	-4.77	212,686

Company	Country	Revenue 10y-Growth (in %)	Revenue 10y-Aver. (in EUR)
BERTHOLD HERMLE AG	DEU	13.90	211,815
FUNKWERK AG	DEU	-4.06	211,131
INTERSPORT AG	CHE	4.73	211,059
MARSEILLE-KLINIKEN	DEU	0.78	209,756
DEUTSCHE STEINZEUG	DEU	-3.00	209,585
GFT TECHNOLOGIES AG	DEU	8.41	207,270
WESTAG & GETALIT AG	DEU	3.49	204,412
TORNOS HOLDINGS SA	CHE	5.13	204,313
SWMTL HOLDING AG	CHE	-7.73	201,662
HANSA GROUP AG	DEU	69.09	200,774
WIRECARD AG	DEU	107.91	200,740
MAX AUTOMATION AG	DEU	8.98	198,716
SPARKASSEN IMMOBIL	AUT	35.42	198,049
SCHWAELBCHEN	DEU	0.99	195,077
PATRIZIA IMMOBILIEN	DEU	135.52	194,517
LEM HOLDING SA	CHE	6.49	194,242
SCHLUMBERGER AG	AUT	4.24	193,836
EUROMICRON AG COMMUN	DEU	10.56	193,835
COLTENE HOLDING	CHE	-1.08	193,509
HOFTEX GROUP AG	DEU	0.79	187,272
CARLO GAVAZZI AG	CHE	-3.03	186,717
CALIDA HOLDING AG	CHE	5.33	186,548
CREATON AG	DEU	5.26	184,658
MUEHLHAN AG	DEU	4.01	181,060
MOBIMO AG	CHE	27.46	181,039
KAESSBOHRER GELAENDE	DEU	-5.06	179,856
BERENTZEN-GRUPPE AG	DEU	-2.16	172,444
MUEHLBAUER HOLDING A	DEU	8.65	171,022
SCHAFFNER HOLDING AG	CHE	3.43	170,354
AS CREATION TAPETEN	DEU	5.34	168,178
UZIN UTZ AG	DEU	7.82	167,146
BACHEM HOLDING	CHE	2.08	165,428
MENSCH UND MASCHINE	DEU	1.64	165,029
ELMOS SEMICONDUCTOR	DEU	6.18	163,240
FRIWO AG	DEU	4.69	162,249
NTT COM SECURITY	DEU	6.40	162,057

Company	Country	Revenue 10y-Growth (in %)	Revenue 10y-Aver. (in EUR)
COMET HOLDING AG	CHE	19.86	160,558
UESTRA HANNOVER	DEU	0.64	160,384
TAG IMMOBILIEN AG	DEU	11.99	158,288
LOEB HOLDING AG	CHE	-6.43	156,506
JOSEF MANNER & COMP.	AUT	4.72	154,108
MINERALBRUNNEN AG	DEU	-0.03	151,807
DATACOLOR AG	CHE	-7.92	151,533
CICOR TECHNOLOGIES	CHE	31.24	150,515
LINZ TEXTIL HOLDING	AUT	-1.54	150,400
AUGUSTA TECHNOLOGIE	DEU	-5.46	144,010
GREIFFENBERGER AG	DEU	3.13	143,826
PSI AG	DEU	2.82	142,807
EDEL AG	DEU	1.55	140,480
TELEGATE AG	DEU	-5.30	139,925
WOLFORD AG	AUT	2.22	139,921
UBM REALITAET	AUT	23.07	139,228
FRANCOTYP POSTALIA	DEU	5.62	137,127
AEVIS HOLDING SA	CHE	129.05	137,027
NEMETSCHEK AG	DEU	7.41	136,857
DATA MODUL AG	DEU	3.59	136,741
BIEN ZENKER AG	DEU	-1.70	136,069
PAX-ANLAGE AG	CHE	44.47	135,993
BORUSSIA DORTMUND	DEU	11.48	135,710
SUESS MICROTEC AG	DEU	5.96	135,466
HTI HIGH TECH	AUT	8.73	134,069
GROUPE MINOTERIES SA	CHE	1.34	129,100
DEUTSCHE EUROSHOP AG	DEU	12.47	127,794
MANZ AG	DEU	46.63	126,267
ESSANELLE HAIR	DEU	1.19	122,918
ZEAG ENERGIE AG	DEU	8.23	121,974
SWARCO TRAFFIC HLDG	DEU	7.80	121,641
BVZ HOLDING AG	CHE	2.95	118,457
DUERKOPP ADLER	DEU	-2.03	117,005
ELMA ELECTRONIC AG	CHE	3.34	116,218
HAHN IMMOB	DEU	96.45	115,771
SOLAR-FABRIK AG	DEU	18.40	114,663

Company	Country	Revenue 10y-Growth (in %)	Revenue 10y-Aver. (in EUR)
TECHNOTRANS AG	DEU	1.58	114,648
OTTAKRINGER GE	AUT	15.67	114,542
VSM-SCHMIRGEL- & MASCHINENFAB.	DEU	2.83	114,527
DEAG DEUTSCHE	DEU	4.78	114,365
MS INDUSTRIE AG	DEU	65.75	113,763
HPI AG	DEU	21.76	113,145
IVF HARTMANN HLDG	CHE	1.59	112,973
ENVITEC BIOGAS AG	DEU	148.04	111,061
IFA HOTEL & TOURIST.	DEU	0.01	107,908
MATERNUS-KLINIKEN AG	DEU	-9.18	107,575
EDDING AG	DEU	2.92	107,163
ZAPF CREATION AG	DEU	-11.99	106,453
DIC ASSET AG	DEU	37.00	105,578
JUNGFRAUBAHN	CHE	6.17	104,625
ERLUS AG	DEU	2.57	103,379
TURBON AG	DEU	-5.13	102,343
ZUBLIN IMMOBILIEN	CHE	-3.02	100,607
SLOMAN NEPTUN AG	DEU	8.48	99,734
VIVANCO GRUPPE AG	DEU	-3.19	99,174
PANKL RACING SYSTEMS	AUT	8.28	97,598
TOMORROW FOCUS AG	DEU	14.92	96,768
INTERSHOP HOLDING AG	CHE	2.95	96,561
PVA TEPLA AG	DEU	9.60	94,747
BOCHUM-GELSEN STRASS	DEU	2.77	93,517
GABRIEL SEDLMAYR	DEU	-3.03	93,328
JOH. F. BEHRENS AG	DEU	-0.24	92,953
DISKUS WERKE AG	DEU	27.91	92,711
BB BIOTECH AG	CHE	-33.27	91,908
MSG LIFE AG	DEU	4.56	91,688
NABALTEC AG	DEU	11.81	90,980
MIFA MITTELDEUTSCHE	DEU	7.28	90,198
CENIT SYSTEMHAUS	DEU	5.55	89,795
ZWAHLEN & MAYR S.A.	CHE	3.54	89,561
VILLARS HOLDING SA	CHE	3.64	88,782
SCHUMAG AG	DEU	-0.54	88,399

Company	Country	Revenue 10y-Growth (in %)	Revenue 10y-Aver. (in EUR)
BHS TABLETOP	DEU	0.55	88,280
HOEFT & WESSEL AG	DEU	-0.36	87,598
ALL FOR ONE STEEB	DEU	17.03	86,921
LUDWIG BECK AM RATH	DEU	0.71	86,534
3U HOLDING AG	DEU	0.11	85,427
SCHWEIZER ELECTRONIC	DEU	4.40	84,590
PNE WIND AG	DEU	15.78	83,001
MUELLER DIE LILA	DEU	5.63	82,632
ADVANCED INFLIGHT	DEU	174.53	81,959
HIRSCH SERVO	AUT	5.91	80,142
BRAIN FORCE HLDG	DEU	4.82	80,139
MME MOVIEMENT AG	DEU	29.28	79,806
SW STOISER & WOLSCHN	AUT	-2.22	79,339
ANALYTIK JENA AG	DEU	2.12	79,276
STRATEC BIOMEDICAL	DEU	16.08	78,619
LIFEWATCH AG	CHE	5.26	78,280
BREMER STRASSENBAHN	DEU	3.25	78,194
PARAGON AG	DEU	9.29	77,855
RATH AG	AUT	4.36	77,336
ECKERT & ZIEGLER STR	DEU	15.61	77,162
BRUEDER MANNESMANN	DEU	-1.25	76,774
NORDDEUTSCHE STE	DEU	3.43	75,205
NET MOBILE AG	DEU	17.78	75,016
WARIMPEX FINANZ	AUT	7.32	73,214
TIPP24 AG	DEU	27.56	71,909
DIERIG HOLDING AG	DEU	-0.84	71,486
ALUMINIUM UNNA AG	DEU	4.01	70,883
BETA SYSTEMS	DEU	0.36	69,953
MYBET HOLDING	DEU	26.72	68,060
INNOTEC TSS AG	DEU	5.17	67,789
PERROT DUVAL HOLDING	CHE	-2.86	65,564
EVOTEC AG	DEU	4.72	65,534
HELMA EIGENHEIMBAU	DEU	26.92	65,109
EHLEBRACHT AG	DEU	4.37	64,534
COLONIA REAL	DEU	214.45	63,906
MATTH. HOHNER AG	DEU	0.05	63,517

Company	Country	Revenue 10y-Growth (in %)	Revenue 10y-Aver. (in EUR)
ADESSO AG	DEU	39.97	62,701
BRILLIANT AG	DEU	1.34	61,640
LPKF LASER & ELECTRO	DEU	20.03	61,622
INIT AG	DEU	13.11	60,633
MORPHOSYS AG	DEU	22.47	59,648
ISRA VISION AG	DEU	14.10	59,141
SEVEN PRINCIPLES AG	DEU	31.68	57,689
P&I AG	DEU	8.08	57,401
INFRANOR INTER AG	CHE	-2.50	57,149
TRANSTEC AG	DEU	-4.19	56,363
CCR LOGISTICS	DEU	13.97	55,072
ROEDER ZELTSYSTEME	DEU	8.76	54,691
MYRIAD GROUP	CHE	18.58	53,328
REALTECH AG	DEU	-2.48	52,155
ENERGIEKONTOR	DEU	34.77	50,578
BASLER AG	DEU	9.40	50,358
HALLOREN SCHOKOLA	DEU	19.42	50,111
CREALOGIX HOLDING	CHE	15.51	49,019
SECUNET SECURITY NET	DEU	13.45	48,775
BAYERISCHE GEWERBEBAU	DEU	-4.93	47,073
FIRST SENSOR AG	DEU	29.39	46,454
PIRONET NDH AG	DEU	10.18	46,441
LEWAG HOLDING AG	DEU	6.37	46,165
HASEN-IMMOBILIEN AG	DEU	84.13	45,087
VISCOM AG	DEU	12.42	44,939
BERGBAHNEN TITLIS AG	CHE	7.01	44,337
UNITED LABLES AG	DEU	0.91	43,934
DR. HOENLE AG	DEU	18.00	43,500
ODEON FILM AG	DEU	1.26	42,599
UMS UNITED MED	DEU	-3.63	41,925
PRIMION TECHN	DEU	17.23	40,699
FORTEC ELEKTRONIK	DEU	4.68	40,568
KPS AG	DEU	18.88	38,972
EIFELHOEHEN-KLINIK	DEU	0.02	38,561
NEXUS AG	DEU	18.21	37,838
TRIPLAN AG	DEU	6.82	37,679

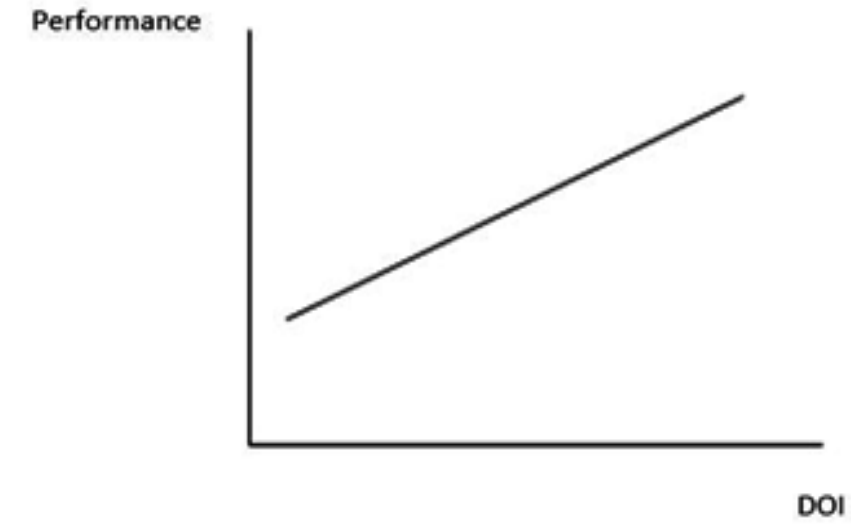
Company	Country	Revenue 10y-Growth (in %)	Revenue 10y-Aver. (in EUR)
DEUTSCHE REAL ESTATE	DEU	-4.02	36,300
SCHULTE SCHLAGBAUM	DEU	2.60	35,687
WIGE MEDIA AG	DEU	0.05	35,671
IVU TRAFFIC TECHNOLO	DEU	4.72	35,471
SPLENDID MEDIEN AG	DEU	6.43	35,278
IMW IMMOBILIEN SE	DEU	63.96	35,212
USU SOFTWARE AG	DEU	11.61	34,015
TWINTEC AG	DEU	55.02	33,351
INTERSHOP COMMUNICAT	DEU	9.95	32,530
KROMI LOGISTIK AG	DEU	26.95	32,505
SHS VIVEON AG	DEU	1.61	31,784
SOFTING AG	DEU	11.44	31,557
PIXELPARK AG	DEU	11.02	31,074
MAGIX AG	DEU	6.17	30,806
JETTER AG	CHE	14.66	30,791
INTICA SYSTEM	DEU	32.79	30,329
MEDISANA AG	DEU	1.37	30,170
TELES AG INFO TECH	DEU	-13.25	29,444
BECHSTEIN PIANOFORTE	DEU	2.70	29,402
ATOSS AG	DEU	4.44	27,045
PULSION MEDICAL SYS	DEU	10.61	26,778
NORCOM AG	DEU	0.01	26,567
GRUSCHWITZ TEXTIL AG	DEU	7.35	25,651
AAP IMPLANTATE AG	DEU	15.17	25,577
ORBIS AG	DEU	5.86	24,812
WARTECK AG	CHE	2.28	24,537
DT. RHEINSCHIFF	DEU	3.26	23,880
PIPER GENERAL. AG	DEU	2.01	23,400
ALLGAEUER BRAUHAUS	DEU	1.11	22,808
FHW NEUKOELLN	DEU	6.12	22,796
EASY SOFTWARE AG	DEU	7.69	22,454
ALPHAFORM AG	DEU	2.38	22,440
PLENUM AG	DEU	-10.52	22,228
DINKELACKER	DEU	-14.79	22,113
SOFTLINE AG	DEU	138.58	21,800
PERFECT HOLDING SA	CHE	50.02	21,646

Company	Country	Revenue 10y-Growth (in %)	Revenue 10y-Aver. (in EUR)
IBS AG	DEU	4.26	21,296
INFAS HOLDING	DEU	2.80	19,471
DESIGN BAU AG	DEU	21.79	19,132
LECLANCHE SA	CHE	-9.04	18,932
VEREINIG FILZFAB. AG	DEU	3.24	18,657
SEDLBAUER	DEU	0.14	18,063
CUSTODIA HLD AG	DEU	22.94	17,824
SNP SCHNEIDER	DEU	16.42	17,708
BBI BURGERLICHES	DEU	0.80	17,448
YOC AG	DEU	30.00	16,930
GIRINDUS AG	DEU	-20.63	16,849
SCHWABENVERLAG AG	DEU	-0.01	16,539
NUCLETRON ELECTRONIC	DEU	-0.71	16,392
LS TELCOM AG	DEU	17.62	16,246
CYCOS AG	DEU	-3.14	16,157
KWG KOMMUNALE	DEU	137.95	15,610
DOCCHECK AG	DEU	3.60	14,915
BRAUEREI KAUFBEUREN	DEU	-12.91	14,910
ZOO BERLIN	DEU	6.87	14,230
GROUP BUSINESS SOFT	DEU	308.71	14,082
STAATL. MINERALBRUNN	DEU	0.63	13,856
VERIANOS REAL	DEU	-5.70	13,363
GERATHERM MEDICAL AG	DEU	9.24	11,963
AGROB IMMOBILIEN	DEU	2.88	10,583
REGENBOGEN AG	DEU	4.59	10,493
ARTNET AG	DEU	10.85	10,359
WESTGRUND AG	DEU	52.42	8,860
MUENCHENER TIERPARK	DEU	5.19	8,822
PAION AG	DEU	292.31	8,657
DESIGN HOTELS AG	DEU	12.65	8,388
WEBAC-HOLDING AG	DEU	6.03	8,268
NANOFOCUS AG	DEU	2.85	8,134
EQUITYSTORY AG	DEU	44.30	8,001
HIGHLIGHT EVENT AND	CHE	3.76	7,930
BERLINER SYNCHRON AG	DEU	6.26	7,901
INTERCARD AG	DEU	13.70	7,470

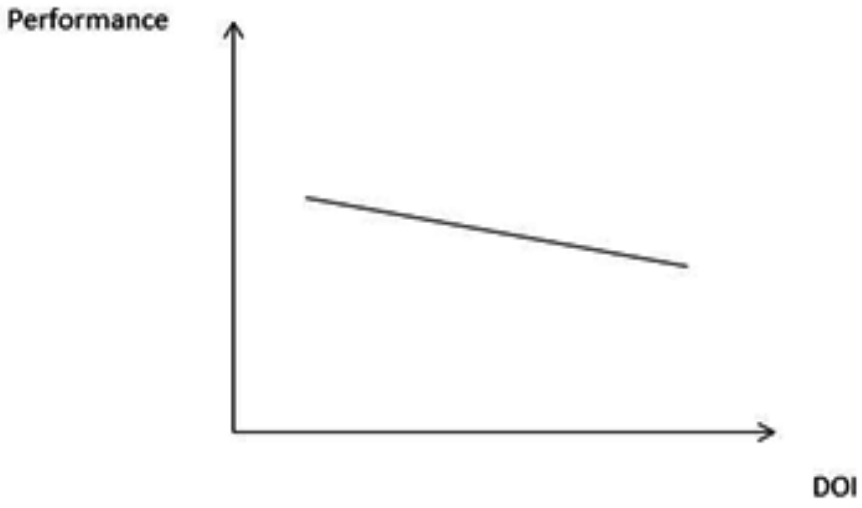
Company	Country	Revenue 10y-Growth (in %)	Revenue 10y-Aver. (in EUR)
RIM AG	DEU	-1.54	7,381
HUMANOPTICS AG	DEU	1.77	7,142
CURASAN AG	DEU	-3.81	6,948
SOFTSHIP AG	DEU	10.31	6,897
AG ALLG ANLAGEVERW	DEU	17.56	6,534
SCHLOSSGARTENBAU AG	DEU	9.73	6,284
NEBELHORNBAHN AG	DEU	2.72	6,163
AMIRA AG	DEU	31.58	5,978
PRIMAG AG	DEU	209.16	5,957
IFA SYSTEMS AG	DEU	6.93	5,660
PLAN OPTIK AG	DEU	14.59	5,562
SYGNIS AG	DEU	6.44	4,783
YOUR FAMILY ENT	DEU	5.25	4,294
EPIGENOMICS AG	DEU	-8.27	4,279
ITN NANOVATION AG	DEU	15.22	3,821
SOLARPRAXIS AG	DEU	15.87	3,715
ELEKTRISCHE L & K AG	DEU	-1.28	3,395
ENDOR AG	DEU	27.59	2,852
F24 AG	DEU	22.55	2,756
4SC AG	DEU	66.16	2,455
GOING PUBLIC MEDIA	DEU	8.03	2,210
HYDROTEC AG	DEU	1.82	2,058
ARTEC TECH	DEU	5.83	1,977
FORST EBNATH AG	DEU	24.60	1,936
CO.DON AG	DEU	27.92	1,542
BASTFASERKONTOR	DEU	12.22	1,456
JOST AG	DEU	15.48	1,158
AG FUR HISTORISCHE	DEU	3.81	1,125
MASCHINEN. HEID AG	DEU	16.54	1,025
MOLOGEN AG	DEU	96.99	874
REALITY CAPITAL PART	DEU	36.71	427
DAHLBUSCH AG	DEU	78.44	100

Appendix II. Curve Patterns of the Relationship between Firm Performance and the Degree of Internationalisation (DOI)

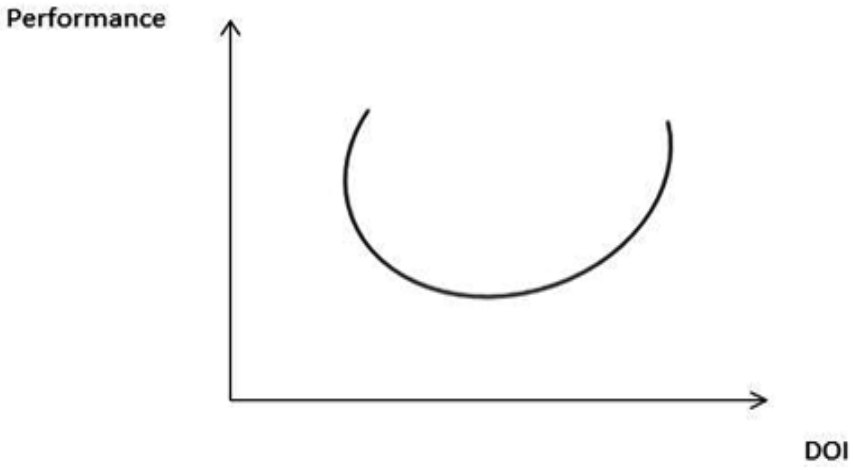
Positive Linear Relationship



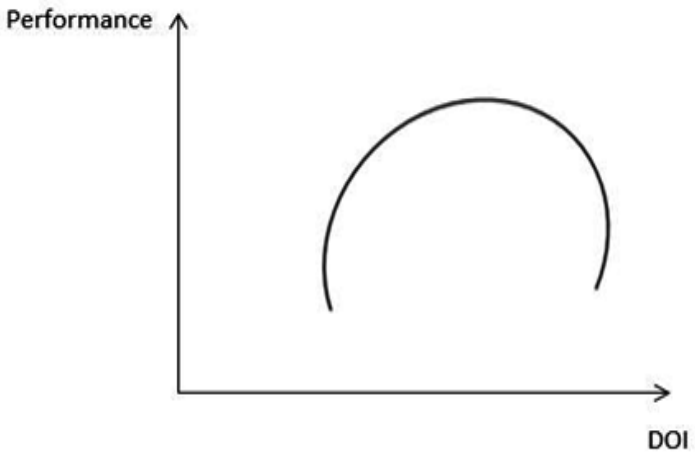
Negative Linear Relationship



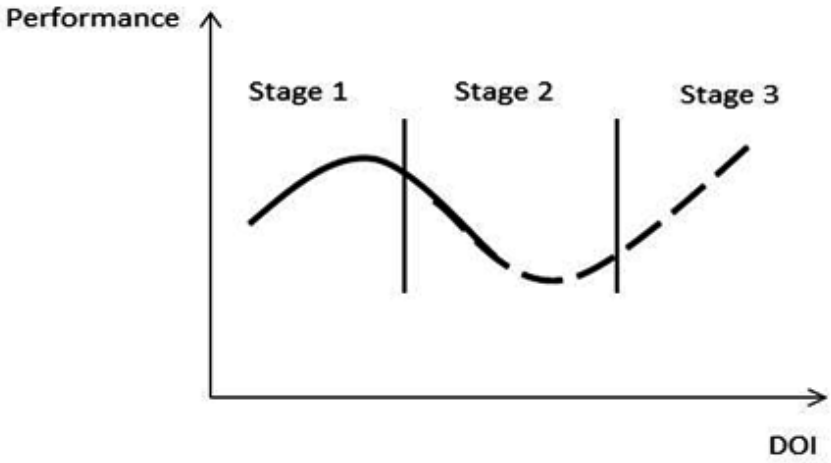
U-Shaped Relationship



Inverted U-Shaped Relationship



Sigmoid Relationship (3-Stage Models)



Source: Author's presentation.