Key Indicators of an Effective Cost Accounting System for Managerial Decision Making:
An Explanatory Study of German SMEs

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Abstract

This PhD is an exploratory study examining the current cost accounting systems and key indicators in SMEs in Germany. The study is based on a survey and interviews with SME managers. Data are collected that provide information on the extent to which SME managers use their cost accounting and key indicators to obtain sound facts as the basis for their business decisions. On the one hand, this is about determining the current situation in German SMEs. On the other hand, the collected data should shed light on what information SME managers would like to have to support their work. In addition, it is being examined whether the target group of SMEs in the development of cost accounting and performance indicator systems is clearly addressed in economics.

The aim of the research is to develop key indicators and a cost accounting system that is tailored to the specific needs of SMEs in Germany. In addition, the current scientific state of these two areas will be examined in a Literature Review. It also provides information on the extent to which SMEs are different from large companies, and whether these types of businesses are so different that a specialized cost accounting and key indicator system is justified and necessary for SMEs. For the development of a special system of cost accounting and the individual key figures, both quantitative and qualitative data are collected and analyzed.

The results show that the way SMEs and large companies work differs significantly. Different levels of technology, different financing options on the capital market or the concentration of many tasks on a small number of employees in SMEs require different strategies than in large companies. A clear reference to the target group of SMEs often lacks in economics. In addition, research often lacks suggestions as to how the theoretical models can actually be put into practice. This is an access barrier for many SME managers, even though they are aware of the importance of tools that help them in planning, management and monitoring.

The data collected has resulted in a cost accounting system and a set of indicators that can map the most pressing needs of SMEs managers, but at the same time, it is kept to a minimum so as not to overburden SME managers when implementing and running the system.

Declaration

I, Christian Huber, hereby certify that the thesis is my original piece of work. It is the record of work carried out by me and it has not been submitted for a comparable academic award.

The thesis is submitted in partial fulfilment of the University's requirement for a research degree award.

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Date   Christian Huber

Dedication

For my beloved sister Heidrun,

who motivates me every day to believe in me

and encourages me to put my dreams into action.

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Table of Contents

List of Tables

List of Figures

List of Formulas

CHAPTER 1

Introduction and Overview of the Study

1.1 Background to the study

The economic performance of SMEs (small and medium-sized enterprises) in Germany is over 37,8 % of the total volume. Of all workers employed in Germany, 55.1% are employed by companies with fewer than 500 employees (Günterberg, 2011). The figures match with the situations of other EU countries. In the UK, SMEs generate 48.8 % of gross national product (GNP) and the share of employees in these types of enterprises is 58.8% of the total workforce (White, 2011). SMEs play a crucial economic role and their stabilizing effect on economic activity is very significant (Schiersch and Kritikos, 2014).

By the end of the twentieth century, the radius of activity and sales scope of these companies has mostly been confined to a microcosm of the region. SMEs were close to their location as a sales area. The customers knew the resident company and the market lacked transparency compared to today (Kranzusch et al., 2016). This situation has changed a lot in the last few decades. Networking through the Internet makes products and services comparable and brings consumers and manufacturers together easily, even over long distances. This opens up new opportunities for SMEs but also puts them under increased competitive pressure (Feldmeier et al., 2015).

Globally, there has been an economic movement or change going on for many years. Germany, on the other hand, has been experiencing an increasing shortage of skilled workers, especially within the SMEs, in recent years and the challenge for companies using the change in technology for their own development and for the profit-making purpose (Heyse et al., 2018; Güth et al., 2018). Customers have a better overview and increased expectations as regards the flexibility, speed and individualization of a

product. SMEs have to meet these rising expectations and at the same time, reorganize their own production in line with the decreasing number of skilled workers.

These requirements can only be met by those who constantly ask questions on how to improve their company and their actions. This includes primarily, the products and their distribution. This, however, is accompanied by increased demands on the planning and management of production, investment and allocation of resources (Lauterhahn; 2015). The processes must also be made more flexible and the material flow from the order stage to the added value level must be accelerated. The employees should be trained for a more specific production. SME managers need to rely on tools that provide them with useful information and numbers that will aid them in planning, management, and monitoring stages.

According to Skinner (1987), Johnson and Kaplan (1991), in economics, this topic has been increasingly explored since the 1980s and new and more advanced accounting systems have been developed to provide better information for managers. In addition, the need for compressing these numbers of indicators has become increasingly important. Thus, indicators for the different needs of managers have been increasingly developed in recent times (Heusinger von Waldegge, 2009).

This raises the question of whether this development is reflected in the economic reality of SMEs in Germany. Studies dealing with the dissemination of modern cost accounting systems have shown different and contrary pictures, especially for small and medium-sized companies. According to a survey conducted by German companies in 2002, 80% of SMEs still use a conventional cost accounting system based on full costs (Joos-Sachse, 2002). These systems, according to the unanimous views of many cost-accounting theorists, are no longer sufficient for the challenges of

a business today (Klinger et al., 2012; Becker and Weber, 2013). A comparable picture appeared in the area of indicators. According to a study by Lingle and Schiemann (1996), it has been shown that companies that identify and analyze indicators are more successful than companies that do not identify indicators. In Germany, however, indicators are only identified and used in a small proportion of all SMEs (Martinez-Sola et al., 2014).

1.2 Research Objectives

A large proportion of SMEs in Germany is currently using cost accounting systems that cannot deal with the current challenges encounter by them. Howel and Soucy (1990) added that 62% of all SME Managers in Germany are dissatisfied with their current cost accounting systems because it cannot support them in decision making.

This contradictory situation leads to the following two research objectives:

> **RO$_1$:** To explore and investigate the potential impact of the use (or lack of use) of a sufficient cost accounting system and indicators on the efficiency of German SMEs by seeking and analyzing managers´ perceptions.

> **RO$_2$:** To develop a potential model which provides a combination of a modern cost accounting system with appropriate indicators relevant to the requirements of German SMEs.

1.3 Purpose of the study

The aim of the work is to create a cost accounting system and an indicator system that is adapted to the needs of SMEs in Germany. The indicators must show the most important operational information. The system has to be clear and easy to understand so that the SME managers can access all relevant decision-making data without

claiming too many resources. The cost accounting systems must be subordinate to this requirement. A system has to be developed which, of course, fulfils the legal requirements in Germany with regard to tax assessment, but at the same time supplies the necessary source data for the determination of the indicators.

The core requirements for a practically functioning system are summarized below.

- *Clear reference to SMEs.* The target group must be clearly addressed by the system. SME managers from Germany must see their own operational reality reflected in the system (Taschner, 2012; Keuper, 2009).
- *Flexibility of the system.* As different SMEs in Germany are, so different are the requirements for the information that an SME Manager needs for its core tasks: planning, control and monitoring (Walter and Wünsche, 2013; Lachnit and Müller, 2012).
- *Effort-Benefit ratio.* The resources in SMEs are limited. Both the cost accounting system and the indicators must take this into account. Both must be reduced to what is really necessary in order to give the SMEs Managers a realistic opportunity to integrate the systems into his company (Schultz, 2012) Drury, 2008).

This work aims to develop a framework for SME managers in Germany to support its management tasks. The system must be understandable and easy to introduce for the user. At the same time, managers should be put in a position with little effort to keep an eye on the most important data on their corporate affairs at all times. In addition, SME managers must be able to customize the system to suit their specific needs and expand it to meet their information needs.

1.4 Outline of the Study

The chapters of this study are structured as follows:

Chapter one gives an introduction to the background of this study and presents a brief overview of the economic challenges SMEs in Germany are currently experiencing.

This is the basis for the two research objectives that describe the scope of this research. This is followed by a description of the purpose of this work, followed by an overview of the contents of the different chapters.

The Literature Review is divided into chapters two and three. Chapter two covers the area of cost accounting. First, it examined the basic requirements for cost accounting followed by the analysis of different cost accounting systems and their relevance. In addition, this chapter focuses on SMEs in Germany, their peculiarities and differences in relation to big enterprises in Germany. Finally, the current status of the cost accounting systems in German SMEs is examined.

Chapter three examines cost indicators and indicator systems. First, the indicators described in the literature and the basic meaning of indicators with respect to planning, control and monitoring were examined. Then the most relevant goals of the entrepreneurial activity are described and linked to indicators. This is followed by an examination of the existing indicator systems and their current use in German SMEs. Information that cannot be inferred from the present literature leads to research questions that are necessary to answer and fulfil the research objectives of this thesis.

Chapter four provides a detailed description of the theoretical framework, methodology and the research methods. The first part of the chapter describes the theoretical framework and the basic research approach, followed by the methodology. Here, the requirements for the data to be collected are determined and the appropriate strategies for data acquisition and evaluation are developed. It describes how to select the addressees for the survey, how large the sample should be, and which survey strategy best reaches the target audience. Finally, the research design will be presented.

In the fifth chapter, the research questions that emerged in the course of the Literature Review are transformed into specific questions for a survey. After preparing a survey questionnaire, a pre-test study will be carried out to identify and improve possible questionnaire errors or deficiencies. After the survey results have been determined a statistical evaluation of the results will be carried out. Finally, personal interviews are conducted with SME managers from Germany to confirm the results of the survey and generate additional information.

Chapter six shows the findings of the cost accounting and indicator systems for SMEs in Germany while Chapter seven shows the conclusion of the study. First, the findings from Chapter Six are put into context with the Research Objectives. Then the academic contribution of this research and the contribution that research can make to SME managers in Germany is described. However, this chapter also outlines the limitations and shortfalls of this work and describes the areas to be considered for further research.

CHAPTER 2

Literature Review - Cost Accounting

2.1 Introduction

The literature review is divided into two areas. In the first part, the focus is directed on cost accounting, the second part deals with the most important indicators. First, there will be a glance at the development of cost accounting. In this respect, particularly the question arises of whether the rapid pace of economic development of the last few decades has also kept pace in the field of cost accounting.

2.2 Requirements for cost accounting

In this section, the current state of cost accounting is identified, and how it has developed over the last few years. The main question here is to ascertain whether and to what extent cost accounting systems were adjusted to the needs of different company's sizes and practices. This is because it has developed to a high degree in the last few decades. Also, to determine whether this development also has had an impact on cost accounting systems.

2.2.1. Adjustment of cost accounting to changed demands

Cost accounting is an integral part of all business decisions. Here, the size of the company does not play a central role, it all applies to both small and large-sized companies. This includes the need for economic pricing and the management and allocation of resources, as well as likelihoods for post-calculation (Fischbach, 2013).

An essential difference between SMEs and LSEs (Large Sized Enterprises) is in the role of the cost accounting in the company. Large industrial companies and LSEs have specialised departments, whose core task in cost accounting is often divided into various specialised disciplines handled by professionals. In SMEs, however, this task is carried out on a regular basis by the manager or by a responsible staff member, whose core task itself is guided practically by the product or the service and

consequently, the monitoring/controlling tasks in the broadest sense are rather carried

out simultaneously (Klamminger et al., 2011).

> **"What Did We Earn Last Month?**
> *Chief: Suffering catfish! Do you mean to tell me that with sales up more than a hundred thousand our profit is $ 20.000 less than last month?*
> *Controller: Yes, Mr Stone*
> *Chief: You´re crazy, Rowe! Or else your confounded accounting system isn´t worth blasting powder! Why that sales increase should have boosted net profit by at least $ 30.000, and yet here you show a decrease of $ 20.000! I know for a fact that we haven´t cut our selling prices, and this statement shows that selling expenses are not out of line.*
> *Controller: That´s true, but in October we produced just about half as much as we sold with the result that the charge for unabsorbed factory overhead ate up the gross margin increase and some more to boot.*
> *Chief: Well, all I can say is your standard cost system is all cockeyed if it produces results like that! Why do we have to recognize unabsorbed overhead, anyhow?*
> *Controller: Good accounting practice recognizes it as a regular thing!*
> *Chief: Then to hell with good accounting practices … I want a profit and loss statement that shows a profit increase when we make sales like these..…"(Harris, 1936; pp 17-18).*

This fictional dialogue between a CEO and a controller was published by Jonathan

Harris in 1936 in the Bulletin of the National Association of Accountants.

He started a discussion on the meaningfulness of the former cost accounting systems

which has not yet been concluded. In the period up to 1930 companies usually used

absorption costing systems. The direct costs were attributed to the cost units and the

fixed costs were allocated to the cost units by calculated or estimated cost rates. This

system had its appropriate origin with large companies in an industrial microcosm that

manufactured few products in chain production and with absorption costing used as

simple and very useful cost accounting tool (Friedl et al.; 2014).

In the subsequent time, different marginal costing systems have been developed and their main features are still used today. The basic idea was to divide the fixed and variable costs in order to facilitate the cost analysis and to avoid the arbitrary distribution of fixed costs to different products (Neikirk, 1951; Luenstroth, 1952; National Association of Accountants, 1961). Scientists especially considered direct costing as a solution to the prevailing problems of cost accounting. Hansen (1955) was critical of the practicability of direct costing. In the 1930s only full cost accounting was known in economic practice and was used by almost all companies.

In the 50s there was a sudden choice from a wide range of marginal costing systems which, however, found little attention in practice. He refers to a study at the beginning of the 50s which found out that only 4% of all companies questioned used planned marginal cost accounting, 6% used a mix and 90% worked based on full costs. Greer (1954), in his article "Alternatives to Direct Costing" in the Bulletin of the NAA (National Association of Accountants), goes even further and writes ironically "…..... t*here is a temptation to suggest what is good is not new and what is new about it is not good." (p 147).* The reason why this new development attained only with a considerable delay is explained by Hummel and Männel (1983) on the grounds that the marginal costing systems only matured during the 1960s into practical concepts, and that the transition from full cost accounting to marginal costing requires a huge deal of rethinking which in the short run can only be carried out by appropriately trained personnel.

The development, however, was not curbed by the critical opinions of the time. Reasonably, the contrary. In research, the understanding was disseminating quickly that "the particular concern is to provide the entrepreneur - in the form of a well-thought-

out and precise working cost accounting - with a management tool that helps him make well-founded decisions" (Dorn, 1961, p. 206).

Harris, with his first reference to and description of direct costing in the United States, initiated a widespread research and development. The system of direct costing was enhanced and implemented in companies by field trials. During this time, direct costing developed in Germany. Plaudt (1953), regarded as the father of direct costing, formulated the theoretical general concept of this flexible standard costing based on margin, which at that time already was well developed, for the first time. As an advisory business economist, Plaudt had his roots in practice and could put his theories into practice in companies. He combined Schmalenbach's theory of direct costing with standard costing developed in the USA into this new system of direct costing.

A new and more radical development and research stage were introduced by Johnson and Kaplan in the 1980s with the publication of the provocative but highly acclaimed "Relevance Lost" about the lack of contemporary accounting systems. They stated the obsolete evolution and the lack of adaption of cost accounting to the economic changes in the 20th century as follows:

> *"……the environment of the 1980s, …..is sufficiently different from that earlier in the century so that any management control system, ……. will likely prove inadequate to the changed circumstances. Given the radical changes in the competitive environment, it is unlikely that the cost accounting and management control systems devised for the 1925 environment can still be as useful sixty years later." (1991; pp. 204-205).*

They explain this stagnation especially with the strong focus on external reports at that time. The cost accounting systems were primarily designed to determine product costs and costs of the stocks. For this purpose, simple procedures had been developed. These helped to meet these requirements but by no means were they sufficient for

management decisions. According to Johnson and Kaplan, some special methods have been developed in addition to the traditional accounting information, but these were conducted in corresponding to the existing systems and failed because of the additional time and spendings incurred.

Their pamphlet on cost accounting triggered a new debate on the current situation of cost accounting, and only a "revolution" in management accounting could also lead to a "revolution" in the area of manufacturing. Many other authors agree with the view that the current cost and management accounting did not reflect the economic reality (Georges and McGee, 1987; Skinner, 1987).

The CIMA (Chartered Institute of Management Accountants) took the former debate about the quality of cost accounting as an opportunity and asked the scientists Bhimani and Bromwich (1989) to carry out a research about the actual state of cost accounting. In their final report with the significant title: "Management Accounting: Evolution not Revolution", the authors arrived at the following conclusion:

> *"The evidence and argument advanced by advocates of wholesale changes in management accounting were not yet sufficient to justify the wholesale revision of management accounting. Evidence of the benefits of new accounting techniques and the continued benefits of some conventional techniques is only beginning to emerge. No general crisis has been identified within the management accounting profession vis-à-vis a changing manufacturing environment and therefore no radical reforms are recommended at this stage" (p. 105).*

Although the authors cannot speak of a problem in cost accounting, they definitely see the need for a further development. This debate led to a change direction and serve as an initial spark for development and research of new cost accounting systems. This development was also acknowledged by one of the biggest critics of the 1980s, Robert Kaplan, who wrote in 1994:

"The past 10 years have seen a revolution in management accounting theory and practice. The seed of the revolution can be seen in publications in the early to mid-1980s that identified the failings and obsolesce of existing cost and performance measurement systems. Since that time we have seen remarkable innovations in management accounting" (pp. 21-22)

In the following years, widely varying approaches have been developed for cost accounting. Very popular and much noticed is the Activity-based Costing (ABC) which developed at the end of the 1980s and early 1990s and according to Chapman et al. (2007) will become the most important innovation in management accounting of the 20th century. The activity-based costing is considered as extremely unconvinced by many scientists, however, Jung (2007) first and foremost criticizes the regression to full cost accounting. ABC breaks down the overhead costs and constant or balances the fixed costs. In addition, due to its proximity to traditional full cost systems, it cannot qualify as one of the most important innovations (Prackwieser and Eckert, 2013).

2.2.2 Increasing specialization of cost accounting

Specifically, the recessionary years in the past, between 1985 and 2000, have contributed immensely to the need for decision-makers to be aware of the importance of proper cost accounting systems. Against this background, the scientific debate, too, became sensitive to this issue and contributed to a variety of new, increasingly specialized systems (Kirsch and Picot; 2013).

Another contributor to the demand is the increasing number and the complexity of decisions that must be made in ever shorter cycles. If previously simple cost accounting systems, for which the term "cost accounting" still concentrated on pure number operations, were sufficient, today increasingly individualized cost accounting systems that support the information prospect for management decisions far beyond "make or buy" or "break-even-analysis" gain more influence (Kilger et al., 2012). In this

context, cost accounting systems such as Resource Consumption Accounting (RCA), Lifecycle Accounting, Target Costing or Complexity Cost Accounting were developed (Lübke, 2007; Monrov et al., 2014).

The historical analysis shows that after a long discussion phase with respect to decision-oriented cost accounting methods on full or marginal cost, specifically, in the last 30 years, an increasing awareness on the benefits and effectiveness of accounting systems emerged. The increasing specialization of the systems, however, always takes place in a general theoretical context. Distinctions are rarely made by company size or the type of industrial sector in scientific papers. Here, the question arises whether a pure service company, a trading or a manufacturing industry, can build their strategic planning on the same accounting basis. The same goes for different company sizes.

The (time-consuming) process analysis of the Activity-Based Costing is justified in mass production with a high degree of repetitiveness. Whether or not this is true for an SME with a variable product range and a low degree of repetitiveness in individual processes, is questionable. In the 1980s, Bohr et al. (1988) took the risky point of view to customize the entire cost accounting theory. In their view, the existing and universally accepted cost accounting systems are not appropriate. Only one cost accounting system that is developed for each company fulfils the individual requirements adequately.

In large corporations, the above views were quite common. According to Schmid (1996), in 1975, Siemens introduced a process-oriented cost accounting specifically tailored to company's needs. Also, Mercedes-Benz AG developed its own accounting system for their logistics monitoring (Hardt, 1995), among others. These are all large

enterprises completely. Representatives of SMEs cannot be found among the companies with individually designed cost accounting systems. This could be explained to be caused by a lack of interest or readiness in the system, however, its main cause could be traced to the lack of economic efficiency.

These different prerequisites and needs between SMEs and big companies are poorly addressed in the current literature. Previous studies on this often consider cost accounting systems too theoretical. Schmidt et al. (1987) added that economists as a rule us very reduced models which often give a simplistic and distorting reproduction of reality.

In the period leading up to the 1960s, there was a seller's market. The demand for products was greater than the supply; this has changed considerably in the 1980s making the market a buyer's market. There was an oversupply of merchandise which led to an increased pressure of price and specialisation (Stotz and Wedel-Klein, 2013). This trend was influenced by the advent of the internet. The internet creates an almost complete price and product transparency which made regional monopolies become redundant in most cases (Friedl et al.; 2014).

This development was also followed by cost accounting. In the times of a seller's market with low specializations, a full cost accounting was sufficient. Cost accounting made a huge boost of development in the years between the 1980s and the 1990s with completely different theories with regard to the cost units. A reference to the different types and sizes of the companies is rarely considered in the actual studies. The approach of Bohr et al.(1988), to develop an individual cost accounting system for every company, would be ideal. This concept, however, will fail particularly as regards the Small and Medium Enterprises because of the enormous amount of costs involved.

2.2.3 Informational content of cost accounting

As the economic conditions are permanently changing, the demands on cost accounting systems are changing as well. In selecting a system that is ideal for today's conditions, specific current requirements need to be considered. In the following section, it will be investigated what information cost accounting needs to provide in principle and which additional tasks would be required.

The Accounting Principles Board defined the term (cost) accounting in the 1970s as follows:

> *"Accounting is a service activity. Its function is to provide quantitative information, primarily financial in nature about economic entities that is intended to be useful in making economic decisions, resolved in making choices among alternative courses of action." (Prowal; 2001; p.4)*

Already at this time cost accounting has moved from a purely backwards-looking monitoring and documentation purpose towards a more future and decision-oriented system. Data that is relevant for planning is a substantial part of the contemporary cost accounting systems as they are in use today (Seebacher; 2015). This type of cost accounting is known as 'management accounting' and is in part differentiated from cost accounting in the literature. The pure cost accounting is attributed to the functions of inventory and success assessment and is used for reports to internal and external stakeholders.

On the other hand, Management accounting has a stronger focus on data that supports the management in decisions, planning and performance evaluation (Ahlemeyer and Burger, 2013). After several discussions and argument on the subject matter, the view becomes so common that in the end, it was agreed that all of these tasks must be possible in an accounting system and that decision-relevant tasks, as well as

documentation tasks, will have to be carried out on the basis of one source of data (Drury, 2011; Mowen et al., 2011; Trapp, 2012).

In addition, Shim and Siegel (2009) follow this view and stated that cost accounting is the preparation of internal reports for the use by management in planning, controlling, and decision making regardless of the type of company. Cost accounting needs to bundle the following four relevant factors:

- Cost recording and reporting, including classifying, summarizing, communicating, and interpreting cost data to interested parties, internal or external.
- Cost measurement or estimation of specific products and services
- Cost management, obtaining accurate product-costing data and managing it to assist managers in making critical decisions (such as pricing, product mix and process technology).
- Cost analysis, analysing cost data, translating them into the information useful for managerial planning and control and for making short-term and long-term decisions.

Shim and Siegel (2009) clearly expanded the definition of cost accounting in their description above by content that is usually attributed to the classical definition of management accounting. This overlap becomes even clearer when Shim's and Siegel's definition of cost accounting is compared with the official terminology of the Chartered Institute of Management Accountants (CIMA). As the largest cost accounting organization in the UK the CIMA sees management accounting as an application of the principles of cost accounting and financial management to create, protect, preserve and increase value for stakeholders of enterprises in the public and private sectors.

According to CIMA (2013), Management accounting is an integral part of the management and should provide information for the following tasks: inform strategic decisions and formulate business strategy; plan long, medium and short-run

operations; determine capital structure and fund that structure; design reward strategies for executives and shareholders; inform operational decisions; control operations and ensure the efficient use of resources; measure and report financial and non-financial performance to management and other stakeholders; safeguard tangible and intangible assets; implement corporate governance, procedures, risk management and internal controls.

In summary, Bhimani et al. describe management accounting as

> *"the action managers undertake in short-run and long-run planning and control of costs that increase value for customers and lower the costs of production and service"* (2012; p 14).

He goes even further and says that management accounting is the challenge of reducing costs and that it needs to put every process and every resource involved on the test bench and, where possible, optimize them.

2.2.4 Development of cost accounting

Management accounting is an integral part of management assistance. It is a permanent process of planning, management and monitoring. Objectives are set, then the measures intended to achieve them are determined and the processes are inspired. Subsequently, the results are compared with the objectives. If the objectives have been achieved, the cycle begins anew with other objectives. If the objectives have not been achieved, the package of measures will be changed after a root cause analysis and the process is initiated again (Schmelzer, 2011).

In order to enable the management accounting to meet these requirements, it must support the management beginning with the plan/objective via the results up to

correction of the processes. In most cases, it must provide a future view of the situation on the ground in form of forecasting assessment (Endenich, 2012).

According to Jeschke (2017) and Heine (2008) Management Accounting is a management-oriented system that is based on two fundamental approaches: A decision perspective and a responsibility perspective.

The decision perspective comprises:

- To illustrate an accurate operational measurement in the resources and services of a company in the form of revenue and costs.
- To demonstrate the consequences of necessary adjustments/actions both in terms of the need for resources as well as in financial-related issues.
- The possibility of making strategic decisions by means of forecasting analysis.

The responsibility perspective comprises:

- An assignment of the incurred variations in resources to responsibility centres;
- Target-performance comparisons;
- In addition to short-term successes, to take into account strategic and long-term objectives into the future calculation.

In the modern literature, however, also trends can be detected that disseminate a separation of cost and management accounting. Bhimani et al. (2012) consider ideological consolidation inappropriate. Cost accounting measures and informs firms or business about the financial and non-financial consumption of an increase or decrease in resources. Management accounting, however, has an additional time level and can inform supportively about all objectives of the company in a historical, current and future-oriented perspective. Rüth (2012) and Freidank (2012) supported the distinction and added that respective tasks are divided into different areas of responsibility.

Challenges and competitions as they were previously predominantly relevant for large companies now also apply more and more to small businesses. The increasing internationalization and the acceleration of business processes in today´s economic competition affect almost all companies, regardless of their size. Increasingly SMEs need to expand their sphere of action onto international terrain and embrace the challenges involved (Leick et al., 2014).

Increasing competitive pressure is associated with increasing demands on information about all kinds of resources in a company. Eventually, the manager of a small or medium-sized company requires transfer to his economic environment the same wealth of information as a large company. The financial and personal appropriations of an SME, however, are not sufficient to facilitate specialized workers for every discipline of a comprehensive cost accounting. Even the effort to determine different data resources for different requirements is not viable in the economic choice of a small-scale enterprise (Meyer, 2011).

Here, a separation can be made in order to meet the requirements of SME by treating accounting as a separate discipline and mapping the contents and tools of management accounting by the use of indicators in an indicator system.

2.2.5 Design criteria of cost accounting

As the previous chapter has shown, the optimal information content is the centre of cost accounting. The more accurate and up-to-date the data is, the higher the information content of the system. Therefore, it is crucial to find the ideal ratio of the time and effort needed for cost accounting on one hand, and its epistemological value on the other hand. However, this ideal relationship between means and purpose is difficult to determine in practice or rather depends on the individual requirements of the

users (Schultz, 2012). Therefore, alternative criteria are applied to the choice of the ideal cost accounting system.

As early as 1977 the American Accounting Association suggests the following prerequisites that are still relevant today:

> *"Four basic standards for accounting information that provide criteria to be used in evaluating potential accounting information: relevance, flexibility, freedom from bias, and quantifiability" (p. 8)*

(I) Relevance

The first criterion "relevance" indicates that cost accounting should only generate data that is valid and necessary for the respective tasks and solutions. According to Rollberg et al. (2010), that are relative direct costs or rather marginal costs which change according to a variety of the quantity of the product or service. This theory is far too limited because cost accounting must consider the whole economic events, at least in monetary matters. Next to the variable costs this includes of course also all fixed costs whose relevance must not be considered any less significant than that of the variable costs. Rather the opposite is the case. Kaplan and Cooper (1998) are of the opinion that it is the close observation of the fixed costs that can contribute to improving the performance of the company. Because cost structures have developed that are often taken at face value and due to their lack of transparency never have been questioned, there never has been made any attempt to optimize them.

(II) Flexibility

The flexibility of cost accounting has several dimensions. On the one hand, cost accounting needs to be flexible as far as the provision of data is concerned, and as an existing database, depending on the requirements, must be interpreted in different

ways, sorted, or evaluated in order to meet the needs of each indicator (Walter and Wünsche, 2013). Lachnit and Müller (2012) also see the very pragmatic need for the adaptability of the system in quantitative, qualitative and historical terms. The cost accounting system must be structured in a modular way to adapt to changing internal processes and external market conditions. In addition, it needs to provide information flexibly with regard to different time frames, which might refer to longer or shorter periods, depending on the value to be evaluated.

(III) Freedom from Bias

According to Staubus (2013), "freedom from bias", or "accuracy of cost accounting" requires that data is gathered correctly in such a manner that they represent the empirical facts on which they are based. Particularly, he emphasizes the fact that the correct structure of the cost accounting system needs to match the real or actual structure of the company. Only this way can be guaranteed that the data obtained exactly represent the operational reality. In this, the degree of accuracy is always directed at the intended purpose.

(IV) Measurability

The Measureability is the decisive criterion in cost accounting and as accurate as possible, representation of reality and the flow of resources are the prerequisites for a functioning cost accounting system. This includes the operational resources that are not clearly quantifiable. Riebel (2013) therefore bases his relevant definition of costs and proceeds on clearly measurable cash flows when he writes: "Costs are additional expenditures or payments, triggered by decisions on the object observed" (p. 84).

Ultimately, these four basic criteria are still relevant parameters for the present purposes of cost accounting and must always be a basic requirement in the design of

the respective cost accounting system. These points are always relevant for the creation of the database, regardless of other purposes, the data will be used for. Therefore, this requirement also exists regardless of the level of the details of cost accounting. In both large and small or medium-sized companies these criteria are prerequisites for a functioning and accessible cost accounting (Rollberg et al.; 2010).

The consensus of opinion among different authors on the global design criteria described above must not, however, conceal the fact that all sources used so far are lacking the special reference to SMEs. Apart from theoretical aspects the decisive factor for a functioning cost accounting system always is its practicability. Rüth (2012) is aware of the need for precise information, but at the same time also has a strong emphasis on the applicability. In his view, it is justifiable to operate with inaccurate or estimated factors if the cost calculator accordingly, gets a better overview of the global company activities from a monetary point of view. The responsible person, however, must be aware of this potential inaccuracy. This view can offer a good conceptual basis, especially, for SMEs.

The entrepreneur of a small or medium-sized company must be provided with a holistic tool whose introduction is easy. In doing so, basic inaccuracies can be neglected for the time being, as long as their users are aware of them. The daily use and growing familiarity with a simple system will raise the awareness of the entrepreneur for relevant weaknesses. If he sees room for improvement in some points, he could assertively increase the accuracy or depth of information and thus improve his system. In the medium and long-term, it is precisely this company-specific evolution that is beneficial for every business accounting in order to reflect the real economic change in management accounting.

2.2.6 Design of a classical accounting basis

All control operations build on a number base as shown in the previous chapter must meet the requirements of relevance, flexibility, freedom from bias and quantifiability in order to allow precise further calculation operations. In Germany, the term "Grundrechnung"[1] has established for this number base. Riebel introduced this term for the first time in 1964. He wants to express that this is a universally valuable collection of costs, whose building blocks can be combined in countless ways and allow for a quick composition of special controls for various issues. The "Grundrechnung" is a combined cost type, cost centre, and cost unit accounting.

In cost type accounting, all costs accrued must be collected and meaningfully broken down. Since this is the foundation for the subsequent cost centre and cost unit accounting, it needs to be handled with particular care. An incorrect assignment in cost-type accounting inevitably leads to errors in the later evaluation.

The different cost types can be differentiated according to different aspects. In order to capture the total cost of a period under consideration in a purposeful way, the costs can be broken down according to their origin and nature and whether they are direct or overhead costs (Rüth, 2012). Cost-type accounting is carried out by all companies since it is the foundation for tax purposes and therefore, mandatory. Cost accounting as a voluntary discipline only starts with cost centre and cost unit accounting (Scheffler, 2013).

According to Thul and Middelhoff (2011), those operational areas qualify as cost centres which form an organizational unit. This can be departments or individual

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[1] „Grundrechnung" can best be translated as „Basic Accounting"

machines. Cost centre accounting serves as a link between cost type and costs unit accounting, which ultimately fulfils two substantial tasks: a cost allocation and a monitoring function.

The allocation task of the cost centres entails allowing allocation of the costs collected to the individual cost units. If a cost centre is used by the cost units in a varying intensity, this, of course, must result in a different amount of cost allocation. In profit margin accounting, only the variable costs are allocated to the cost units. The control task entails controlling the costs at their place of origin.

Rüth (2012) describes the cost unit accounting as the third and most complex stage of cost accounting and it determines how the costs were accumulated. It takes the direct costs from cost-type accounting and the overhead cost from cost-centre accounting. Its primary task is to distribute the costs accrued to the cost units.

This short and pragmatic process description of a cost accounting shows the theoretical stages of cost accounting. The system describes a broad framework in which a wide range of specific coordination or different interpretations is developed.

2.3 Different cost accounting systems and their relevance

In the following section, a broad overview of the basics of cost accounting and the various cost accounting systems and tools will be explained. Considering all modes of operation and details of the presented systems is beyond the scope of this work. Consequently, they are only roughly sketched respectively. The focus of this chapter is to show the objectives of the respective cost accounting systems and also to show how it distinguishes itself from other cost accounting systems.

To narrow down a realistic level of different cost accounting systems to be considered, the first part of this section is focused on those systems that have proven to be relevant in theoretical research. In a second step, the practical application of the respective systems is examined. Here, the focus primarily is on the empirical evidence and how relevant the respective cost accounting system is in practice. This investigation is designed to show whether the systems are compatible with the general requirements for cost accounting as well as the specific needs of SMEs.

2.3.1 Systems of cost accounting

Below, the different systems of cost accounting will be explained and analyzed. The various main concepts of cost accounting are usually divided according to two criteria as described by Schneck (2012), Fischbach (2013) and Rüth (2012):

- Time reference of costs

- Cost allocation to cost unit

With regard to the time reference of the costs, the cost accounting systems differ as follows:

- Actual cost accounting systems

- Normal cost accounting systems

- Standard/planned cost accounting systems

Actual costs are actually accrued costs. Actual cost accounting purely refers to the past, since it only refers to the costs incurred in previous periods. It is easy to determine and it helps to determine the actual costs incurred during the billing cycle in retrospect (Freidank, 2012). For the appraisal and adequacy of costs incurred, however, the benchmark is missing. In supporting entrepreneurial decisions, an exclusively past-oriented system is not suitable, either (Gaedke et al., 2011; Busse et al., 2011).

Normal cost accounting systems are a further development of actual cost accounting systems. In the case of normal costs, too, past values are being used. However, these constitute the average of the costs of different periods. Thus, individual rogue results or unusual fluctuations in the cost history are being smoothed. Here, too, there is no benchmark for the economic efficiency of the smoothed results. The pure past-oriented view in this system, too, does not serve any decision-making process (Padberg, 2012).

The disadvantages described above led to the development of a standard (planned) cost accounting. This is based on the two variables: the standard quantities multiplied by the standard prices. Unquestionably, the standard values always have a certain target character. The responsible person can use planned costs synonymously with target costs. In planning, the principal of economic profitability is assumed.

Therefore, planned costs also are considered a benchmark for the economic efficiency of the affected areas of a business (Freidank, 2012). In order to ensure comparability and the monitoring of economic efficiency, planned cost accounting must always be supplemented by actual cost accounting. Only this way the target values can be compared with the actual costs and revenues. Under these conditions plan cost systems achieve good results in efficiency control. Through this forward-looking view of planned cost accounting, this system is suitable for supporting decision making in a company (Ott and Förster, 2012).

Another distinguishing criteria/factor is the way, costs are allocated. The classification of cost allocation, according to Lohmann and Körnert (2013) happens in two areas:

- Full-cost systems

- Marginal costing systems

- In addition, Activity-Based Costing Systems[2] (Alvarez et al., 2014)

In full cost accounting systems, all costs are allocated to the cost unit that is, variable and fixed costs. The fixed costs must be allocated according to an allocation key that cannot be accurately determined and that reacts highly sensitive to variations in the volume of production (Walter and Wünsche, 2013).

With marginal costing systems, only the variable costs are allocated to the cost units and the remaining costs directly allocated to the operating results. The underlying idea is to only allocate those costs to a cost unit that were also accrued by it. The total fixed and overhead costs are included in the operating results collectively or in layers as in the multi-stage contribution margin accounting. With this system, wrong decisions due to the arbitrary allocation of fixed cost to single products or services are meant to be avoided (Labitzke et al., 2011).

Activity Based Costing was first clearly definded in 1987 by Kaplan and Bruns. With ABC it is not the cost unit that is to be visible but the processes that are directly or indirectly involved in its accumulation. The goal here, on one hand, is to identify and possibly to eliminate unnecessary processes, and on the other hand, to improve the processes necessary for rendering such services (Kaplan and Bruns; 1987). In German-speaking countries, Horváth and Mayer (1989) have provided the decisive impetus for a German version of the ABC. Their process cost calculation was a modification of the ABC according to German cost accounting purposes.

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[2] Strictly speaking, ABC is a subspecies of the full cost systems because the overhead cost pool is converted into the individual processes by an allocation formula. Because of the great relevance of ABC in economic science and its many unique features, a separate consideration next to the full-cost systems is recommended (Alvarez et al.; 2014)

The 1980s of the last century indicated a radical change in cost accounting research. With increasing changes in the economic environment, the need for adjusted cost accounting systems grew. Especially in the last 30 years, intensive research in cost accounting has been done that has led to new approaches and new cost accounting systems (Friedl et al.; 2014).

The revealed limitations of the theoretical development and practical adjustment of cost accounting systems have led to a further development of classic cost accounting approaches as well as to completely new approaches (Kistner, et. Al; 2013). In full cost accounting, the variable / fixed costs and direct/overhead costs are allocated to the individual cost unit. This, however, leads to the following problems:

- Overhead costs are always accrued in multiple cost units. Thus, overhead costs are allocated to cost units that are not necessarily the real point of origin of the costs.
- Fixed costs, by definition, are independent of the produced quantity of a cost unit. If, however, an allocation of the fixed costs to the individual cost units takes place, this leads to a so-called "proportionalization of fixed costs". This implies a change in fixed costs when changing the output volume to cost units (Freidank, 2012)

The first listed point of allocating overheads is critical. In the worst case, the allocation of overheads leads to the assumption that a decrease in sales volume must be compensated by increasing sales prices to keep up the coverage of overhead costs. Lower sales numbers entail a lower cover of overhead costs that in turn would result in a loss. In the framework of full cost accounting, this loss could only be compensated by increasing the proportion of overhead costs for each cost unit. However, an increase in prices in a stagnant market would most probably only lead to a worsening of the problem.

The allocation of fixed costs to cost units entails further risks. On the one hand, the allocation formula can only be set arbitrarily or on the basis of predictions. When the fixed costs are then allocated to the cost units, a control of the accuracy of fixed costs is almost impossible due to a lack of transparency. Inefficiencies that are hidden in the proportion of fixed costs can be neither discovered nor resolved (Friedl et al.; 2014).

These problems of full cost accounting have ultimately led to the development of direct costing systems that meet the problem with a separation of variable and fixed costs, or direct costs and overhead costs respectively. Direct cost accounting based on variable costs splits costs into a variable and a fixed part. This is based on the assumption of a linear course of change in variable costs when the output quantity is changed. Only the clearly attributable costs are allocated to the cost unit. All fixed costs that do not meet this criterion will be accumulated in one position and included en bloc in the operating results (Siller and Grausam, 2013).

2.3.2 Classic forms of cost accounting and their suitability for SMEs

Among the classic cost accounting system, budgetary control, flexible standard costing based on marginal and direct costing or contribution margin accounting are the most common representatives (Schweitzer and Küpper, 2011).

(I) Budgetary Control

Budgetary control is a flexible planned cost accounting on the basis of full costs. Its predominant objective is the provision of information for operational, target-oriented planning and management. In budgetary control, all existing fixed prices are set as planned prices in connection with future expected market prices. The reference values for the planning of the cost centres are coordinated with the sales plan and adjusted annually. In budgetary control, the cost control and the resulting profitability are in the

foreground. The combination of planned prices and the planned quantity of sales results in the data for cost control, strategic management and profit maximization. The projected costs are compared with the actually paid prices after the period. Therefore, it becomes clear, how the effective development of market prices affects the profitability of the company. It is regarded as a kind of information cost accounting and would thus be suitable as the foundation for a management accounting system (Friedl et al., 2014).

The idea of budgetary control in use at an SME has the advantage that the respective head of the cost Centre has more responsibility but can also act with a higher flexibility. The focus is on the profitability and not productivity. Short-term higher or lower deviations from the planned quantities or planned prices are acceptable as long as the planned profitability adds up in the end. This allows for flexible working to the requirements of SMEs (Steger, 2010). Budgetary control, however, is based on the system of full cost accounting. Here, there is the problem with the allocation of fixed costs to the individual cost units.

In addition, the planned sales volumes also are the result of forecasts which will inevitably be subject to fluctuations. Deviations in activity and production have a negative influence on the budgetary control system. As an accompanying measure for SMEs, it would be interesting. In this case, however, the overhead needs to be considered in relation to the additional benefits.

(II) Flexible Standard Costing Based on Margin

Flexible standard costing based on margin is a planned cost accounting system based on variable costs for monitoring the profitability of individual cost centres, as well as for supporting the operational, result-oriented planning and monitoring. In flexible standard

costing based on margin, activity is the only flexible variable with an influence on costs. It presupposes that all costs can be divided into variable and fixed costs and that the cost performance of the variable costs changes proportionally with regard to activity. The basic idea behind this is the distribution of costs that can be allocated directly to the cost-unit and a single block of fixed costs (Schäffer, 2013).

Flexible standard costing based on margin was developed with the goal to support short-term planning and control processes with the necessary information. In the allocation of costs to a cost unit only the marginal costs, that is the directly attributable costs, will be used. In cost unit accounting, the products will only be valued with the variables costs that are accrued by its production (Kremer, 2013).

Flexible standard costing based on margin as a system of direct costing has the decisive advantage to do without an allocation of fixed costs to cost units. This avoids the serious problems of full cost accounting with regard to deviations in activity and production. The specialization in the respective individual product, or rather the variable costs that are caused by its production, is to be considered as detrimental for a global system for SMEs since no concrete proposals for the assessment of the fixed costs are made. There is a possibility that products with very low marginal costs cause very high fixed costs (Wöltje, 2013). A profitability comparison between different products with different fixed costs is very difficult to accomplish.

(III) Contribution Margin Accounting

Contribution Margin Accounting was developed by Riebel (2013) with the aim of providing a system with which the planning and management of the company activities are possible within a short and long-time interval. In single-stage contribution margin accounting, the cumulated contribution margins of the cost units are determined first.

These result from the proceeds of the cost units minus the directly attributable direct costs. From the overall result of the contribution margin, the whole block of fixed costs is then deducted. In multi-stage profit margin accounting, the block of fixed cost is further subdivided and the costs are allocated to the company divisions or cost centres that initiated those costs (Kühnapfel, 2013).

In the early days of contribution margin accounting, the fixed costs were partially neglected and only the variable costs were seen as the lower price limit. This led to aggressive price wars especially in the steel industry (Bartels, 2012). This risk also exists today. However, with respect to the use of an SME, this risk can greatly be reduced.

The distances are short and there is a fast knowledge transfer in each area. Because of the limited human resources in SMEs, the employees are in charge of a wide range of tasks and therefore have a certain basic understanding in all areas. The salespeople are in constant exchange with production planning. If the company runs at full capacity, products are only offered at standard prices, but if they work below capacity, products can be offered in the margin between their full costs and variable costs (Riebel; 1997). For a better control and overview of the fixed costs, a multi-level profit margin accounting is recommended. Thus fixed costs can be identified on a pure production level and better conclusions with regards to the total cost of the origination process of individual cost units can be drawn.

2.3.3 Modern forms of cost accounting systems

In addition to the supplementary development and modification of the existing systems also entirely new approaches have arisen. Often times, they are combinations of existing subsystems or individual solutions developed to meet specific requirements.

In the German-language literature, there is a consensus view on modern cost accounting systems. In addition to some niche solutions, especially lifecycle accounting, target costing and process cost calculation are considered as relevant. (Schweitzer and Küpper, 2011; Kütz, 2014).

In the following section, these three most relevant new cost accounting forms will be presented in a meaningful but short form. If there is one system that proves as particularly suitable for the deployment in the all-inclusive cost accounting system for all relevant management accounting tasks, this system will then be covered in more detail in a later chapter.

(I) Lifecycle Accounting

In the classical forms of cost accounting, costs are recorded and analysed in certain specified time periods usually, in a month, quarter or year. This period-related view does not take effect in lifecycle accounting. It looks at a product during its entire lifecycle. That is, from the development during its market phase up to the follow-up or service phase (Deppenmeier, 2011). Lifecycle accounting provides strategically relevant information for a cost management that is specifically tailored to suit the different products. It provides information about whether a product, incorporating all development and follow-up costs, is profitable and at what point of time during the market phase the break-even point is reached.

The product observation is usually done during the classic product life cycles that start at market introduction and end at the discontinuance of the sale. Lifecycle accounting develops these areas. The product accrues costs starting with the idea and its development, and even after discontinuation of the sale service and warranty can still

lead to costs. In lifecycle accounting, all costs are accumulated and covering all periods allocated to the products (Heise, 2010).

Lifecycle Accounting meets broad approval in certain areas because of its holistic approach. In practice, however, it is primarily used in companies with large-scale production. In a survey, Franz and Kajüter (2002), found out that only 7% of all enterprises surveyed consider the use of Lifecycle accounting. As reasons for the lack of interest, over half of all those questioned said that it was too expensive, just under 30% considered it simply as not suitable. A further field of application for lifecycle accounting sees Troßmann (2013) in the area of large plant construction. In this specialized industrial field the entire lifecycle, from the initial idea through to disposal or decommissioning is relevant. In terms of costs that regularly accrue with such installations, the expense of lifecycle accounting is justified.

For the SME sector, which rarely deals with large plant constructions or with mass production, lifecycle accounting is not suitable. The overhead is too high and too many areas, such as process optimization and fixed cost management, are not taken into account. In addition, due to a lack of human resources projects in SMEs cannot be planned to the last detail. Adjustments or changes in direction in the course of the product development and market launch must be actively accompanied by the cost accounting (Franz and Kajüter; 200). Here, lifecycle accounting is not flexible enough, however, its basic idea, to consider products through their entire lifecycle, including development and modifications, could be considered to provide good information for individual projects in SMEs. On a case-by-case basis, additional accounting on the basis of lifecycle accounting could be carried out.

(II) Target Costing

Target costing management is particularly prevalent in highly competitive markets with strong pressure on prices and short product life cycles. Target costing is not a pure cost accounting system but a cost planning, cost management and cost monitoring structure (Kirsch and Picot; 2013).

By setting the final price, target costing already begins with product development (Friedl, 2014). Coenenberg et al. (1997) found out in a study that 70-90% of the costs per unit of a product are determined in the early development phase. This is exactly where the target costing sets in. Because whether or not the target price of the product can be achieved, according to this study is already determined in development. Unlike traditional cost accounting systems, the aim here is not to determine the exact production price of a product, but to achieve a fixed price. If the target price is determined, analyses are performed on how high the direct costs of the product can be, how high the investment will be and what proportion of overhead costs must be covered. According to these numbers, negotiations with suppliers and production processes can be coordinated (Friedl, 2014).

(III) Process Cost Calculation

Process cost calculation is designed as full cost accounting and draws from the cost accounting system of cost type, cost centre and cost unit accounting. Direct costs are directly allocated to the cost units, overheads are allocated via cost centre accounting to the cost units. It is precisely in this second step of overhead allocation that the special feature of process cost calculation comes into play. The allocation of the overheads is not made to the classic cost centres but to indirect cost centres that represent certain processes. The detailed capture and splitting of overhead costs begin

with the description of all sub-processes in a cost centre. These sub-processes are grouped into logical processes.

Subsequently, the processes are divided into supposed Activity Quantity Induced and Activity Quantity Neutral Processes. The former are processes which accrue dependent on the produced quantity of a cost unit. The latter, however, accrue independently of activity. They are overhead costs that cannot be allocated via processes to the cost units. These costs are collected in a separate overhead block (Bruhn, 2013).

The Activity Quantity Induced Processes must be assessed in monetary terms. This is done via the evaluation of all resources that are consumed in the process per cost unit. Thus for each activity quantity induced process, one gets a rate of process costs per cost unit produced. An addition of all activity quantity induced processes that are necessary for a cost unit leads to its costs per unit. To this, the proportion of activity quantity neutral costs needs to be added (Prackwieser and Eckert, 2013).

The concept of process cost calculation seems valuable because it tries to map individual processes and allows for great potential in increasing efficiency and resource conservation. However, with process cost calculation, too, the question of the equitable distribution of fixed costs remains unanswered. In addition, the analysis and monetary evaluation of all processes are time-consuming. Scheibeler (2002) sees a problem for SMEs, especially in this regard. In SMEs, the expenditure for the definition of the costs to the individual processes is too big. SMEs often lack the most basic data, such as the cost rates per department. All times and costs for the processes in the area of administration, in general, do not exist at all and had to be defined and determined. Another problem lies in the low repetition rate of products which is the rule in SMEs.

The high level of expenditure for the determination of the process costs is in no relation to the low repetition rate of the processes.

All three systems presented are based on full cost accounting. They are lacking the possibility of an equitable allocation of overhead costs to the individual cost units, process or life cycle phases. All three systems presented are strongly focused on the selling price of the cost units which in SMEs is not the decisive criterion (Welter, 2013). For a comprehensive management accounting, the systems presented leave too many areas unconsidered. Questions on make or buy decisions or the optimization of fixed costs which presupposes direct costing cannot be solved with the modern cost accounting systems mentioned above.

2.3.4 Practical relevance of the systems presented

Implementing theoretical concepts into a practical context is always difficult and many theoretical concepts lack a roadmap for their practical implementation (Brenner, 2013). Separate practical situational conditions cannot be represented entirely in a theoretical approach. In some cases, scientists even dismiss the practical applicability of their systems in order to do their theoretical research free of any influences.

Riebel (2013) writes in the conclusion of his standard work on direct costing and contribution margin accounting with regard to his approach:

> *"We were quite radical in our approach- without regard to traditional terms, prevailing theories and the procedure of the practice, yes, without regard to the feasibility with the resources currently available in practice." (p. 630).*

Determining the practical suitability of systems based on theoretical aspects is not possible; a practical relevance of the systems presented can therefore only be derived

via deviations. Surveys that deal with the frequency of use of different cost accounting systems are a potential tool for this purpose.

Homburg et al. (2008) were commissioned by the WHU (Academic Institution for Business Management) to question 376 companies in various industries on their use of cost accounting systems. In that connection, there was the question for the current cost accounting system in use. The results of the study clearly showed that despite all the criticism of science with regard to full cost accounting systems, the vast majority of 78% uses full cost accounting in their current operation.

In the second place, with just under 50% came contribution margin accounting and far behind with only about 5% process cost calculation (multiple answers were possible in this survey). In addition, there was also the question for systems that are used on a case-by-case basis. In the process, it became clear that companies, that did not use full cost accounting on a continuing basis, however, employed it on a case-by-case basis. The explanation for this is tax demands that are often met with the help of full cost accounting (Schweitzer and Küpper, 2011).

Figure 2.1: Use of accounting systems in German industrial companies

	Permanent use	Occasional use	No use
Full Costing (based on actual costs)	78	22	
Contribution Margin Accounting (based on actual costs)	50	42	8
Activity Based Costing	5	39	56
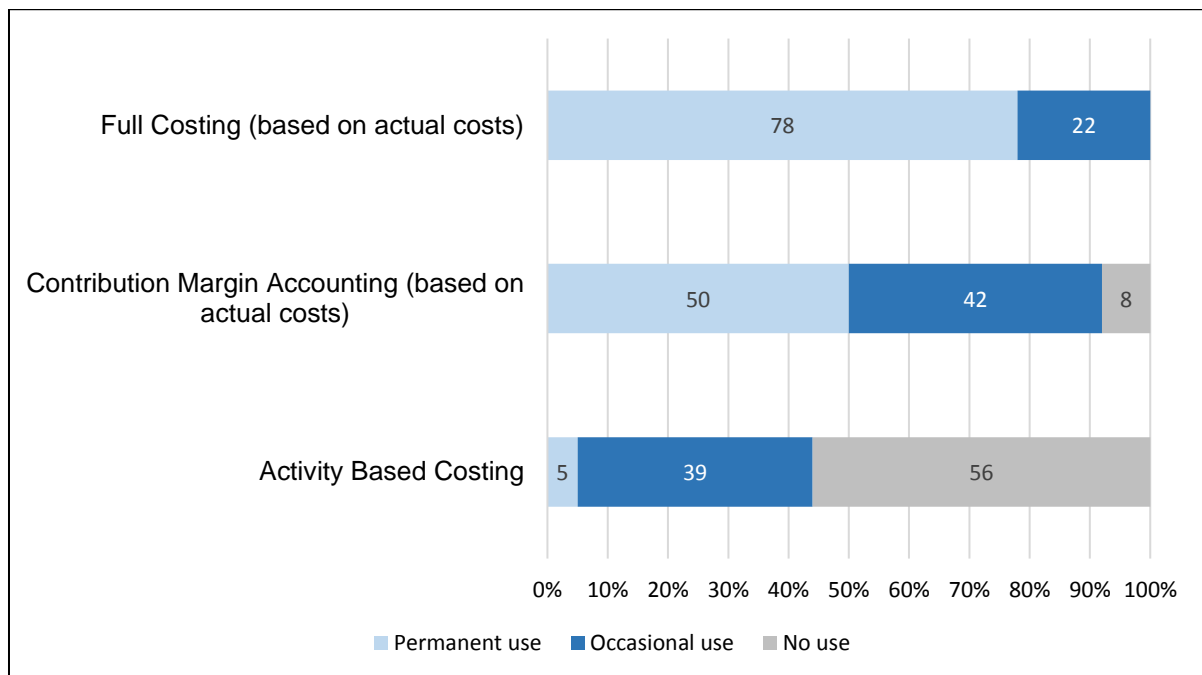
Source: Homburg et al., 2008, p. 16

Comparable results were revealed by a study conducted by Weber et al. (2000). The possible responses of this study were subdivided a bit finer. With regard to the different cost accounting systems, the possible differentiation was as follows: "Monthly and half-yearly use", "individual cases" and "no use". In this study, too, full cost accounting was the most utilized cost accounting system with 74% in the area of monthly and half-yearly use. Contribution margin accounting amounted to 64% followed by process cost calculation, with 11% the least-used variant.

Figure 2.2: Use of cost accounting
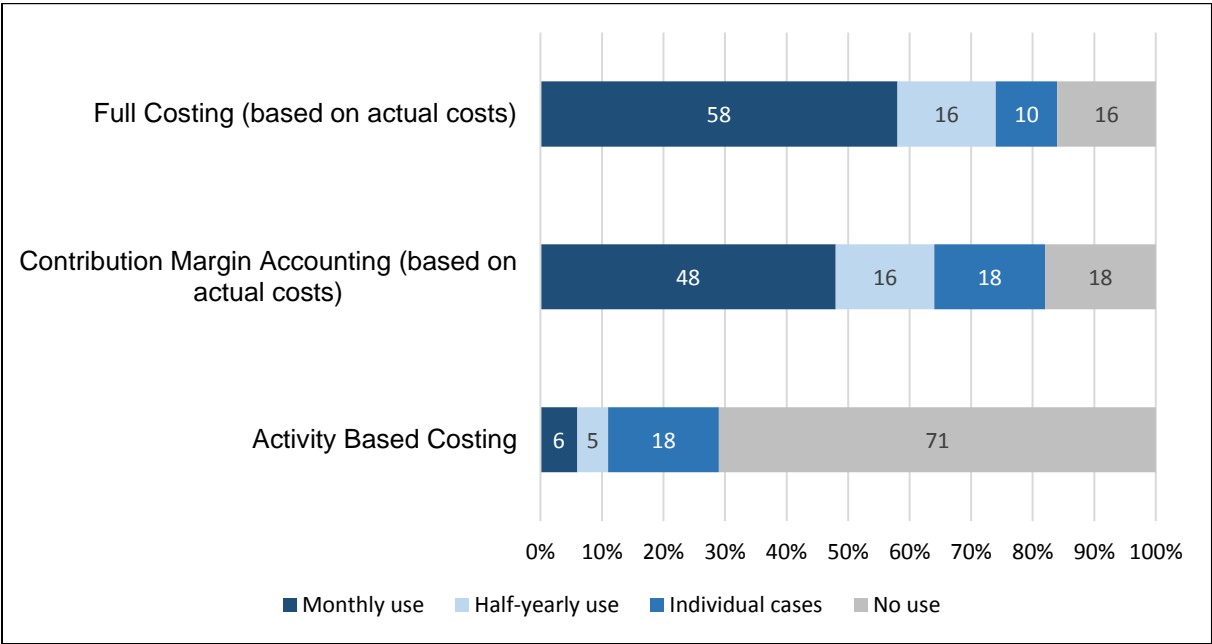
Source: *Weber et al., 2000, p. 239*

The studies have in common that primary traditional cost accounting systems are used. Weber (2012) puts this down to the fact that many managers that today conduct the business of a company have never come to know modern cost accounting systems. Until a theoretical approach and the associated mindset prevails in business practice, a certain time offset cannot be avoided.

In this chapter, the importance of cost accounting in today's time has become clear. Cost accounting, however, amounts to much more than just the processing of figures from past periods. As established, cost accounting has been developed into a central planning, management and monitoring tool. The development of various cost accounting systems has been particularly strong since the 1980s. However, surveys of the 1990s and 2000s demonstrated that these more modern cost accounting ideas have not yet been accepted by the corporate environment. Pritsch (2000) explained that this may be due to a lack of knowledge on the part of the currently responsible managers.

As this first part of the literature review has shown, many of these modern cost accounting approaches are designed for more specific tasks and thus, are to be considered more as accompanying systems to a global base system. In the field of modern cost accounting systems section, 2.3.3 has shown that those are always built on a full cost basis. The high degree of specialisation of these systems belies the fact that fundamental questions remain open.

In the above examples, this is the question of the allocation of fixed costs to the individual processes, periods, or cost units. In section 2.3.1 the major weaknesses and the arbitrariness of the allocation formula for fixed cost were shown. Even if an attempt is being made to allocate the costs as precisely as possible, the numbers still are vulnerable to changes in the output. The allocation of fixed costs is only true in case the underlying planned output has been reached. With higher production numbers the amount of fixed costs is too high, the products are too expensive, and vice versa.

In the previous analysis of the existing systems, multi-stage contribution margin accounting stands out. It seems to be the most flexible system that on the one hand, provides the best information base through the separation of fixed and variable costs. On the other hand, it also provides enough room for the higher density of know-how of SME managers in relation to the individual operations. Worth mentioning here, particularly, is the multistage separation of fixed costs.

2.4 SMEs in Germany

Companies are divided into small, medium or large sized businesses in most countries. In some cases, the division is limited to SMEs and LSEs. This structure is mainly based on statistical data considering the number of employees or the annual turnover. In Germany, instead of SMEs, often the term "Mittelstand" is used. These two terms can

be used interchangeably to a certain degree. However, it is not sufficient to define the German "Mittelstand" only on the basis of statistical indicators. Besides economic definitions on the basis of size and turnover, the "Mittelstand" exhibits characteristics that cannot be displayed statistically (see section 2.4.1).

In addition to economic definitions and indicators, the "Mittelstand" also comprises social and psychological aspects. If the "Mittelstand" is used as the recipient of an investigation, therefore both quantitative and qualitative aspects must be considered. It is precisely the qualitative demarcation of the purely quantitative definition of SMEs from the "Mittelstand" that is crucial for understanding their actions, their motives and the strategic objectives of these companies.

In this chapter, the different definitions of small and medium-sized companies will be illustrated and the features of the "Mittelstand" in Germany will be dealt with. The goal of this chapter is to work out a quantitative company size that can be used as the exemplary model company for this work.

The following considers the importance of SMEs to the economy as a whole and focusses as much on the economic as on their socio-political influence.

2.4.1 Qualitative features of the "Mittelstand"

Brüse (2011) indicates the unity of property and performance as the most important qualitative characteristic of the "Mittelstand". The owner or a member of the owner's family is the manager or has at least a significant influence on all relevant decisions and future orientations. The VDA (German Association of the Automotive Industry) states in its political letter in 2010:

> *"Because in family businesses ownership and management are in the same hands, there is often a stronger sense of responsibility to their employees,*

who in turn identify in a unique way with their employers. Other factors in the success of the 'Mittelstand' are the usually flat hierarchies, bureaucratic structures and strong ties to the local area" (VDA, 2010, p. 7)

There are great strategic advantages if ownership and management are united in one person. The responsible entrepreneur is able to act without consultation and can adapt his/her decisions flexibly and quickly to changing market conditions and customer requirements. According to Schön (2012), in small and medium-sized owner-operated companies, decisions are made in a quick and little formal way, even if these decisions have a strategic or existential consequence. According to him, a similar picture emerges with the solution of problems. In practice, this speed in essential decisions turns out to be an enormous advantage.

The responsible and independent entrepreneur solves problems as they arise and thereby has the whole company with a long-time prospect in mind. In large companies, led by external managers, there exist clear procedure protocols for problem-solving. This means that on the one hand clear processes to approach a problem are determined, quick decisions, however, cannot be reached with this approach. Also, managers are more easily subject to the pressure of delivering good quarterly results and to blank out long-term consequences as would be the case with the owner (Becker et al., 2012; Berger, 2013).

An owner-managed company is also characterized by personal responsibility. This is reflected in the responsibility the owner has towards his/her employees. Nüssel (2010) describes in the annual report of the "Mittelstand" that during the financial and economic crisis during 2009 and 2010 most of the employees of the "Mittelstand" were kept in the company, while in large-sized companies, in proportional terms, more employees were laid off and displaced by temporary staff after the crisis.

These qualitative criteria can lead to a certain conclusion about the size of the company. In an industrial company with several 1000 employees, it is simply impossible for the management to maintain contact with every single employee as it is for a business with 50 employees. This results in further psychological behaviour differences between the leadership styles of the managers described.

However, the attempt to define the "Mittelstand" primarily by indicators of size has not been undertaken by politicians either. Ludwig Erhard, the minister for economic affairs of the post-war period who was formative for the current German economic system, stated it in 1956:

> *"If we understand the "Mittelstand" only in material terms, if one can infer the Mittelstand only from the tax table, so to speak, then this term of Mittelstand, in my view, has taken a very dangerous turn. The Mittelstand cannot be fully balanced on material values, but rather is much more characterised by a disposition and an attitude in the socioeconomic and political process." (p 54).*

The subsequent years followed this course, the Federal Government of the 1970s takes a stand against a schematic and general definition of the term "Mittelstand". A separation based purely on economic indicators inevitably would have lead to an arbitrary demarcation (Press Service of the German Bundestag, 1996).

It has been shown that the Mittelstand has several components which have not only an economic and political component but also a strong socio-political relevance. The key economic indicators of SMEs and their high share in the Gross National Product of Germany are an understandable reason for their importance both from a market economy and social perspective (sections 2.4.7 and 2.4.8). The term "Mittelstand" implies positive core values in the German self-image, while from large companies, there seems to permeate a permanent danger, the "Mittelstand" is usually stylized as

a job creator and the pillar of the market system (Franz, 2013). The "Mittelstand" is seen as a generalized unit and associated with terms such as "down-to-earthiness", "responsibility" or "sustainability".

The term "Mittelstand" is often regarded, the subject of foreign research. In them, the "Mittelstand phenomenon" is described with comparable qualitative criteria as listed in the previous section (Albaum and Duerr, 2008; Luther et al., 2009; Gilpin, 2011; Smith, 2012). No information can be found in the reviewed literature that the qualitative definition of Mittelstand above could not also be transferred to any other European economic players.

It seems likely that the special feature of the Mittelstand is rather to be found in the term itself and its use than in its content-related criteria. Responsible for that could be the strong coinage of the term during the reconstruction years in post-war Germany. Erhard's economic policy always saw in the Mittelstand the respectable businessman who contributes to the welfare and prosperity of the country (Erhard, 1957). Thus, he created a positive connotation of the term that continues to the present day.

2.4.2. Quantitative definition of SMEs

The quantitative criteria of a company can already lead to certain conclusions regarding the company size. The above-mentioned behaviour of a manager with respect to his/her decisions or the personal and responsible contact with his employees can be exercised only up to a certain company size.

Clear quantitative variables are needed for statistical evaluations in order to categorize the different companies. F&E projects in Germany, for example, are only subsidized for businesses with a size up to 250 employees (Kölling, 2014). In addition to the

number of employees, other indicators such as turnover or combinations of several variables can be found in the framework for government funding[3].

The Institute for SME Business Research in Germany quantifies by the number of employees and the annual turnover. They distinguish three categories:

Table 2.1: Classification Scheme for SMEs

Size of Enterprise	Number of Employees	Turnover (Euro/Year)
Small	up to 9	Up to 1 Million
Medium-sized	10 to 499	1 to 50 Million
Large	500 and more	50 Million and more

Source: *Günterberg and Kayser; 2004, p. 3*

Not both values need to be reached. The indicator that places the company in the higher category is the relevant one. If, for example, a company has only 8 employees but a turnover of EUR 2 million it is the turnover that counts and the company is considered as medium-sized although the number of employees would put it in the category of small business (Ihlau et al., 2013).

The EU recommends for its member states a categorization that in some points differs from the German definition. In addition to the turnover and the number of employees, the balance sheet is considered an additional category, micro, is introduced. In May

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[3] In 2012, for instance, the German Ministry for Education and Research initiated the Eurostars program within the framework of the European Research Initiative EUREKA which is exclusively targeted at companies with fewer than 250 employees (BMBF, 2012). One example of combined variables is the Pro Inno Program of the German Federal Ministry of Economics and Technology. Eligible for funding were small and medium-sized enterprises (SMES) with operations in Germany, less than 250 employees, an annual turnover not exceeding EUR 40 million or an annual balance sheet of maximum EUR 27 million (Bertram, 2011).

2003 the following categorization was determined which has been in force since 1 January 2005[4].

Table 2.2: New Classification Scheme for SMEs after the EU

Size of Enterprise	Number of Employees	Turnover (Euro/Year)	Balance sheet total (Euro/Year)
Micro	up to 9	Up to 2 Million	Up to 2 Million
Small	10 to 49	2 to 10 Million	2 to 10 Million
Medium-sized	50 to 249	10 to 50 Million	10 to 43 Million
Large	250 and more	50 Million or more	43 Million or more

Source: Günterberg and Kayser; 2004, p. 4

In addition to this quantitative classification, extensive independence is a requirement for micro, small and medium-sized companies. A company that belongs to a group of companies and therefore is limited in its freedom of decisions does not belong to the above-mentioned groups. The Commission's recommendation defines independence as given if no other company owns a share of more than 25% of the respective company (European Commission, 2009).

2.4.3 Demarcation of the relevant companies

For this research, the classification of the EU fits best: Enterprises with less than 10 employees designated as Micro are not covered by the scope of this research. With such a small company size it can be assumed that the offered products or services have a degree of complexity for which a comprehensive cost accounting tool is not profitable. At the other end of this categorization of companies with up to 250

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[4] The classification of the EU is particularly important as it is used for the allocation of funding, loans and guarantees. If a company participates in programs specifically launched for SMEs, the criteria of the European Union are used and not the national categorizations of the respective member states (European Commission; 2012).

employees, in relation, still are so small that they could fit the category of owner-operated companies. The recommended classification in Germany is too broad for this purpose as companies from 1 to 499 employees belong to the group of SMEs. Of course, there are owner-managed companies with more than 250 employees. With a company of this size, however, it must be assumed that there is a separate department for cost accounting and that it is worth the effort to develop a customized accounting system for their own needs.

Particularly with regard to an accounting system that on one hand, provides all decision-relevant data and on the other hand, reflects and considers the economic reality of small and medium-sized companies, the recommendation of the EU to classify SMEs as companies with between 10 and 249 employees is ideal. Thus, if in this research work the term SME is used, it refers to this recommendation of the EU.

This classification seems to be the most appropriate for this research, but still involves difficulties. Analysing a car repair shop with 12 employees and a Biotec company with 240 academic employees (both in the range mentioned above) with the same standards could lead to conflict. This problem can only be addressed with a further demarcation. In this work, a concentration on certain industry takes place which should lead to a better comparability and a higher information content of the survey results. This concentration will be dealt with in the sections 2.4.4 and 2.4.5.

2.4.4 Service provision in German SMEs

The previous section determined that the company size relevant to the purpose of this research lies between 10 and 250 employees. No further differentiation of this target group was made. It must be said that according to the type of company studied (trading companies, service providers or companies in the manufacturing industry), different

requirements apply. This creates the need for yet a finer classification of the type of company considered in this study. The same goes for the frequency with which the production of one item is repeated (frequency of production). Even here a company in the manufacturing industry manifests different requirements and priorities than one specializing in single-unit production.

The following discussion aims to identify the most appropriate classification of SMEs in terms of their range of products. Furthermore, it also sets out to determine whether the way in which a service is provided has an impact on the selection of an appropriate type of company for this study. This refers in particular to a differentiation according to its level of repetition. This includes all companies between the two extremes of producing individual custom made and specializing in mass production.

SMEs can offer any service in the production chain between the extraction of raw materials and the sale of the finished goods (from production to trade) and can do so in almost all economic sectors (Andersen and Rossi, 2012). It is therefore impossible to treat all SMEs as equal in terms of content or context. The one type of SME that encompasses all SME variations does not exist. Before an effective cost accounting system can be developed it is thus necessary to further differentiate SMEs. As it will not be possible to cover the needs of all SMEs with one single cost accounting system, a group of SMEs must be picked out that a) encompasses all SME characteristics identified so far and b) is able to represent the majority of SMEs despite being limited in its content.

Hagenloch (2013) proposes a two-step model for differentiation. The first step classifies businesses according to the service or good they provide. This generates the distinction between service providers and producer of goods. Service providers

include trading, banking, insurance, traffic and all other companies offering services. Producers of goods, on the other hand, include primarily extraction, preparation and processing companies whose output is mainly that of tangible goods[5]. Amongst these producers of goods, industrial and manufacturing companies assume the most important role.

Dobhan (2012) describes a supplementary approach to classifying SMEs based on the type of production and more specifically, their level of repetition. He distinguishes between custom-made items, small batch production, large batch production and mass production. The production of custom-made items refers to the manufacturing of single units tailored to individual customer needs that will not be repeated in this identical form in a certain period of time. Small batch production indicates the repeat production of one product on a relatively small scale. Large-scale production describes the production of identical products in large quantities that alternates with the production of other identical products in equally large quantities. The fourth type of production is mass production. This occurs when a product is produced without modifications for a long period of time (Wenger et al., 2011).[6]

2.4.5. Narrowing down the range of products and services

"The theory of cost accounting aims to represent real production and service processes in terms of a model system" (Bungenstock, 1995, p. 82).

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[5]Extraction-companies include agricultural, forestry and mining companies that actively extract raw materials. Preparation-companies produce semi-finished goods from raw material and include for example, steel mills, saw mills or refineries. Processing-companies include all production oriented companies that turn semi-finished goods into finished goods or refine entire product groups.

[6]Wenger et al. (2012, pp. 192-196) adopt a strictly scientific approach to defining these terms. Their level of detail is however not relevant to the present study.

This quote clarifies the need for determining and focusing on one type of company in order to reach useful results. For this purpose, it needs to be clarified if there is a difference in the accounting processes of companies with different forms of output as there are service companies and producers of goods.

The function of cost accounting exhibits far more peculiarities in companies that provide services than in those that produce goods. These peculiarities are particularly evident in terms of cost types, cost centres and cost unit accounting.

While these three stages of cost accounting are common practice in goods-producing companies (Fischbach, 2013), it is difficult to realize the same classification amongst service providers as they lack the operations that would allow identifying different cost types and cost centres. In companies providing service, it is frequently the case that various processes are bundled in one department or one employee. The classical way of splitting up a process into its individual steps and stages, as is common in companies producing goods, does not take place. It, therefore, proves difficult to differentiate cost centres according to the function they perform (Poynter, 2013).

 Furthermore, great costs are incurred in companies providing a commitment to services[7]. It is not possible to distribute these costs across different cost centres in such a manner that accurately reflects where they were generated. Moreover, no direct link can be made between these costs and the service they ultimately fuel (Janakiew, 2013). The costs of maintaining commitment are generally higher in the service

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[7] Maintaining commitment for service is a business operation intended for but not yet received by third parties. The term business operation thus refers to that intermediate state in the process of creating and consuming a service, during which a service intended for a third parties has been partially created but not yet transformed into a final market service i.e. consumed (Maleri, 1997, p. 224).

industry than in the industrial sector. In order to meet customer requirements in times of high demand companies must be generously equipped with all necessary resources.

A parcel service company needs enough human, logistical and transport resources to support operations in the busy Christmas season on the one hand, but that is not running at full capacity for the rest of the year. This proportionally largest cost centre cannot be set off against individual services, it must instead, be considered as a fixed cost, incurred independently from the services provided (Pannicke and Zamekow, 2013). Deliberated in terms of individual services these (fixed) stand-by costs represent overhead costs, the factors that generate costs are involved in the production of more than one service. This largest cost block can therefore not be appropriately allocated to individual services (Klein and Schnell, 2012).

Determining cost units in a service-providing company is just as difficult as all the above. Individuality is a main characteristic of the service industry. Services are marked by a high degree of heterogeneity. Processes can vary considerably even within just one type of service so that accurate comparisons are hardly possible. The example of a consulting company usefully illustrates this difficulty. In a consultancy firm, each customer represents a separate cost centre. Grouping consultations according to a quantity structure would allow comparison between them; unfortunately, this is not generally possible. External factors such as location, duration, quality, complexity, personnel requirements etc. are too diverse to be represented and analyzed in a monetary environment. For this reason, and because of the difficulties associated with maintaining commitment for service, no resource-related cost planning can be conducted (Röttgen, 2013).

2.4.6. Different levels of repetition

In relation to the different levels of repetition, there is the needs to determine, first, if there is a difference between SMEs and LSEs and if the level of repetition has a noticeable impact on the kind of accounting in SMEs. Bungard et al. (1993) surveyed SMEs regarding the frequency of production of their main production method. Participant SMEs could give multiple answers. The distinction between small and large batch production was not made. The proportion of SMEs in the field of mass production (accumulated through multiple answers) was relatively low (9.1%). Instead as much as 89.7% of the companies surveyed described themselves as producing either custom-made or small batches.

Table 2.3: Types of production

Types of production	% of companies surveyed
Custom-made	26.1
Batch production	37.5
Mass production	2.3
Custom-made and mass production	1.1
Custom-made and batch production	26.1
Batch and mass production	3.4
Custom-made, batch and mass production	3.4

Source: *Bungard et al.'s study; 1993, p. 80*

Nebl reached similar results in his large-scale survey of SMEs in 2011. Multiple answers were possible. Even here, SMEs were mainly concentrated in the fields of custom-made and small batch production.

Table 2.4: Type of production

Type of production	% of companies surveyed
Custom-made production	76
Small batch production	89
Large batch production	22
Mass production	8

Source: Nebl, 2011, p. 51

In Schneider's survey of 2011, only 7.2% of the surveyed SMEs stated they were active in batch or mass production. The remaining 92.8% were distributed across custom-made and small batch production.

Table 2.5: Type of production

Type of production	% of companies surveyed
Custom-made production	33.8
Batch production	59.0
Batch and mass production	3.6
Mass production	3.6

Source: Schneider; in Stützt; 2011, p. 90

Specifically, the differences in cost accounting between service-providing and goods-producing SMEs (section 2.4.5) clearly represent the need to differentiate the recipients of cost accounting systems. In the present case, the facts displayed above justify narrowing down the SMEs considered in this study to goods-producing ones. Developing a cost accounting system that embraces the peculiarities of both goods-producing and service-providing companies would be incompatible given the prevailing opinion that corporate accounting needs to be tailored to the specific needs of different company types.

The three studies quoted in section 2.4.6 regarding the frequency of production in SMEs reach varying results; something that can be attributed to the different survey periods between 1993 and 2011. Furthermore, the surveys do not clarify the criteria by which the surveyed companies were selected. Merely the commitment to the size of SMEs ranging from 10 to 249 employees remained consistent across the analysis of all three surveys.

Amongst the different types of companies, goods-producing ones proved the best-suited to the purpose of this study. Their operations are most compatible with the prevailing systems of cost accounting in terms of cost types, cost centres and cost units. Despite the difference in results, a trend can be detected. Core competencies of a vast majority of SMEs lie in the fields of custom-made and (small) batch production. The share of SMEs operating in large scale or mass production varies between 7.2% and 18%. Regarding the level of repetition, one of the categories specified above emerged as relevant as well. According to the surveys above, a majority of about 80-90% of all SMEs surveyed are specialized on custom-made or small batch production. This proves the logical assumption made earlier regarding the spectrum of production in SMEs.

The influence of a company's size, its specialization of performance and frequency of production was discussed and proven in sections 2.5 and 2.7. This allowed a meaningful narrowing down to the best-suited model-company for the purpose of the present study: a goods-producing SME employing between 10 and 250 people. The question that remains open is that of whether this differentiation is sufficient. Especially in relation to the services rendered (i.e. goods produced), it must be determined

whether an increase in the scale of production also leads to an increase in the complexity and relevance of cost accounting in SMEs.

This observation gives rise to the following research question:

RQ 1: Does the production system affect the choice of the Cost Accounting model in German SMEs?

The studies cited in previous chapters showed that while cost accounting is well developed in large-scale companies, it still presents significant gaps in small and medium enterprises. In general, the size of these varies between 10 and 250 employees, a size range which is not further broken down in the prevailing literature. It still needs to be determined whether companies with 10 or 250 employees can be equally well served by one and the same cost accounting system. An empirical study of the following research question can help clear up this doubt.

RQ 2: Is there a correlation between the company's size and the quality of cost accounting in German SMEs?

2.4.7 Sociopolitical influence of SMEs

The literature of cost accounting does not make many references to SMEs as a distinct target group. This may be due to the following two factors. Firstly, the economic weight of SMEs might be too small for it to be worth considering this organizational form on its own. Secondly, an organization's size might even be negligible when it comes to cost accounting. The following considers the importance of SMEs to the economy as a whole and focusses as much on their economic as on their socio-political influence. The categorization of small and medium enterprises and the study of their importance to the economy as a whole found its way into research as far back as 1870. As one of

the first German authors, Schmoller (1870) published a "statistical and economic analysis of small national (German) businesses" within which he described the leading sociopolitical role that emanates from small and medium enterprises, loaded with innovation potential. This view was dominant until the period of economic change between the 19th and 20th century. In these years the overall economic trend shifted from a plenty of small independent businesses to large industrial companies.

According to Schumpeter (1942, New edition 1993), the organizational structure of small businesses was an obstacle and their dissolution, a necessary sacrifice for the progression of innovation, industrialization and concentration. In this sense, he wrote that "the completely bureaucratized and industrialized giant industrial unit displaces ... the smaller or medium-sized business." (Schumpeter, 1942, p 218).

Marx defended the view that small businesses were "only tolerable within narrow-limited borders of production and societies. Wanting to eternalize them would mean … to decree (impose) a general mediocrity" (Marx, 1975, p. 727). Together, the increasing concentration on just a few but always larger companies, the monopolization of individual industries, the inherent disadvantages for employees and the development of price policies changed the way people approached topics of economic policy.

According to Eucken (1952), a founding father of Ordoliberalism, economic prosperity can only be increased through unrestricted competition between companies of the equal or similar offering. Röpke (1948) takes this thought a step further in that he depicts SMEs as significant economic factors and describes them according to the following exclusive characteristics:

- An employment-stabilizing effect in economic cycles. In large firms, this function is only made possible through intervention which has the side-effect of distorting competition on the free market.
- The innovation potential of small businesses always seeking out new solutions in niche markets.
- The even then recognized necessary transition from an economy based purely on production to a mix of products and services. Especially the development of a service sector required the great imagination, individuality and flexibility of small and medium-sized enterprises.

The change from the dominance of large industrial enterprises to a coexistence with large and small enterprises was completed a long time ago. Röpkes theories are successful in describing essential elements of companies despite being more than 60 years old. He assigned the function of stabilizing the economy, especially to SMEs. Whether this includes a clear difference between SMEs and LSEs will be discussed later.

To this point, no study has been able to detect or prove an SME's employment stabilizing effect. Bauer et al. (2008) evaluated micro-data generated during business operations in the hope of identifying a relationship between the size of an SME and the job stability it offers or its ability to create new jobs; the attempt, however, proved unsuccessful. Borger and Gude (2008) came to a similar conclusion in their annual report on structural issues in SMEs. These studies rely on statistical data regarding employment figures that companies provide themselves. In 2008 Germany's Research Data Center started publishing a tax panel that makes longitudinal micro-data[8] available on all German companies and all Germany social security paying employees. For the first time, thanks to this comprehensive set of data, a study was able to detect

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[8] Longitudinal data is created when, for example, people are repeatedly interviewed on the same topic within a specific time period. Longitudinal data reproduces the development of an issue over time.

a smaller employee turnover as well as a higher recruitment rate in SMEs than for LSEs for the period of investigation between 2001 and 2005. In 2005 LSEs offered only 0.5% more jobs than in 2001 while SMEs offered 2.5% more jobs. These results stem from the fact that SMEs created and maintained more jobs than they destroyed (Haunschild and May-Strobl, 2009).

A study by the Institute for SME Research shows that within the service industry 88.2% of all companies are small enterprises while only 11.5% are medium enterprises and 0.3% of all companies in this sector are large business enterprises (Güterberg, 2011). These facts highlight the exceptional importance of SMEs in the service industry thereby supporting Röpkes hypotheses from the 1940s.

Merely the field of innovations is characterized by a recent trend that speaks to the great potential of SMEs. Generally, it is almost impossible to empirically or theoretically determine the relationship between a business' innovation potential and its size. Cohen and Levine (1989) summarize these contradictory results with an almost ironic observation:

> *"The most notable feature of the considerable body of empirical research on the relationship between firm size and innovation is its inconclusiveness" (p. 1069).*

It is, however, possible to reach conclusions regarding an SME's innovation potential in indirect ways. Germany's Donor Association for science drew up a list of R&D expenditure in different companies between 1997 and 2004. According to this list, the sum of internal R&D expenditure increased by 33%. SMEs however only contributed 6.5% to this rise. In comparison to large-scale companies, this indicates a far lower willingness to invest in R&D (Hutterer, 2013). Nonetheless, R&D expenditure doesn't necessarily equate to actual innovation. A further indicator could, for example, be the amount of patent application submitted in a year. While not every innovation leads to

a patent application, seen from a cross-sectional point of view, this figure can at least give a rough representation of reality. The German Patent and Trademark Office makes no clear distinction between the proportion of patent applications stemming from SMEs and those originating from LSEs. From a random sample of all patent applications made in 2005, Bernotat and Nickl (2006) calculated that a share of about 20% could be attributed to SMEs. Their study followed German recommendations for the categorization of firms by size according to which SMEs are classified as having up to 499 employees. Had a European classification been chosen, it is likely that the share of applications attributable to SMEs could have been even lower.

Referring to this sample, Bittelmeyer et al. (2007) calculated that in the year under consideration only 5500 SME patents were filed. Based on the total number of SMEs in Germany, this means that only 0.1% of all SMEs filed a patent. Still, all these numbers state is that SMEs file proportionally fewer patients than LSEs. Again, this is not enough to draw a conclusion regarding the degree of innovation amongst SMEs. According to Wurmnest (2012), the readiness to work with patents primarily depends on a firm's market power and the costs of submitting and maintaining the patent. As such, an SME's generally restricted financial capabilities could be considered the key to understanding their lower share in patent applications.

2.4.8 Economic and political influence of SMEs

While the influence of social and psychological characteristics of SMEs on the overall economy can only be demonstrated by examples and appropriate conclusions, their economic importance can easily be proven by statistics and surveys.

In Germany, the last calculation of 2011 was made for the year 2009. Firms were classified by size according to a European classification scheme. In 2009, 99.5% of all

registered companies were SMEs which means 3,578,360 of 3,597,248. In the year of survey, SMEs were responsible for generating 37.8% of Germany's GDP, 25.5 million employees paying social securities and employed 55.1% of Germany's working population (Günterberg, 2011).

Similar figures were published by the BIS Department for Business Innovation & Skills for the UK in 2011. Here the proportion of SMEs is even higher than in Germany; it accounts for 99.9% of all registered companies. 58.8% of the UK's working population was employed in such a company and together these SMEs earned a total of 48.8% of the private sector's turnover (White, 2011).

For the entire EU-area, the latest survey was conducted in 2005. In Europe, the share of SMEs lies at 99.8%. SMEs employ 67.1% of the European working population which generated 57.6% of the economy's added value (Schmiemann, 2008).

In Germany and all other countries considered, SMEs generate a great share of the economic added value. In quantitative terms, the relevance of SMEs to the overall economy is thereby unequivocally proven. This economic figure is further strengthened by the fact that 80% of all apprenticeships are allocated within SMEs (Günterberg, 2011). SMEs therefore also play a crucial role in training new employees.

Schiemann's figures regarding the relationship between the share of employees in a firm and its contribution to value creation in the overall economy, however, prompt a series of questions. Considering that LSEs only employ 32.9% of Europe's total workforce, the fact that they contribute 42.2% to the overall economic value creation calls for attention. Huber (2011) justification of this lies in the relationship between firms' degree of mechanization and its size. Larger firms have disproportionate access

to the mechanization of business processes, leading to a higher added value with lower employee engagement.

Surely, an LSEs higher efficiency can be partially put down to its higher degree of mechanization. However, a firm's degree of efficiency may also be influenced by its organizational structure. As elucidated in the previous two chapters, leadership in small and medium-sized enterprises is frequently organized around a family tree. Management is continually passed down within one family. This is harmful in two ways: on the one hand, it might overlook the fact that a family's internal approach to managing the firm may not necessarily be the best. On the other hand, repeatedly handing over leadership and control within the same family might also lead to passing down harmful behaviour to the next generation. SMEs traditionally focus on producing, improving and selling products. There are often no tools or resources available to improve internal processes, optimize areas generating fixed costs or to control purchase prices (Hubert, 2013; Deimel, 2008).

Could the higher efficiency of LSEs also be influenced by the fact that decisions are not reached via the short-cut of following one's own feelings and intuitions but on the basis of clear analyses and procedure protocols? Or by the fact that within large firms indicators are regularly collected and analyzed while SMEs often have little more than their sales and profit figures to which they can resort for decision-making (Benedikter, 2013).

SMEs are often praised for their quick reaction to changes in their external environment and customer expectations. Being able to fulfil a customer's special need quickly and flexible is definitely something worth pursuing. If however the production of these custom-made items is not based on sound calculations, it will be impossible to

determine the real effectiveness of such orders. If during the production of such tailor-made products it turns out that the financial calculations preceding it assumed a far lower resource effort than needed, it will be virtually impossible to reach a new price agreement with the client.

This example clearly highlights the demand for tools that enable SMEs to measure and control the efficiency of their processes. They need to be able to evaluate individual steps of their production process in monetary terms in order to later make comparisons and reach informed decisions on the most cost-effective production alternative. This requirement can be reached by integrating a cost accounting system tailored to the industry in which it is applied and SME-relevant performance indicators.

2.5 Cost accounting in German SMEs

Section 2.3 demonstrated the general need for classical cost accounting. Even from just a legal point of view, companies are forced to perform a certain degree of accounting; however, given the increase in competitive pressure and the acceleration of business procedures the world experienced in recent years, the spectrum of classical cost accounting is no longer sufficient. Central tasks such as making long-term decisions or planning, managing and monitoring of business operations have become more dependent on a reliable and precise supply of information from the accounting department.

2.5.1. Studies of bankruptcies in SMEs

The need for modern cost accounting was validated by various theoretical considerations. These theoretical approaches were proved on the basis of pragmatic evidence. However, there is no sound research into what successful SMEs have in common, or what makes their success. Therefore, a retrograde approach, which has

caused the failure of SMEs, is chosen and identified; the analysis focuses on the reasons that caused bankruptcies in SMEs.

The results of the studies of Meyer (2010) and Wildebach (2008) agree with the observation that the rate of insolvencies is higher amongst SMEs than LSEs. It is difficult to explain an insolvency through concrete facts as it is generally the combined effect of a number of factors that lead to a company's economic downturn and ultimately to its bankruptcy.

Numerous qualitative studies focused specifically on uncovering reasons behind bankruptcies in SMEs. In a survey of 53 insolvency administrators, Wieselhuber (2003) identified what he claims to be the main factors leading to bankruptcies in SMEs: errors in corporate governance and management. Furthermore, a number of insolvency administrators point out that SME business models are often uncompetitive and that investors are generally less willing to invest in SMEs. A study by Credit reform (2004) reached similar results[9]. This study names managers' inability of making economically efficient decisions or to adequately plan and monitoring business operations as the main reasons for insolvencies in SMEs.

A study by the Euler Hermes AG in cooperation with 125 insolvency administrators provides more detailed results. This study did give the surveyed insolvency administrators a number of concrete reasons they could judge. In its results, the survey names deficient planning, management and monitoring as the reason for bankruptcy in 79% of all cases. This was followed by financing gaps (76%), insufficient debtor

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[9] The Creditreform AG is Europe's largest group of companies for credit reports, credit ratings and debt collection services (Schneck, 2008)

management (64%), poor transparency and communication (44%), erroneous investments (42%) and wrong production planning (41%) (Krystek et al., 2009).

2.5.2 Demand for modern cost accounting in SMEs

The studies described above agree that insufficiencies in planning, management and monitoring are the main reasons behind SME bankruptcies. These processes all rely on the support of a well-functioning cost accounting system. This suggests the apparently undisputed need for a cost accounting system tailored to the needs of SMEs (Taschner, 2012).

Keuper et al. (2009) reach the conclusion that it is absolutely indispensable:

> "*to support the management process of defining goals, planning, managing, and monitoring with instruments, coordination and through the provision of information, thus creating additional leadership capacities*" (p. 61).

The basic need for cost accounting systems that go above and beyond the scope of classical methods of cost accounting was already stressed in the first part of the literature review. The arguments declared above now also support the need for comprehensive cost accounting in SMEs. If the lack of effective accounting systems is unanimously agreed on as the main cause for a SMEs failure, this encourages the assumption that even in the realm of SMEs a successful company can only stay profitable in the long run if it is supported by a well-functioning system of cost accounting.

What still remains unanswered at this point is the opinion SME managers currently share on the topic of modern cost accounting. It is not clear if they are aware of the importance of comprehensive cost accounting and if they are willing to invest in this with the same intensity as in their core business?

These considerations lead to the following research questions:

RQ 3: How important is a cost accounting system for decision making in German SMEs?

RQ 4: Are Cost Accounting systems assessed and updated according to the changing economic environment in German SMEs?

2.5.3 Studies to cost accounting in SMEs

This section deals with the actual dispersion of cost accounting systems in practice. For this, a number of studies will be evaluated that dealt specifically with cost accounting in SMEs.

The practical use of cost accounting is prevalent and documented in plenty of studies (König et al., 2012; Paul, 2014). What these studies stop short of, however, is a restriction or classification of the size of companies surveyed. As Kiederer (2011) shows, only very few empirical studies deal with the actual spreading of cost accounting in SMEs. The studies discussed in this chapter deal with cost accounting in SMEs and show that in such companies cost accounting is mainly used for investigation and inquiry. This is reflected in the fact that calculations are mainly done with actual figures, something that only allows an evaluation of the past. Such evaluations are unsuitable for future-oriented planning and monitoring. Planned costs are integrated into a firm's accounting only once the firm grows (Schultz, 2013).

Research on this topic agrees that a future-oriented system of cost accounting is an important requirement for the successful management of a company. Prätsch et al. (2012) demand an evolutionary thought-process which expands the currently only investigative system of cost accounting in SMEs to also encompass a decision-making

function. Lengenhausen (2013) takes a slightly different approach. The comparison of SMEs and LSEs leads to the recommendation that cost accounting systems in SMEs should indeed be slightly reduced and simplified than those used in LSEs but still take into account modern approaches of cost accounting. These should be picked that information is made available to select decision-making areas.

Lengenhausen (2013) conducted a survey amongst 159 companies with less than 500 employees each[10]. According to his results, the main methods of cost accounting in 75% of all SMEs are the classical approach of full cost accounting, with the allocation of overhead costs via an expense distribution sheet. Some of this 75% encompass future-oriented cost planning. The overall proportion of SMEs in this survey that made use of these elementary instruments of future-oriented cost accounting stood at just 36%. The study reaches the fundamental conclusion that cost accounting systems are generally underdeveloped in SMEs.

A study conducted in 2005 by Berens et al. empirically proved that in 70% of the surveyed cases, the task of cost accounting was not being carried out by specially trained employees, rather, by the company's managing director himself. This indicates that smaller companies do not specialize in cost accounting or controlling. As in the study cited above, these findings support the observation that classical methods of cost accounting prevail in middle-sized companies. Strategic or future-focused instruments of cost accounting are rarely used in smaller companies. In 80% of all

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[10] Some surveys on SMEs draw on German recommendations the classification of companies by size according to which the size of a SME ranges from 10 to 499 employees. Instead other surveys simply refer to SMEs as a whole and make no explicit statement regarding the size of companies surveyed. Due to the scarcity of studies on SMEs, the present work will also consider results from studies that fall out of the determined range of 10 to 249 employees.

companies surveyed, cost decisions are generally based on the experience of its managers.

Ossadnick et al. (2004) surveyed 155 companies in their study on SMEs. All companies surveyed employed less than 500 people. Their results indicated major shortcomings in the area of cost accounting amongst smaller companies. 31% of the companies surveyed admitted to considering cost accounting as "work on the side". Managers only started feeling aware of the importance of cost accounting and of taking appropriate care of relevant departments in companies with over 200 employees. Ossadnick et al. (2004) reach the conclusion that there is still a strong need for action in the implementation of cost accounting systems, particularly amongst SMEs counting less than 200 employees.

2.5.4 Requirement for current information

According to Keuper et al. (2009), the biggest gaps in the area of cost accounting in SMEs consist:

> *"in providing management with information on the respective market environment that will facilitate decision making and in reducing investment risks through the use and implementation of appropriate instruments. Above and beyond this, the systems of cost accounting currently implemented in SMEs are largely incapable of relieving management through a well-functioning system of support information."* (p. 70)

The study of relevant literature revealed that studies focus on the implementation of cost accounting systems in SMEs are scarce. The studies that do exist, consistently demonstrate a lack of functioning cost accounting systems in SMEs. Specific information on individual cost accounting systems or tools for specific requirements is however completely absent. This can be explained by the low dispersion of modern cost accounting systems in SMEs. If, as revealed in the survey of Joos-Sachse (2002), over 80% of all SMEs only work with classical methods of full cost accounting and

make no or very limited use of additional indicators for corporate governance, qualified answers on the topic of "modern cost accounting tools" simply cannot be expected.

Through a survey conducted in 1999, Dintner and Schorcht reached the conclusion that: "on the whole, the use of controlling and accounting instruments and methods is generally very weak amongst middle-sized companies" (p. 67). This summary is consistent with the results of relatively current studies cited above. A study indicated that 80% of all managers in SMEs base their decisions on experience. This fact is risky for two reasons. Firstly, a company's external environment changes too quickly for it to be in any way sensible to rely on one's own experience when making decisions. Secondly, in middle-sized companies, management is often handed down within the family itself or within the management's close personal network (Wegmann, 2013). Frequently these successors are not necessarily the ideal candidates and they generally lack the experience to continue making decisions following the preceding pattern.

Meanwhile, the urgent need for a unique system of cost accounting has become clear. The most current studies on this topic are however almost 10 years old, a time span in which computer-aided systems have been greatly developed. The provision of information through the internet has also greatly improved. The range of training courses on the topic of cost accounting has increased and access to this information been made much easier (Männel, 2013).

In order to obtain an understanding of the impact, these changing conditions and possibilities have on the current state of cost accounting in SMEs, the following research questions must be answered:

RQ 5: Is German SMEs planning strategy based on future trends or on the costs of the last period?

RQ 6: What are the most common cost accounting systems used among German SMEs?

RQ 7: What information is currently being determined by the cost accounting system in German SMEs?

2.5.5 Studies on the barriers to the dispersion of modern cost accounting systems in SMEs

The scarce dispersion of modern cost accounting systems was verified and discussed in the previous chapters. The following chapter focusses on identifying the reasons behind this observation. For this, it draws on existing studies.

Studies that indicate reasons behind the scarce dispersion of modern cost accounting in SMEs date back to the years 2001 and 2009.

Leidig (2001) identified a "gap in the theory of cost accounting" (p. 95) as the main reason behind the low dispersion. The spectrum of methods and theoretical approaches presented in the literature are usually designed for the use and needs of LSEs. New approaches in cost accounting are far too complex for the requirements of SMEs and cannot be integrated to their operations. The second point that Leidig (2001) uncovers is the excessive focus on theory. As shown in previous sections, many studies lack a final practical evaluation of their theoretical findings. SMEs often lack someone able to grasp the theoretical context and translate it into everyday practice (Schmitt et al., 2011).

Jacobs et al. (2009) reach a similar conclusion. According to them, the main reasons for the scarce dispersal of modern techniques of cost accounting are the distinct requirements of cost accounting brought to the table by different types of organizations. SMEs are characterized by largely heterogeneous structures and departments (especially in the manufacturing industry). Overwhelmingly, SMEs occupy the field of custom-made or small batch production while LSEs generally focus on a large batch or mass production. On this basis, it becomes clear that two entirely separate approaches to cost accounting must be chosen. Strategically speaking, it is interesting for SMEs to conduct a project-related evaluation of their costs. In competition with each other, SMEs look for USPs and characteristics of differentiation through which they can set themselves apart from their competitors. LSEs, however, focus more strongly on success through cost-leadership. Cost accounting in SMEs must, therefore, provide tools for project-based management and monitoring.

2.5.6 Reasons for the scarce distribution

The scarcity of resources available to SMEs is continually pointed out as the main reason for the lack of modern cost accounting systems. Recent studies on SMEs are relatively scarce. Drury and Thales (2000) demonstrated that the main barrier to introducing and maintaining a modern system of cost accounting is the costs and human capital that SMEs visualize would involve.

In the same year, Innes et al. (2000) examined the results of different studies and amongst others, reached the conclusion that within large companies the structures necessary to support such a system generally already exist, something that considerably facilitates implementing a new system. Furthermore, trained specialists (who generally already have experience with similar topics) are available to support

each area of expertise in larger companies. Also, the development and implementation of new cost accounting systems can easily be facilitated by temporarily hiring appropriately skilled workers. Given their economic condition, these resources cannot be called upon in SMEs (Innes et al., 2000).

Hamann (2013) also sees the lack of resources as the greatest barrier to introducing modern systems of cost accounting in SMEs. Hamann's view of reasonable cost accounting takes into consideration the diversity of tasks SME managers are faced with. This includes both responsibilities of daily operations and of planning long-term strategies.

Professional cost accounting is also hard to attain because, despite there being a great deal of information on cost accounting in the literature, not much of it focuses specifically on the needs of SMEs.

> *"The general methods of controlling and cost accounting are elucidated over and over again. There is however often a lack of concrete indications as to which combination of methods is advised for which type of company and when"* *(Jacobs et al., 2009, p. 50)*

Grieco and Pilachowski (1995) studied the reservations SMEs are frequently met with. They found very pragmatic reasons for the unwillingness to implement new methods of cost accounting. The main answers they collected included statements such as: "We don´t have the money and resources necessary to do the job right", "People won't accept change" and "We don´t have the time" (p. 158)

Systems of cost accounting are rejected due to their low specialization on SMEs. If methods and tools tailored to a company's size and its industry existed, the acceptance of new cost accounting systems would be considerably higher. Theories that primarily

address large companies are considered as being relevant for only such companies (Klemisch and Rauhut, 2009).

The reasons cited for the low acceptance and the slow rate of introduction of modern cost accounting systems can ultimately be summarized by a lack of specialization on the needs of SMEs. Little research deals with the particular requirements of SMEs. Such research must be constructed on a basis with which managers of small or medium sized enterprises can identify. Only then will it be possible to convey the benefits of accurate and future-oriented cost accounting, the need for which was identified several times in the literature review. SMEs shy away from the introduction of a modern system of cost accounting but at the same time, as already identified, they are unsatisfied with the current state of their cost accounting system and wish for a more meaningful one.

In order to respond to this with an adapted system of cost accounting, the following research question must be answered:

RQ 8: What is the most important information that needs to be determined with the accounting system in German SMEs?

2.6 Summary

> *"There are good reasons to recommend cost accounting systems to middle-sized companies whose leadership is often focused entirely on the managing director" (Obermaier, 2005, p. 67).*

Due to the close relationship between ownership and leadership, the structure of organization and leadership in SMEs often revolves around the owner. There are few levels of hierarchy but a very broad range of tasks combined with a low degree of

labour division and specialization. This results in short information paths, strong personal coordination and high flexibility.

On the other hand, these characteristics can also cause managers of SMEs to feel overloaded in their operational responsibilities which would then lead to a neglect of strategic planning, management and monitoring.

As shown, there is a clear gap in the literature regarding research to cost accounting dealing specifically with the overall requirements of SMEs. Existing systems are generally too complex for the resources and needs of small and medium-sized enterprises -they are rather intended for large companies with specialized departments (Ossadnick et al., 2010).

In SMEs, the tasks of cost accounting are rarely carried out by specialized organs, rather by non-specialized employees who are also responsible for other jobs and generally have little knowledge or experience in cost accounting. Generally, this responsibility falls to a company's internal book-keeper or its management. There is thus, no professional support and mostly, the manager or book-keeper is also distracted by other jobs he is responsible for (Hamann, 2013).

The first part of the literature review clearly demonstrated the economic relevance of SMEs. An ideal type and size of company for the purpose of this research emerged, as well as the undeniable need for prevailing cost accounting systems to be tailored to such companies. In order to support planning, management and control in SMEs stronger focus must be placed on the needs of such companies.

CHAPTER 3

Literature Review - Indicators and Systems of Indicators

3.1 Introduction

This second part of the literature review identifies the relevance of indicators in general and with regard to the management of SMEs. At the outset, the basic business planning in SMEs will be determined. In a survey, on which the results of this work will be based, objectives and their relevance will be queried first and foremost. Therefore, the clear definition and substantiation of potential economic and social objectives of an SME are of great importance. This is followed by a brief description of the importance and content of indicators and indicator systems, which again will be put in context with the specific needs of small and medium-sized businesses. This is followed by yet another research on how business objectives can be connected with indicators which shows the necessary database identified with these indicators and how ultimately relevant indicators can be integrated with the most appropriate cost accounting system.

3.2 Indicators

Managers rely on information to guide them through the process of achieving goals. Such information must quantify past occurrences and is referred to as past values. A manager needs to be able to visualize the firm's current state and ultimately deduct realistic predictions regarding firm's future development.

A great amount of information is not the same as a high degree of knowledge.

> *"The accuracy of information is not determined by the number of structural elements but rather by their subjective relevance to a particular purpose and its respective requirements" (Höflinger, 1975, p. 147)*

This quote is relevant to the current context of SMEs for two reasons. Firstly, it highlights the importance of defining the exact requirements in small and medium-sized enterprises. Secondly, it calls to attention the need of subjectively defining the number of structural elements required for each particular purpose.

This need emerges from the previously discussed scarcity of personal resources common in SMEs especially in regards to topics of little relation to the firm's core business activities.

The following chapters critically analyze the use of indicators. Particular emphasis is placed on their impact in the context of SMEs.

3.2.1 Definition of indicators

Indicators are regularly drawn upon to compress and compare information needed for the planning, management and monitoring of strategic goals in a business context (Zwißler et al., 2013; Mayr and Ausweger, 2013). Relevant literature has not reached an agreement regarding the definition of an indicator. The whole spectrum of indicators can, however, be referred to by Küting's definition of 1696:

> *"Indicators are highly compressed metrics that provide precise, concentrated and documentable ratios of numerically detectable facts, inform one about a businesses' development and form strategic factors of success" (p. 237)*

This definition, as much as any other, resorts to the simple and compressed mention of 'facts that can be quantified'. Soft facts are exempt from this as they cannot be represented in figures and are thus, hard to compare. This becomes evident in the example of employee satisfaction which is hard to quantify but, as an essential indicator still has a great impact on business decisions. Appropriately evaluating it would require a different set of standards. Such standards are however subject to arbitrariness and will inevitably lead to inconsistencies even within the firm's own environment. Soft facts are becoming increasingly important in business management. This is made evident by current publications that shift away from stringent definitions of quantifiable indicators (Paul, 2014; Ogura and Uchido, 2014).

Essentially, indicators are tools to aid the implementation of goals. As such, they have considerable influence on firm's decision-making process and its organizational behaviour. The abundance of single pieces of information complicates the assembly of meaningful sets of data. Indicators reduce these abundances thus making it easier to estimate the consequences of any business decision (decision-making function). Furthermore, they allow for patterns and problems to be identified amidst vast amounts of data (Vollmuth and Zwettler, 2013).

Indicators indicate a firm's current performance and can be implemented to control and coordinate business activities (behavioural control function) (Posch and Speckbacher, 2012). Indicators are especially helpful in the field of behavioural-control. As a firm's performance measure, indicators are a manager's essential decision-making tool since all goals he follows will in one way or another aim to increase performance. The setting of goals should be tied to the fulfilment of specific indicators values as this will act as an incentive for the responsible manager (Belohuby, 2014). "What you measure is what you get" (Hummel and Huitt, 1994, p. 10). The authors of this quote assume that a goal can only be reached when tied to specific performance values.

3.2.2 The significance of indicators

In the literature, a major emphasis is placed on the advantages of using indicators (Rachfall, 2013; Vezzetti et al., 2014; Paul, 2014). Ewert and Wagenhofer (2008) however point out a number of problems that can potentially arise:

- Indicators (or, a small number of indicators) never fully capture every aspect that will be affected by a manager's decision, e.g.: a decision's interdependencies to other business areas.
- Indicators can be influenced by matters that the manager has no control over
- Managers generally allocate less time to the fulfilment of indicator goals than a business owner would
- Indicators can be manipulated by managers to suit their needs

Schneyder (2007) expanded the list by pointing to more general issues:
- Risk of reducing the significance of Indicators. Occurs when the data from which indicators are calculated is of low quality.
- Indicator-failure through lack of acceptance. Occurs when employees of an area addressed by indicators feel observed and monitored by the increase in transparency or when managers are generally sceptical about the evaluation of business matters in abstract numerical terms.

Reinecke et al. (2009) supplement the list by adding the following point:
- Problems or wrong decisions caused by the misinterpretation of indicators. It is crucial for the person evaluating indicators to possess the appropriate knowledge for this task and have the right attitude. In this context problems frequently arise when managers are not aware of how indicators are composed and on which basis they perform their calculation.

Applied to SMEs these criticisms can be evaluated as follows:

Regarding Ewert and Wagenhofer (2008) indicators will never represent all factors and interdependencies influencing a business decision. The idea behind indicators is to simplify reality and thereby facilitate the comparison of real situations. This compression will always lead to a loss of information. Indicators must therefore generally be selected in such a manner that the neglected (marginal) information is less crucial than the information gained by the indicator. Scientifically speaking, the hope of depicting all relevant issues with just one indicator appears almost absurd. It is an indicator´s nature to be focused on just one measure or a combination of measures in relation to one another. In order to depict all indicators needed by a firm's strategic management, a variety of indicators must be collected and evaluated together. This accumulation of indicators must be broad, respect interdependencies and simultaneously clear and easy to understand (Preißler, 2008).

Ewert and Wagehofer's second point of criticism can be avoided by making sure at the point of selecting an indicator, that the manager in charge will be able to influence it.

More precisely, it must be possible to influence the indicators development within an accounting period.

Ewert and Wagehofer's last two points of criticism can be neglected. Management and ownership are commonly contained within one and the same person in the type of business considered by this study[11]. Such managers are in no way interested in changing or manipulating the firm's indicators.

Schneyder's first point of criticism must be taken into consideration. The reduction of information that naturally takes place when calculating indicators demands an increase in the quality of data with which calculations are carried out. Given that such data is primarily collected by the firm's accounting department, its precision can be generally guaranteed. Data used for the strategic management of a firm will, however, be based on plans and forecasts. It must be visible to management that such indicators were not calculated on the basis of tangibly collected data. In SMEs planning and collecting strategic data will generally be done in response to a manager's business forecasts or in close coordination with management, thus ensuring awareness of the data's source.

Schneyder's second argument needs to be taken into consideration as well. It can be generally assumed that managers are interested in finding the ideal way of controlling their company and planning its future. Nonetheless, when selecting indicators for an SME's accounting system, it must be ensured that they share the same context as the business' operations. This means, issues and circumstances they represent should be as tangible as possible and their advantages easy to detect. Not just managers but leading employees too must be able to understand the sense and method of applying

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[11] According to a 2007 study by Deimel and Kraus, 72.2% of all SMEs in Germany are owner-managed.

selected indicators and need to be motivated to support their implementation. To reach this, managers must address an employee's fear of feeling observed by indicators. Indicators designed to discern error rates and process times will fundamentally always also identify alterations in employee performance. The conflict this provokes can be counteracted by closely cooperating with the employee in question at the time of evaluating indicators. This cooperation should not aim to uncover his weaknesses but rather look for ways to better promote his strengths and opportunities, be it in the form of increasing the resources in his department, providing him with additional support in the shape of extra staff or by modifying processes and procedures.

The fears Reinecke et al. (2009) identified are also significant to the context of this study. As was shown in the previous chapter, leadership of an SME sets managers a lot of different tasks. The sheer number of these highly varied tasks prevents managers from carrying out each one with as much competence as an appropriately skilled worker would. The threat of potentially misinterpreting indicators due to a lack of background knowledge must, therefore, be taken quite seriously in the context of SMEs. The threat can be avoided by treating any indicator used in the calculation of indicators rather transparently. To a certain extent, their content must certainly receive the most attention. Additionally, it must however also be possible to identify factors involved in the calculation of an indicator as well as their respective interdependencies. Only when the manager is aware of the thematic and structural composition shaping an indicator will they be able to use it appropriately and to have it serve his purposes.

The criticisms listed above and their respective evaluation lead to the conclusion that indicators must be deducted from pragmatic operational procedures and common financial transactions. This is the best way of ensuring high comprehensibility and a

close tie to reality. It means that managers must be aware of all factors influencing any individual indicator. Furthermore, they must understand in which direction such factors need to be changed if a certain result is to be achieved. This assumes that the data from which indicators are calculated is as accurate as possible.

As the literature review has shown over and over again, the ideal system of cost accounting is characterized by a compromise that is quick to grasp, does not require many resources to be implemented but at the same time has the necessary breadth to determine all data relevant to business decisions.

3.3 Expressing business goals in Indicators

The type of company's goals is the basis for selecting appropriate indicators. Making the most accurate selection will depend on the clarity with which goals are defined. A question that arises and yet remains to be answered is whether SMEs and LSEs adopt different perspectives of setting goals.

The following section starts off by sketching the development of goal-setting in the last few decades. This is followed by an analysis of various business goals and their respective differences. The resultant categorization of goals will later allow developing a system of indicators for SMEs that covers all relevant goal perspectives and thus forms the basis of a decision-based cost accounting system.

By way of introduction, potential company goals referred to in literature are collected and evaluated. This is followed by a differentiation between SME and LSE goals. Should differences emerge, this will suggest that specifications will need to be made in the field of indicators as well.

The aim of this section is to limit the scope of indicators to a relevant size before designing the research survey. Such a pre-selection bears the advantage of not overloading SME managers with too many questions and answer choices at the time of filling out the survey and prevents losing focus on truly important topics.

3.3.1 Business Management

In literature, three main functions of business management have been identified: corporate design, corporate management and corporate development (Dillerup and Stoi, 2013; Hamann, 2013).

> *"Corporate design refers to the act of creating and maintaining an institution capable of acting as a whole and fulfilling its tasks while remaining steerable and powerful (Jung, 2010, p. 165).*

Corporate control represents the function of maintaining existing structures while permanently adapting them to internal requirements and respective changes in their economic environment. (Neumann, 2014). Corporate development describes the process of continually improving a company. Its primary goal is to promote the company's ability to innovate which it will need to remain competitive in an increasingly global and dynamic environment. (Kriegesmann and Kerka, 2014).

These three functions cannot be considered in isolation since it is their interplay that brings to life the overall function of business management. The basis on which these functions can develop is a company's goal. Goals of corporate design will need to take into account the company's culture and philosophy which include general values and patterns in behaviour. Corporate control instead requires individual, concise, short- or medium-term goals. Lastly, goals of corporate development are long-term and reflect the overall development of the company (Happich and Classen, 2013).

3.3.2 The evolution of business goals

For many years business culture was characterized by economic priorities. In a publication by the "Deutsche Wissenschaftliche Hochschule für Unternehmens-führung" (WHU), Merkle affirms that

> *"The company's goal … may only invest existing or procured capital in a beneficial way. The only opportune thought is: a company must yield a long-term benefit" (Merkle, 1994, p. 29).*

Despite Merkle's statement, purely economic company goals focused on creating or maximizing profit have been at the source of much criticism since the 60's. In fact, empirical studies on economic goals conducted as much as fifty years ago already resulted in a broad range of approaches to setting business goals (Kern and Hartung, 2013).

The previously narrow focus on just one business goal has broadened in recent years. It is now common for business goals to better suit the description of a set or system of goals. By definition, this refers to multiple, interrelated goals that stem from one main goal and can be structured into intermediate and sub-goals (Amann and Petzold, 2014). The vast majority of relevant contributors to literature believe that such a broad and differentiated approach to setting goals has a major impact on both strategic and operative business operations (Hamacher et al., 2013).

The evolution of business goals from being purely profit-oriented to adopting a more holistic approach is accurately reflected upon by Macharzina and Wolf (2012):

> *"Since corporate culture emerges through the actions of all company members, the company's philosophy can be considered as something created by its members. A similar connection can be made for the setting of goals, company principles and the company's culture." (p. 241)*

3.3.3 Classical goals of business management

Business literature remains vague in regards to concrete business goals: turnover, profit, profitability, shareholder value, market position, growth, competitiveness. Next to these purely monetary goals, "Soft Facts" are increasingly gaining importance. Examples include the company's image, independence, the contribution to protecting the environment, reduction of resources used, increased customer satisfaction and a heightened awareness of social responsibility (Lippold, 2013; Ottersbach, 2013; Schmid-Gundram, 2014).

Goals generally aim to maximize goods or the potential of services. Neither individual goals nor their consequences should, however, be viewed in isolation. If for example, a business pursues the goal of increasing efficiency, it must not forget to consider the effect on interrelated goals like employee satisfaction. Should an increase in efficiency put pressure on employees, employee dissatisfaction will be a likely outcome which in turn leads to poorer quality of work? In this example, an increase of efficiency not only causes the company's work atmosphere to deteriorate, it also leads to a reduced quality of work which in turn produces finished goods of lower quality.

A system of goals must, therefore, take into consideration interdependencies and evaluate these accordingly. Managers must be aware of the dangers inherent in these relationships as well as of the fact that they cannot be fully eradicated. Compromises need to be made especially in SMEs. The ability to make the 'right' compromises will strongly depend on a manager's expertise.

3.3.4 Different business goals

The later development of a cost accounting system based on indicators that respect current needs of SMEs will be achieved by means of a survey. To avoid unnecessarily

lengthening the survey, this chapter focuses on core business areas and their respective indicators. This reduction starts off with a collection of business goals mentioned in the literature. It is followed by an evaluation of the extent to which indicators can represent these goals and whether this is at all convenient to SMEs.

Kamiske (2013) and Horbel and Weismann (2013) classification of approaches to business goals can be used as a basic framework along which further details can be discussed:

- Business Financing
- Sales Market
- Process and Material Logistics
- Human Resources and Innovation

3.3.5 Business Financing

Planning and controlling a business' finances has the highest priority in securing its existence. Although the trend of limiting oneself to indicators of financial nature has passed, their importance remains unaffected (Helmke and Uebel, 2013). When speaking of financial goals, liquidity, cash flow and profitability are still the most commonly mentioned figures. A company's liquidity determines its availability and access to cash. This allows making inferences on the company's ability to meet its obligations (Knieps, 2014). Cash flow instead describes the net inflow of cash during the period under consideration. This allows an assessing the company's financial health (Brown et al., 2013).

Profitability generally describes the relationship between a company's profit and the sum of capital invested. It provides an indication of the extent to which an investment earned the company an interest in its profit in the period under consideration (Schmid-Gundram, 2014). Achieving financial business goals is considered an indicator of

success – one of double meaning. On the one hand side, they provide a company with the direction in regards to liquidity, stability and profitability. On the other they work as "primary goals" and as such direct all sub-goals and targets which essentially exist to help a company reach its primary financial goals (Piontek, 2004).

When speaking of financial indicators, special attention must be given to the particularities of SMEs. In SMEs being able to always meet payments is just as important as securing long-term financial stability. In terms of finding sources of finance, large-scale companies have easier access to the capital market. This means SMEs are forced to run on less financial means of which, furthermore, the majority generally stems from private capital (Welge and Witt, 2013).

The most important form of equity financing in SMEs is the investment of retained earnings. SMEs may of course resort to credit financing, though it must be clear that this creates a dependency on banks and increase the costs of liquidity (Langer et al., 2013). The need for liquid assets on top of retained earnings shows that SMEs have an especially high demand for sound financial planning.

(I) Indicators to Liquidity

A company's liquidity expresses its ability and willingness to meet its obligations on time (Geyer, 2013, p. 367). The value of liquidity includes cash - referred to as "natural liquidity" or "cash ratio" (Bestmann, 2011). Good liquidity is the basis for smooth business operations. It is especially important to strictly monitor liquidity when investment decisions are being made. Liquidity is of essential importance to businesses of all sizes. However, as was revealed in the first part of the literature review, SMEs suffer from the disadvantage of having restricted access to the capital market. This means they only have a limited number of sources of finance to fall back

on, should they need short or even medium-term funding. Maintaining a healthy level of liquidity is therefore of far greater importance amongst SMEs than LSEs and must be considered a core goal by its managers (Weber and Wewer, 2013).

Problems emerge when trying relating liquidity to indicators since liquidity is barely predictable. It can generally not be foretold when a customer will make his payment. Customers are granted time to make their payment. Strong bonds and personal relationships to customers, as is usual in SMEs, often stand in contradiction to a strict policy of debt collection. The ability to pay obligations depends on the punctuality with which outstanding payments are received. In literature are listed many figures in terms of liquidity, only a few are suitable for SMEs (Schmidlin, 2013; Amann and Petzold, 2014), thus financial accounting and a daily view of the bank account provide SME managers with plenty of information they can access on a daily basis, without having to rely on their own indicator calculations.

Hahn (2014) suggests planning one's liquidity before making an investment because, when making an investment, one's attention is set on the long-term and the exact timing of short-term cash flows automatically receives less consideration.

Ratios of financing are generally of little help for internal use in SMEs. The different types of liquidity only play a significant role in regards to external funding (Dethlefs, 1997).

(II) Cash flow indicators

Liquidity ratios are used to monitor an SME's external funding. They do not, however, provide an evaluation of funds generated by the SME itself. This is where cash flow ratios come in handy (Steiner et al., 2014). The formula for calculating a firm's Cash Flow is being continually developed so as to always include all relevant facts.

Based on the current state of research it is recommended to use the following formula developed by Wöhe et al. (2013):

Formula 3.1: Cash Flow

Cash Flow
Net Earnings +/-Build / appropriate reserves +/- Build / appropriate provisions that do not lead to long-term expenditure or revenue - Depreciation

Determining a company's Cash Flow means to be able to assess its financing potential, its force of growth, potential to distribute profit (or, retained earnings) and its ability to pay back debts (Schmidlin, 2013). Combining the Cash Flow to other performance indicators allows deriving even more metrics of use to an SME. Linking the Cash Flow to the firm's turnover (Cash flow/turnover * 100) has the advantage of reflecting the direct relationship between turnover and profit. According to Baumann and Reber (2011), this important indicator should be regularly calculated and evaluated.

Gehrig (2013) suggests Free Cash Flow as a further approach to measuring Cash Flow. This is obtained by the difference between operating Cash Flow (Cash Flow from operations) and investment Cash Flow (Cash Flow from investment activities). Gehrig defines Free Cash Flow as follows:

> *"Free Cash Flow, the royal ratio for SMEs is a key parameter for investments and financing decisions in small and medium enterprises (SME). When consulting SMEs it is important to adapt, apply and interpret this ratio according to the specific characteristics of the SME in question"* (Gehrig, 2013, p. 94).

However, viewed in isolation, the Free Cash Flow contains the flaw of just reaching limited or one-sided conclusions about the firm's profitability (Lukas and Rapp, 2013).

Even in a booming economy with growing turnover, businesses may only reach low levels of Cashflow if, during this time, they invest in new products or product developments. As soon as these products are brought to market and a business' R&D costs are reduced, Cash Flow will increase. This does not, however, allow an assessment of profitability. Cash Flow is an important and valuable indicator; it is however not recommended to make it the sole object of one's attention.

(III) Indicators of profitability

Profitability is the main goal of any economic enterprise (Hoffmann, 2012; Becker, 2011). To ensure the existence of a business, aside from maintaining its liquidity, it must also run profitably. Profitability is considered as the ability to cover or exceed operating costs through revenue (Arndt, 2013). A business needs to be profitable at least in the middle to long-term. This does not mean just covering costs but also counteracting currency depreciation. A business' profitability must ensure that capital investment returns better interest rates that an average investment in the financing sector would (Jung; 2010). By now a variety of ratios available to calculate capital profitability is incredibly broad (Weber and Schäfer, 2014).

Indicators of profitability include both Earnings before Interest and Tax (EBIT) and the Return on Investment (ROI). Indicators of profitability create a relationship between measures of success (e.g. profit) and input (e.g. capital invested). The ratio of profit to capital invested (ROI) provides insight on how much profit was yielded by which amount of capital invested (Steiner et al., 2014). Indicators of profitability depict success from past periods and provide data for reliable future predictions. A number of empirical studies confirm that indicators of profitability are relevant to a company's value and can be used to calculate it (Lukas and Rapp, 2013).

Indicators of profitability can be influenced by changing the measure of the success of the input. This exactly expresses the danger of this indicator. In principle, the aim is to increase it by increasing the measure of success (Belohuby, 2014). However, this effect can also be reached by decreasing the input. This creates the risk of neglecting necessary investment to R&D or further business plants. Limiting this sort of investment would indeed increase profitability, though it would also reduce the company's chances of success.

On the whole, a positive conclusion can be drawn from a financing perspective for the ratios described above despite there being legitimate evidence of misinterpretation. Liquidity can be determined by the business' accounting department without needing a ratio. Profitability and Cash Flow lead to useful and valid results when used in combination - as results from the examples of EBIT and Free Cash Flow. The EBIT margin provides an overview of the macroeconomic situation, unaffected by project-related cash flow. Free Cash Flow instead places its attention on actual earnings which prevent exploiting leeways in fiscal policy (Lukas and Rapp, 2013).

3.3.6 Sales Market

A number of strategic goals can be followed in the business' market environment. Primarily, the aim is to position one's business and to determine or describe its target group. This goes hand in hand with a definition of the specific benefits - the core value - a business can offer its target audience (Horváth & Partner, 2000).

Determining target customers and a target market sets the economic framework in which the business must operate in order to be competitive. A business' success is directly dependent on its sales, which is why controlling business operations are

absolutely necessary (Fiedler and Gräf, 2012). In the context of SMEs, Dethlefts (1997) recommends using indicators to assess the way sales, customers and channels of distribution are developing.

(I) Sales indicators

The core function of a sales department is to distribute and sell products or services. This includes tasks of advertising, customer support, shipping products, administrative maintenance and distribution. An SME's market is generally a niche market for individual products which is not being catered for by LSEs. An SME's limited resources are the reason why such enterprises tend to target highly specified customer audiences (Bürkle, 2012). Despite this concentration on niches, SMEs are usually able to acquire large market shares nonetheless. SMEs provide small target audiences with a narrow but highly tailored ranges of products, that are with great know how (Gelbmann et al., 2013).

This major niche-policy common amongst SMEs needs to be taken into account when selecting indicators.

The high degree of specialization in a narrow SME market can lead to high storage costs and thus, a high commitment of capital. It is, therefore, necessary to be able to access reliable information on market developments in order to optimize production and procurement. Calculating trends is a popular approach even though it is dependent on a number of unpredictable factors. Linear or logical trend equations suggested by literature are of little use to SMEs and can therefore not be recommended. SMEs should rather revert to expectations and anticipations of their sales team and customers (Brandt, 2013; Dethlefs, 1997).

Concrete figures can be provided by the order backlog structure (order backlog of product X / total backlog x 100) or the ordered development (ratio of the backlog of different periods). Together with the statement of operations, these indicators are amongst the most important tools for tracking success (Dethlefs, 1997).

(II) Customer and Distribution Indicators

In the current context of the saturated market, soft facts, that is, facts that are hard to express in exact quantitative figures, are starting to play an increasingly important role in a business' view of customer relations. This primarily concerns customer satisfaction. The formal goal of measuring customer satisfaction needs to be made more specific which can be done by evaluating the ratio between (new) customers won, (old) customer lost. Alongside this, one may also take into consideration frequency of complaints or the average duration of a customer's relationship to the business (Bagusat, 2006).

The narrowly limited customer base common to SMEs allows meeting individual customer needs which indeed is an SME's primary way of securing its existence (Tran; 2010). Making use of indicators in the area of customer relations allows a systematic approach and provides the business with direct information on the success of its sales (Dethlefs, 1997).

SMEs are recommended to use indicators to monitor markets, product quality/distribution reliability, customer loyalty, pricing and distribution (Taschner, 2012; Borchert et al., 2011).

It is particularly important for SMEs positioned in clearly defined and narrowly limited markets, to have a good in-depth knowledge of their market situation. An accurate overview of the own market share and regional distribution of orders can provide

valuable signals for the control of advertising and sales. The quality of products and reliable deliveries are especially important in the SME sector where individual service characteristics can influence purchasing decisions more strongly than affordable prices. Managing and controlling these business activities via indicators, therefore, has a direct impact on the SMEs long-term success (Wagner and Zacharnik, 2005).

When pricing a product, particular attention must be paid to an SME's specific requirements. Since price is often not the decisive factor in a customer's purchasing decision, profit margins should be calculated. SME managers should furthermore be aware of the relationship between discounts granted and the increase in sales that would be needed to reach the same result (Dethlefs, 1997). Sales, or its individual aspects (staff, travel and/or advertising costs), should be regularly evaluated in relation to the revenue they brought in. This allows comparing the success of sales and the efficiency of means used in any given period of observation (Dietzel, 2013).

3.3.7 Processes and Material Logistics

Material logistics covers all processes between sourcing materials and their final improvement. Material costs and capital tied up in stock are particularly relevant in SMEs (Schön, 2012).

The importance of indicators for an efficient management of materials becomes evident when looking at the extent to which the cost of materials contributes to profit:

Formula 3.2: Profit contribution

Profit contribution through a decrease in material costs in %
$$\frac{C_M * CR_M}{R_S}$$ C_M = share of material costs in sales in % CR_M = reduction of material costs in % R_S = return on sales in % (profit / turnover x 100)

Source: *Preißler (2008)*

Consider, for example, a ROI of 4% at a 50% contribution of material costs to turnover. In this case, reducing the cost of material by just 2% would lead to a 25% increase in profit. This example illustrates the influence consistent control and management of stock can have on overall business results. This is particularly important in light of the fact that similar results are difficult to reach by increasing sales.

In terms of production, an SME's strength is clearly its ability to quickly react to market changes. Its specialization in niche markets and the cost-efficient production of small-batches or individual products are further strengths (Dethlefs, 1997). Productivity expresses the relationship between resources used in production and the resulting output (Hofstadler, 2014). Increasing productivity has become an essential discipline in SMEs pushed by an increase in competitive pressure and higher labour costs in less and less mechanized SMEs.

Indicators of production are not easy to implement in SMEs due to the high versatility of products and their small numbers which makes comparisons difficult (Dethlefs, 1997). Such indicators are nonetheless useful in measuring the effect of rationalization measures. Still, it should be decided from case to case whether to use these indicators or not. There are too many influences to use them for settings of the target value.

Another area that indicators can be used in is the control of production, specifically in regards to the duration of a production cycle and the adherence to deadlines.

3.3.8 Human Resources and Innovation

The three previous perspectives highlighted the way in which a company needs to deliver its products and services in order to stay competitive in an economic environment. Instead, the following employee perspective focusses on the personnel structure required to run operations competitively.

The human resources and innovation perspective receives a special role. While financial, customer and process-oriented goals interlock and are planned across a similar time span, the personnel perspective adds a dimension that does not follow the sole purpose of maximization. Personnel goals can indirectly aim in a different direction since, alongside measurable variables such as the productivity of individual employees or groups, they also aim for "Soft Facts" such as employee satisfaction and employee loyalty (Paul, 2014; Schreiber et al., 2012).

Innovation belongs to the Human Resource perspective since it is a direct derivative of employees' actions and innovations. This perspective includes product innovations and improvements of internal processes and employee working conditions (Winter, 2014; Peritsch and Lercher, 2014).

External goals are based on formal financial goals. The expansion into new markets and market penetrations is supported by marketing and sales but also by innovations in product or service. On top of economic goals, internal innovations can aim for more sustainable and environmentally friendly production processes or process

improvements. Training and qualifying employees is another measure of internal innovation. (Schmitt et al., 2011; Bolz, 2013).

When considering the Human Resource and Innovation perspective, great differences emerge from the comparison between SMEs and LSEs. The personal relationship between company managers and employees typical in SMEs cannot be realized in larger companies. It is not uncommon for the manager of a small-scale company to take a daily tour of his business and exchange a couple of words with employees (Cecia and Lubattib, 2012). This allows him to respond far more quickly and effectively to employee concerns. The regular and personal contact with his employees also helps him recognize mood changes at an early stage and to counteract them swiftly. Similar effects occur in regards to an employee's desire or need for further training or promotion. The benefits of a personal relationship between managers and employees must not, however, obscure the fact that this area too, requires clearly formulated goals. Employees of SMEs have an impressive know-how seeing how they are responsible for a broad range of tasks. This means it is far harder to compensate for employees that leave an SME than in the frequent personnel fluctuations common to LSEs. Considering the increasing shortage of skilled workers, it is predicted that this problem will worsen in the future, creating an additional challenge for SMEs (Siegert et al., 2013; Loebe and Severing, 2013).

The setting, implementing and controlling business goals is crucial to the success of a company. As has been demonstrated, SMEs reveal particularities even at the time of setting goals. Four different approaches to setting goals were identified. It was particularly important to determine whether these different perspectives could be supported through indicators. Indeed this holds true for each perspective which

highlights the importance and suitability of indicators. The survey will purposefully pick out topics from all four perspectives and query their importance for managers. This will allow determining which indicators are actually relevant in SMEs.

3.4 Different Indicator Systems

Used individually, indicators bear the advantage of representing facts and circumstances in a clear and concise manner. Relevant literature, however, criticizes such a one-sided application. Using indicators individually does not allow accurate representations of economic reality including its complex interdependencies – doing so requires the combination of indicators. Business developments with positive effects on one indicator might indeed affect a different indicator negatively (Weber, 2012; Leyh and Neumann, 2012). Using indicators in isolation prevents or strongly limits the necessary coordination with overall strategic goals (Reinecke et al., 2009).

The risk of reaching incorrect decisions through the use of isolated indicators can be counteracted by resorting to a system of indicators. In literature, this risk has been known since 1927 when Schmaltz demanded a well-organized system of interrelated Indicators.

A system of indicators encompasses a number of elements that stand in close relation to one another. Its main reason for application is to avoid inconsistencies in the interpretation of individual indicators. Moreover, it expresses the dependencies between individual indicators (Meyer, 2011). Its ability to depict relationships and interdependencies allows for it to be used in matters of business planning, management and monitoring (Nagl, 2014; Brexendorf and Tomczak, 2011).

The following sections introduce a number of indicator systems and discuss their respective relevance. This is followed by an evaluation of the system's aptness at

providing the core business tasks of planning, management and monitoring with necessary data.

3.4.1 Introduction of various systems of Indicators

"A system of indicators is generally understood as a compilation of qualitative variables in which individual performance indicators are held together by a relationship objectively judged as reasonable. They complement or explain one another and are generally aligned to the same overall goal" (Reichmann, 2001, p. 23).

This definition combines several major characteristics. The system must be composed of indicators that share the same context and whose combined effect is greater than the sum of individual results, giving some indication of the overall economic situation (Menze, 2013).

Following Becker (2007) the central characteristics of an indicator system can be summarized as follows:

- Indicator systems must be tailored to clearly defined goals
- The facts and circumstances that are analyzed must be relevant to business operations and largely quantifiable
- The complexity and interdependences of the circumstances at hand can only be expressed through a system of indicators. An evaluation based on individual indicators would not be sufficient.

Literature divides indicator systems into classification systems and systems of computation. Systems of computation have the advantage of generating clear statements and depicting the relationship between individual indicators. Their pyramid-like structure follows a hierarchy of mathematical relations. Indicators at the top of this pyramid are of overriding importance, such as business profit or ROI (Return on Investment). The decisive disadvantage is that Soft Facts which cannot be recorded in quantitative terms will not be considered (Pape, 2012).

Classification systems of organization are composed of indicators that answer the same question. A mathematical relationship between the indicators is not mandatory. Indicators are systematically sorted into groups, connected by business circumstances. The lack of mathematical logic holding the system together creates the need for a separate analysis of interdependencies. This must be treated with particular priority since the lack of hierarchy of this system prevents the identification of one overarching indicator (Brecht, 2012).

3.4.2 Indicator systems for core tasks of management accounting

(I) Indicators and Indicator systems for the core task of planning

Planning requires making decisions. In a business context, management decisions generally affect either the entire company or at least parts of it. For a full overview of the facts and circumstances involved in a decision, it is helpful to make use of indicators as they generously compress large quantities of data. To organize the indicators and depict the interdependencies between the individual decision sequences, the indicators must be placed in a logical relationship (Werner, 2013; Buchholz, 2012).

A business decision is generally preceded by a problem and a problem statement. Indicators are early indicators of existing or potential problems. The quantification of problems – which to some extent can be reached through indicators – combined with the ability of indicators to make comparisons with previous periods support the formulation of a clear problem statement and the introduction of appropriate measures. The same applies to setting a goal and identifying alternative methods of reaching them. Indicators are crucial in the evaluation of such alternative courses of action,

especially when the subject of interest is a prediction of their further development (Lukas and Rapp, 2013).

To reach the aspiration level of planned goals with indicators it needs measurable data. For indicators to be as valuable as well formulated and carefully planned goals or targets they require. Such data allows for business controlling to be based on verifiable facts and forecasts rather than on a manager's instinct, as often happens to be the case in SMEs. Indicators are ideally suited to help formulate targets. This applies, for example, to targets of profitability but also to the area of ratios.

In relation to the quantification reached through indicators, Horváth (2011) used the term operationalization, that is, the characteristic of quantitatively formulating terms and concepts. Goals are thus considered operationalized when they are expressed in an understandable manner and can be quantitatively measured. These requirements are met each time indicators are used, which supports their suitability in tasks of planning:

> *"As long as a business' overarching goal and its individual components can be quantified, indicators are suitable to factually rendering circumstances at almost every stage of business planning. Goals of higher yields or growth can be expressed directly by indicators. Other goals such as for example the ability to pay obligations can only be expressed indirectly with indicators"* (Dethlefs, 1997, p. 30)

The process of identifying a problem and searching for solutions requires data which allows grasping an overall impression of the relationships and interdependencies involved. In this, indicators compress the data to a manageable level and help display all possible situations. Indicators allow for a quantitative comparison of alternative strategies. The ability of indicators to clarify the consequences of different alternatives allows for these alternatives to be classified in order of importance, which makes it

considerably easier to reach a decision. The consequences to each alternative can be replicated by changing the input figures of an indicator. This leads to comprehensible decisions that are easy to communicate (Rachfall and Rachfall, 2013).

Compared to large-scale companies, tasks of business planning are readily manageable in SMEs. The characterization of SME managers in chapter 2 illustrated that they are generally forced to make decisions based on their experience and that due to a lack of time they are frequently forced to improvise. No system of indicators will be able to replace such experience and industry-related knowledge. Instead, its main role should be that of helping managers verify and confirm plans they made intuitively by evaluating them according to facts and figures. In this process, a meaningful though concise system of indicators can be perfectly tailored to SME tasks of business planning (Dethlefs, 1997).

(II) Indicators and Indicator systems for the core task of managing

The problem of analysis and planning follows the implementation of the chosen strategy through various actions. As has been shown so far in the Literature Review, there is a need to support the steering and coordination of individual actions in the respective subsectors of the company due to limited resources in SMEs.

Indicators and indicator systems contribute to this by projecting useful targets for sub-goals and corporate management. According to Fresow (2013) indicators play a double role in this.

On the one hand side, they act as carriers for the transmission of quantitative facts. On the other hand, they allow formulating sub-goals by breaking down company-wide goals to smaller goals appropriate to individual business areas. In doing so, it must be ensured that the indicators of sub-goals only contain input figures which the respective

addresses can actually influence. Indicators influenced positively by positive performance are particularly well suited to appeal to the motivation of individual employees.

The biggest challenge in the context of managing via indicators is the determination of appropriate target values. This can be approached in three different ways (Arnolds et al., 2013; Gladen, 2011):

- Comparisons of time: facts from different periods are compared to one another. Their average determines the target
- Company comparisons: Indicators from companies in identical industries are used as a basis on which to construct target values for one's own company
- Deriving goals from target values: target values are deducted directly from overarching company goals.

Comparisons of time have the disadvantage that figures from past periods that do not issue any information on their quality. Furthermore, the previous section went to show that business planning and the setting of goals emerge from the identification of a present problem whose origin generally lies in the past. Values from these periods will thus not be suitable as target values.

Company comparisons are not feasible in SMEs (Langer and Seufert, 2012). Gaining access to indicators or relevant financial information of competitors is generally not possible; neither when it is specifically asked for. Access is merely granted to general industry indicators which are however too general to deduct individual target values for the core tasks of planning and management (Deffner, 2011). SME targets can thus essentially only be derived from overarching company goals in a process based on experience and forecasts.

Target values must motivate individual managers to reach higher levels of performance without demotivating them by setting unreachable goals. Formulating these targets must stem from a mix of indicator-based information and prediction or experience. The practical implementation of business goals follows a number of subjective decisions made by management on a daily basis. The impact of this subjectivity is lessened by the outstanding market knowledge managers of SMEs tend to possess (Stütz, 2011).

Alongside subjective experience, indicators also play a central part in supporting managerial tasks in an SME. Managers can extract important data from them which they can use to quantitatively verify predictions based on experience. The outcome of such a comparison aids managers in setting realistic targets.

(III) Indicators and Indicator systems for monitoring

The successful implementation of measures through targets can be met requires a system that allows comparisons between target values and actual values. This function distinguishes between a strategic and operative monitoring. Strategic monitoring tests the appropriateness of a chosen strategy; operative monitoring instead monitors the progress of implemented measures (Amann and Petzold, 2014; Krupp, 2013). Management can only derive meaningful information on the success of measures when both sorts of monitoring are combined. This allows them, for example, to identify whether and to what extent measures need to be modified or expanded in order for the overall goals to be reached (Jung, 2007).

The core task of monitoring managerial activities is made up of four steps as described by Dillerup and Stoi (2013; Bea and Haas (2012),

- Determining the present situation
- Comparing actual results to target levels

- Analyzing deviances between targeted and actual outcomes
- Initiating correction measures.

Efficient monitoring relies on an exact comparison between a targeted and an actual outcome level. Setting target values will always constitute the basis of such a comparison. When actual outcome levels correspond to the target or lie within an area of tolerance, no further measures need to be introduced in the current control situation. Should the deviance between actual and target levels, however, lie beyond a certain level of tolerance, indicators can be used both to visualize the deviance as well as to investigate its cause (Dethlefs, 1997).

When deviances occur, following measures should be initiated. Firstly, responsible managers must be prompted to change variables that influence the successful accomplishment of predetermined targets and to adjust business operations in this direction. Secondly, the targets themselves must be examined in regards to their quantitative sizing (Bayer and Kühn, 2013).

Indicators are indispensable tools especially in the function of controlling seeing as they reduce quantifiable facts to comprehensible levels and thus offer an ideal basis for target-performance comparisons.

The combination of the three core business functions (planning, management and monitoring) with indicators and systems of indicators has led to consistently positive results. Certainly, all three areas are shaped more strongly by the personality of a manager or leader in an SME than in larger companies. However, indicators allow generating valuable information in each of the core business functions. They also allow visualizing relationships, something which until then, relied on experience and estimation.

3.4.3 Different indicators systems

Before developing a system of indicators which is tailored to the specific requirements of managerial tasks in SMEs, an analysis of current systems must be made. Individual indicators and their logical connections to one another are treated extensively in the relevant literature. There is sufficient evidence for the impact a meaningful system of indicators has on a company's economic success (see section 3.2). The following section introduces popular, well-established systems of indicators by briefly describing each concept's general idea and drawing comparisons to other systems. The individual analysis of these systems aims to give some indication of their functioning and practicability. The analysis places particular emphasis on whether they are suited to meet needs and requirements of SMEs that emerged in chapter 2.

All management decisions must take into consideration the principle of economic efficiency, a principle that applies just as much to the selection of an existing system of indicators as well as to the development of an individual one. The level of detail and the individual indicators that are chosen to be included in a system of indicators will depend on the company's goals, size and respective industry. Fundamentally it can be stated that as a company increases in size and complexity, its system of indicators will include a larger number of indicators and be more detailed in its structure (Schmid-Gundram, 2014). The development of a new system of indicators is thus preceded by the economic imperative of examining the suitability of existing and established systems.

Amongst the many scientifically developed systems, the following four were particularly successful in establishing themselves in German business practice (Brecht, 2012, Becker et al., 2011, Krüger, 2011):

- - Du Pont System of indicators
- - RL System of indicators
- -Balanced Scorecard
- - ZVEI System of indicators

(I) Du Pont System of Indicators

The Du Pont System of indicators is one of the oldest, most well-known systems of indicators developed in 1919 by the American chemical company E.I. Du Pont de Nemours and Company. It served as the basis for the development of a number of similar systems such as the "Pyramid Structure of Ratios" or the "Tableau de bord" (Yadav, 2013).

The Du Pont System is an accounting tool of computation introduced for the control and supervision of companies which has been continuously developed. It is based on the assumption that a company's primary goal is not the maximization of profits but the increase of return on investment (ROI) (Krumwiede et al., 2013). The Du Pont system establishes a relationship between aspects of accounting, financing and cost-efficiency. It is simple to understand and is limited to a few indicators. A firm's ROI is calculated by the return on sales x asset turnover. It can thus be increased by reducing costs produced by the income structure or by increasing the capital turnover on the asset side (Heesen, 2011).

Held together by the top-level indicator (ROI) the Du Pont System is split into two strands of indicators.

Figure 3.1: Du Pont System
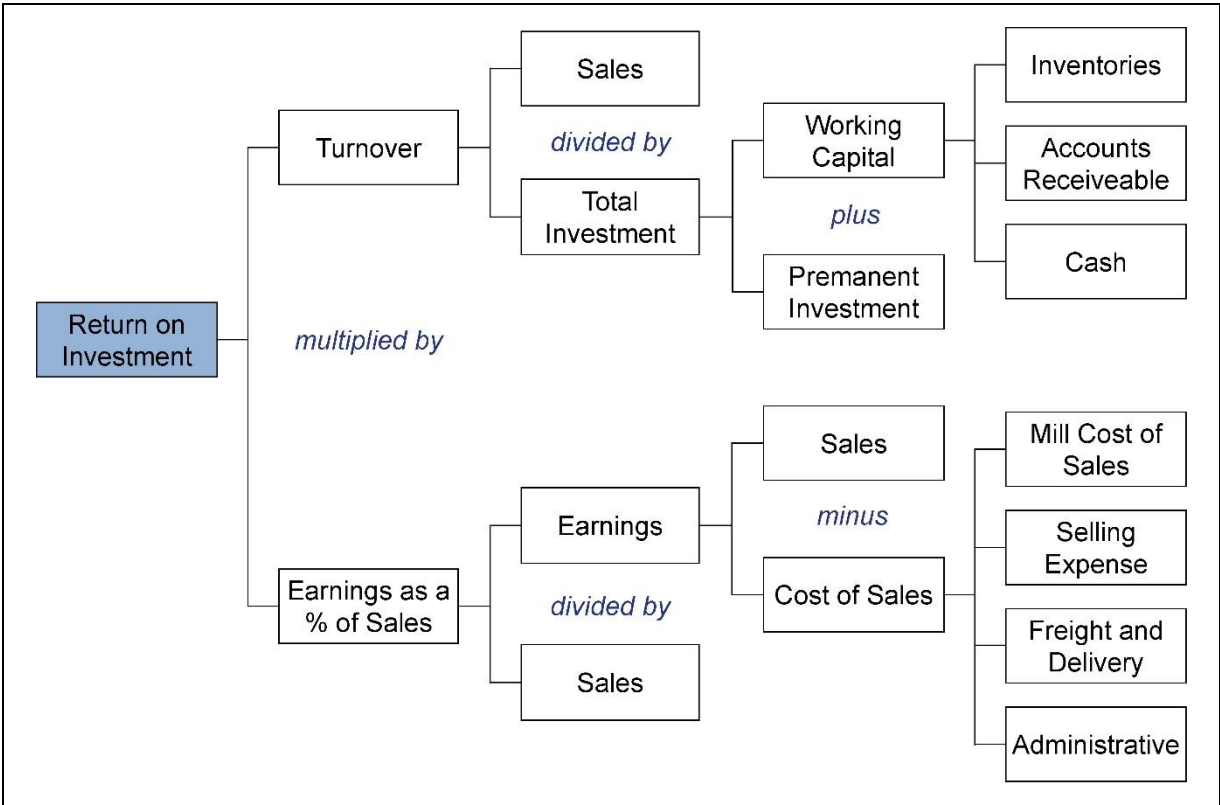
Source: *Johnson and Kaplan (1991), p. 85*

The indicators on one side, are influenced mainly by a firm's profit. Those on the other side instead place emphasis on fixed and current assets. This simple structure, reduced to just the most necessary factors, is clear and easy to grasp – a major benefit when applied to SMEs. An accurate analysis of the system's top-level indicator is furthermore complicated by the mutual influence of both indicator strands. This means that sources of change in a company's ROI cannot be identified at first glance. An equally critical situation is that of an unchanged ROI which implies constant values and thus no need for deeper analysis. Opposite trends in both strands can, however, lead to compensation in the top-level indicator (Horváth, 2006).

The Du Pont System is considered as a tool for external analysis and works with a cost-on-sales method. This is where the first difficulties appear: the cost of sales

method requires far more effort than the alternative aggregate cost method, predominantly used in Germany (Buchholz, 2013).[12]

The restriction to just a few indicators connected by mathematical relations makes it furthermore difficult to use this system for tasks of planning. A further disadvantage of the system is the ROIs inability to accurately reflect a firm's commercial reality and its focus on short-term success. Postponing investment in fixed assets leads to short-term increases in profitability but bears high risks in the long run (Herzberger, 2015)

(II) RL System of Indicators

The top-level indicators of the RL-System are profitability and liquidity which are treated in a general and a special section respectively. The general section includes indicators that are valid for all types of company. It can be separated into the areas of profitability and liquidity. The same separation is valid for the special section which is tailored to individual companies and their respective needs for accurate analyses (Lachnit and Müller, 2012).

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[12] In the aggregate cost method the income value corresponds to the company's overall performance. All expenses in one period are compared with one another. Instead the cost of sales method compares sales revenues with the cost (cost price) of services sold in the period (Wöltje; 2013).

Figure 3.2: RL System of Indicators
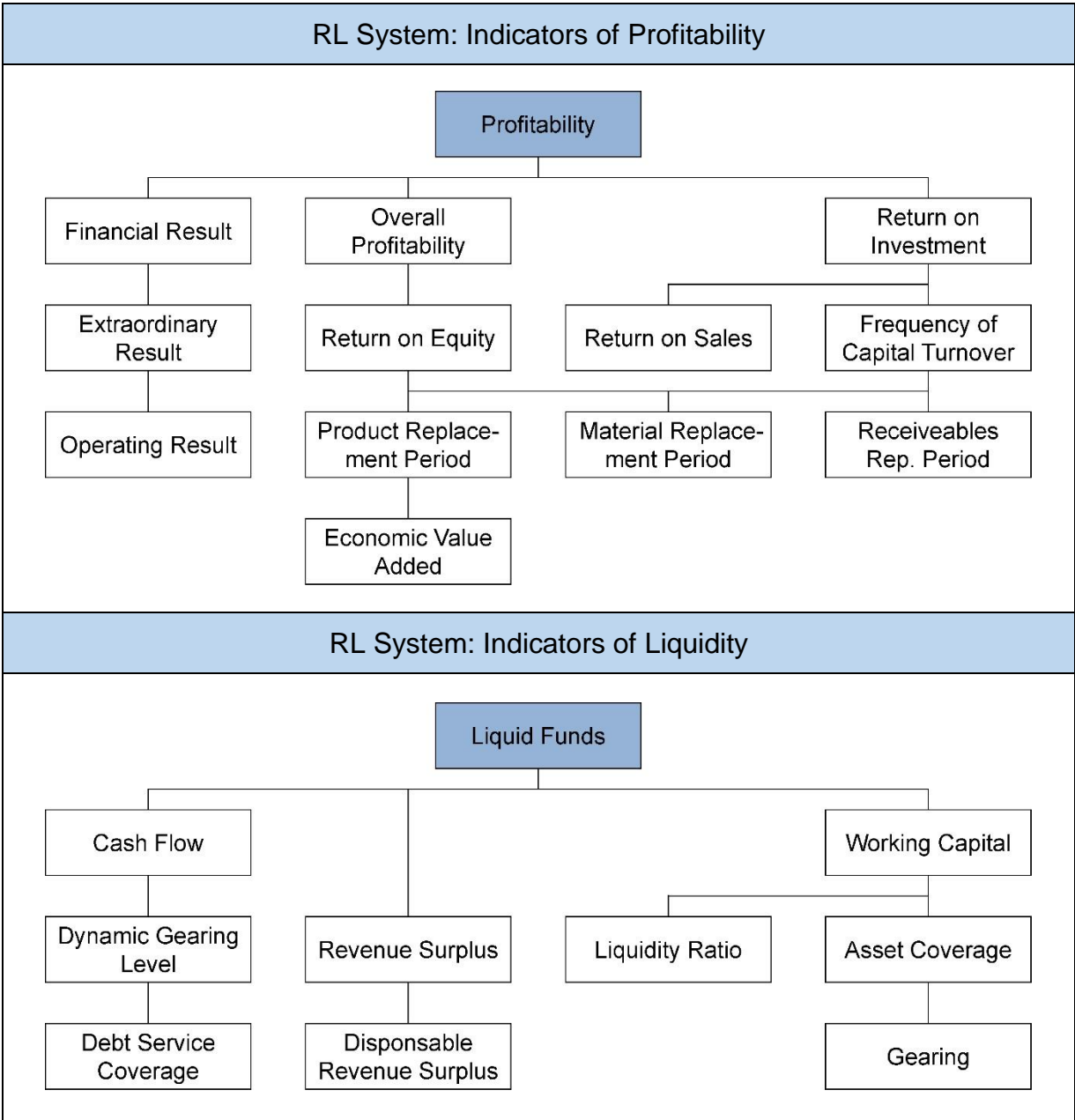
Source: *Lachnit and Müller (2012), p. 297*

The RL System of indicators is a system of an organization whose individual indicators do not stand in a mathematical relation to one another. Their organization does not follow mathematical but logical rules (Brecht, 2012). This organization draws mainly on information sourced from the business' accounting department. Given its relatively small number of indicators, it is fairly easy to introduce and implement this system into

daily business operations. Its special section allows catering to company-specific needs.

The system's basic idea is to depict the relationship between profit and liquidity. A company's profit mirrors the control over company goals while liquidity ensures the long-term survival of the company (Steger, 2014).

Profitability indicators from the first (general) section refer to the ordinary result which can be controlled by return on equity, overall profitability, return on sales, return on investment and the frequency of capital turnover. Dethlefs (1997) does not recommend including these indicators in a system of indicators tailored to SMEs. Monitoring a company's ongoing success should be done by means of the operating result rather than by the indicators mentioned above. He furthermore points out that the frequency of capital turnover is an unsuitable indicator for this task due to the numerous ways it can be influenced.

Liquidity indicators of the first (general) section monitor the existence of sufficient liquid assets. This can be reached by calculating cash flow and working capital. In regards to SMEs Dethlefs criticizes these values, too. The RL-System requires all figures to be collected on a monthly basis which makes little sense when calculating cash flow. Working capital as a control parameter is superfluous since its main area of application is that of external financing.

Overall, it can be stated that a monthly survey of liquid assets is not sufficient for a company's operational reality. Instead, liquid assets need to be collected and surveyed from day to day. The design of this system's special section and the indicators included within allow making useful conclusions on SMEs.

Given the difficulties mentioned above, the RL System of indicators is not entirely suitable to be implemented in SMEs.

However, the idea of splitting the system into a fixed section - composed of the more basic indicators - and a special section - which can be freely composed of any indicators deemed necessary - appeals as strongly attractive. Even if this exceeds the responsible manager's abilities, a system that includes all necessary basic indicators of planning, managing and controlling will nonetheless be created. Company-specific indicators can be added at a later stage.

(III) Balanced Scorecard (BSC)

> *"The Balanced Scorecard … puts strategy and vision, not control, at the centre. It established goals but assumed that people will adopt whatever behaviours and take whatever actions are necessary to arrive at those goals. The measures are designed to pull people toward the overall vision … The balanced scorecard keeps companies looking – and moving – forward instead of backwards" (Kaplan and Norton, 1992, p. 79)*

The BSC helps users quickly reach decisions suitable to the relevant goals and strategies. The underlying idea consists of different perspectives of performance assessment: the customer perspective, internal business perspective, innovation and learning perspective as well as the financial perspective. These perspectives allow deriving concepts for the control and leadership of the company or individual business units. Alongside financial parameters, which primarily reflect past events, future-oriented parameters that aid, for example, the estimation of growth opportunities are also included. The BSC is designed according to strategic considerations. The scope and specifications of indicators involved are aligned with the company's strategic planning (Jost, 2013).

Figure 3.3: Balanced Scorecard

Financial Perspective	
Goals	Measures
Maximize value at least cost	Cost to spend ratio
Maximize cost savings	Purchasing influenced savings
Timely payments	Delinquent payment penalties
Maximize productivity	Ratios

Customer Perspective	
Goals	Measures
Timeliness	On time delivery as defined by the customer
Quality	Quality of the service and product as defined by the customer
Service and partnership	Responsiveness as defined by the customer

Internal Business Perspective	
Goals	Measures
Acquisition Excellence	Assessment of internal quality system
Accurate, timely and effective data collection	Assessment of management information system

Learning and Growth Perspective	
Goals	Measures
Meet present mission goals	Self-assessment for continuous improvement
Meet future mission goals	Self-assessment for strategical and tactical planning

Source: *adapted from Kaplan and Norton 1996; p. 182*

The Financial Perspective includes indicators that are relevant to business owners or shareholders. This includes cash flow and the company value. These indicators are used to evaluate the current business situation and therefore belong to the most important measures of business outcomes. Based on specific financial indicators, managers can determine whether a certain strategy pays off in monetary terms.

The Customer Perspective reveals product or service that features the customer desires in terms of indicators. Such features include quality, time, price and facilities and are further broken down into indices of customer satisfaction and customer

profitability. In order to meet the market's requirements, the Internal Business Perspective combines all internal business processes. In doing so, the main focus should fall on those indicators that represent processes which primarily contribute to satisfying customers' wants and wishes. This includes quality standards and price targets.

The Innovation and Learning Perspective is aimed at internal processes. Unlike the Internal Business Perspective the Innovation and Learning Perspective places future perspectives in the foreground. It combines indicators that set benchmarks for product and process innovations as well as initiate and supervise employees and individual processes (Gleich, 2011).

There are no default indicators in the BSC. These four perspectives rather specify a system of order in which the indicators can be assigned. In order to develop a BSC, Kaplan and Norton suggest the following four steps:

1. As part of the "Management" step, clear business strategies and visions must be formulated
2. Strategies and Visions must be communicated and goals must be further specified
3. As part of the "Business Planning" step, which includes the application of indicators, resources must be allocated in such a way that they provide the best possible support for the overall strategic process.
4. The last step, "Feedback and Learning", requires a reflection on the goals reached and a comparison between target and actual indicators. This occurs both on a financial and non-financial basis thus ensuring a holistic approach to implementing strategic goals (Kaplan and Norton, 1996).

(IV) ZVEI System of Indicators

The ZVEI System of indicators is particularly common in Germany. It was developed by the "Zentralverband der elektrotechnischen Industrie e.V." in 1969. It was adapted to the new financial reporting standards of the German Accounting Directives Act in

1989. Aside from legal adaptations, this upgrade also prompted the inclusion of further indicators, enlarging the system from originally 140 to 208 indicators (broken down into 87 main indicators and 121 support Indicators). The purpose of support indicators is to provide orientation, justifying the reduced significance of their assertions (Deimel et al., 2013). Indicators used are industry-neutral, thus allowing a transferal to other industries.

In terms of its structure, the ZVEI-System is a system of calculation which exhibits sets of indicators held together by logic – comparable to a classification system– alongside such sets bound together by computational ties.

Figure 3.4: ZVEI Indicator System
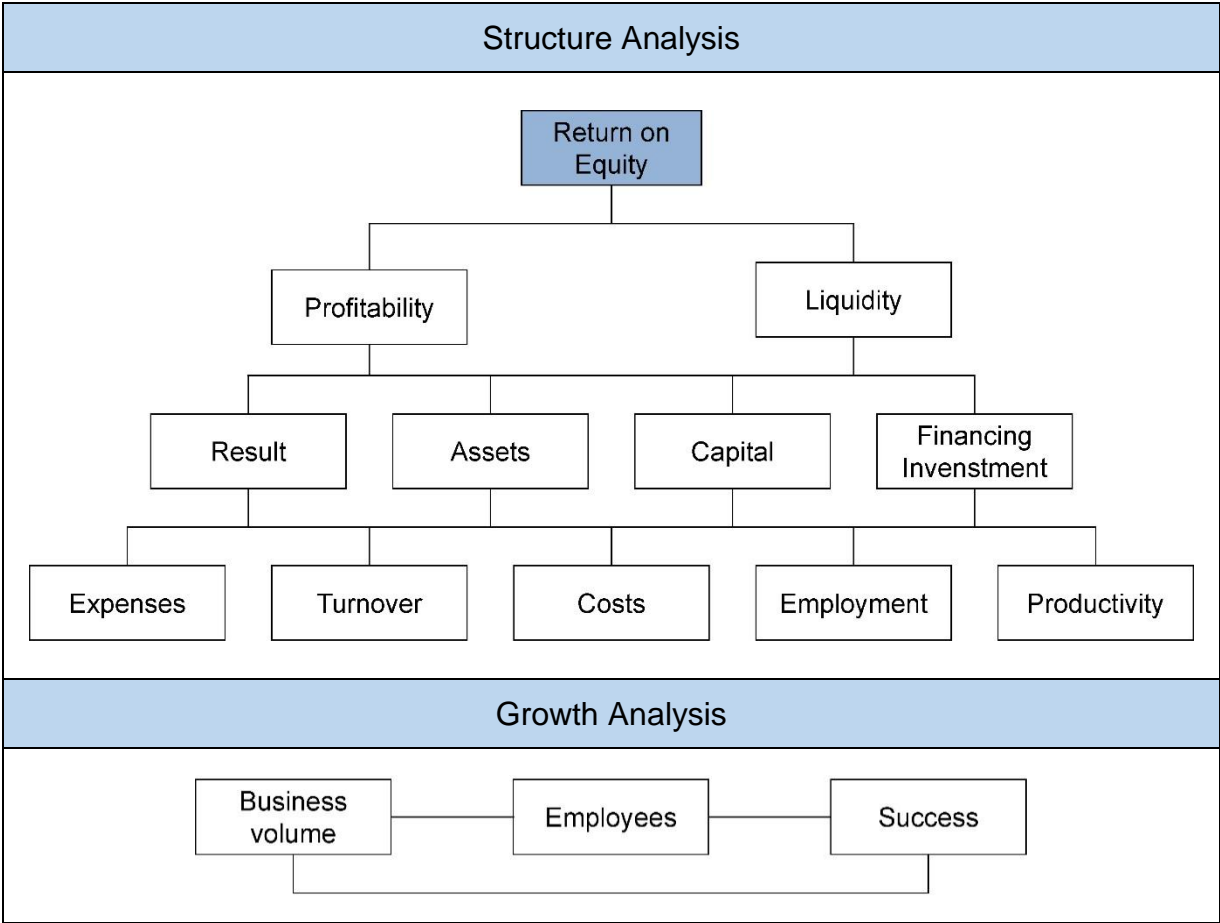
Source: Preißler; 2008; p. 52

130

This system encompasses two underlying ideas or goals. First, to provide a growth analysis through the comparison of significant figures in absolute terms with those of previous business periods and secondly, a structural analysis carried out by the comparison of relative figures with efficiency evaluations (Preißler, 2008).

The structural analysis constitutes the main part of the ZVEI System of indicators. It is based on a system of calculation whose main indicator is Return on Equity. This indicator is divided into its constituent components: profitability, liquidity, outcome, assets, capital, funding, effort or financial expenditure, turnover, costs, employment and productivity.

The growth analysis is conducted to evaluate the business' efficiency. Figures such as transaction volume (turnover, order backlog etc.), staff or success (Cash Flow, annual surplus etc.) are calculated by placing absolute figures of current periods in relation to similar figures of previous periods. This creates an overview of today's business performance in comparison to that of previous periods (Dethlefs, 1997).

Implementation of the system is facilitated by documents which introduce and explain the purpose, formula and origin of each indicator. These documents exist only for the main, not for support indicators. There are also forms for the depiction of indicators in absolute figures and such for the computation of indicators and their auxiliary parts (ZVEI, 1990).

The ZVEI System of indicators is not suitable to the needs and requirements of SMEs mainly due to the vast number main and support indicators it includes. Considering the limited resources available to SMEs it is unrealistic to assume that more than 200 indicators can be properly collected, calculated and evaluated on a monthly basis. On

top of being time-consuming, it would also simply overwhelm a manager to comprehend all logical relationship that holds this mass of indicators together. Chapter two lead to the conclusion that an ideal system of indicators for SMEs would distinguish itself by providing only compact and relevant information. Since the indicators of the ZVEI System are held together by computational logic, it is difficult to make reductions or adaptations. It is thus not possible to reduce the breadth of this system in order to fit the requirements of SMEs.

There are clear differences separating the four systems introduced in this chapter:

- The Du Pont System is a system of indicators based exclusively on monetary evaluation criteria. Furthermore, the indicators that can be used as part of this system are fixed. An adaptation of this system to individual business needs is not envisaged.
- The RL-System of indicators is also based on financial indicators. Given its division into a fixed and special section, it does, however, allow for a certain degree of flexibility. The fixed (or general) section includes indicators considered compulsory for all businesses. Instead, the special section includes indicators focused on individual business requirements.
- The BSC represents the most flexible concept. Indicators are held together by rational logic. The only fixed points are overarching categories. The selection of indicators is focused exclusively on satisfying individual business needs and strategies.
- The ZVEI System of indicators allows for extremely in-depth analyses. Given its size, it is, however, not suitable to SMEs.

3.4.4 Practicability of Indicator Systems

The Du Pont System of indicators is the oldest system of indicators. Developed as early as 1919 it was continually developed and improved and is considered one of the most popular indicator systems until today (Steiner et al., 2014). In the meantime, a vast number of other indicator systems have been developed and have received great attention in literary discussions. Still, the theoretical spreading of indicator systems gives no indication of the practicability of its implementation in practice.

The following section introduces a number of international studies conducted on the implementation of indicator systems and discusses their findings. The selection of studies was made in accordance with the needs and requirements of SMEs.

In 1995 the consulting company Lingle and Schiemann interviewed managers of US companies from a number of industries. Roughly half of these companies were SMEs in the manufacturing industry. In answer to the overarching question regarding relevant indices of long-term success, the majority of respondents named customer satisfaction. Financial and operative indicators ranked second and third followed by employee satisfaction. Social responsibility, innovation and change were classified as least relevant. See Figure 3.5 for precise positions.

Despite the majority of all managers interviewed for the study naming the above indices as crucial to long-term success, the quality of this data is rather low. 85% of all interviewees consider customer satisfaction as the most relevant index for success by profitability (79%). In practice, however, only a fraction of companies collect and evaluate the indicator required to calculate these indices. The main reason for not doing so is the lack of necessary data (Lingle and Schiemann, 1996).

Figure 3.5: Evaluation of the Importance of Information. Target / Actual Comparison in % by all Respondents
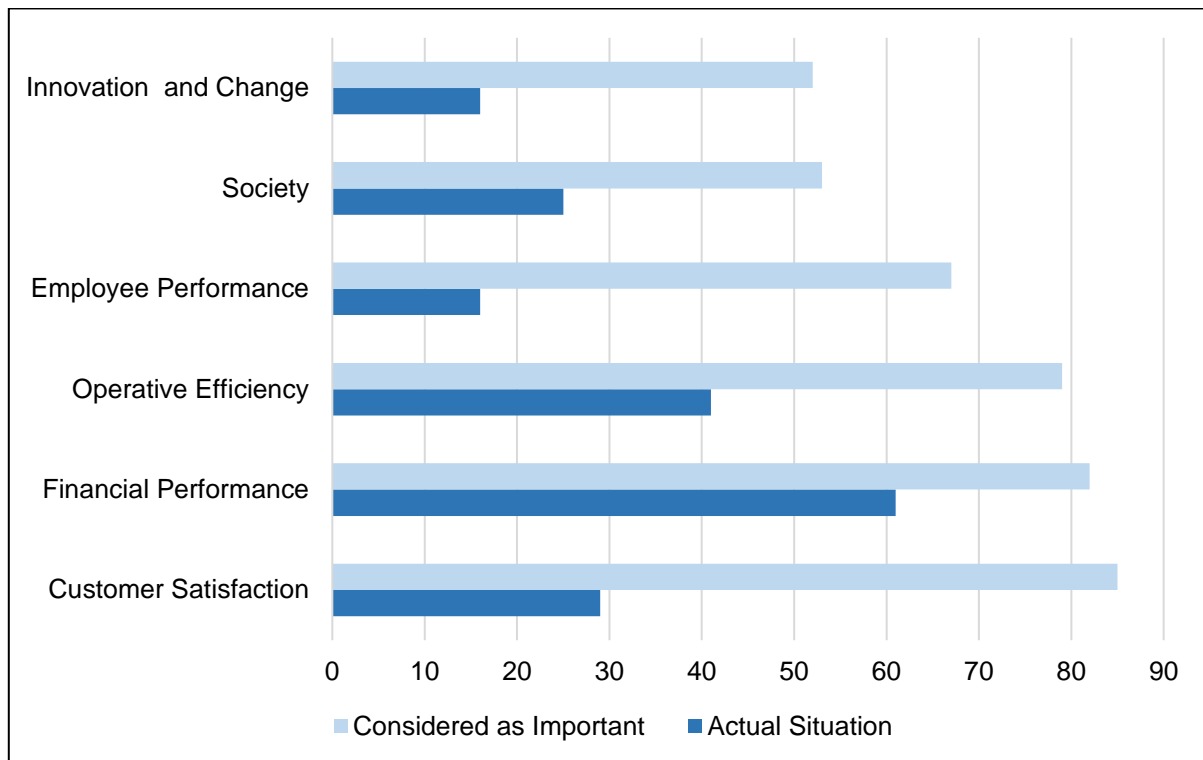
Source: *Lingle and Schiemann; 1996 p. 57*

Lingle and Schiemann reach the conclusion that "Measurement-Managed Organizations" (Lingle and Schiemann, 1996, p. 60), i.e.: companies whose planning, management and monitoring are based on strategic indicators, are more successful than companies, who spend no effort on collecting and evaluating indicators. Precisely, the authors define "Measurement-Managed Organizations" as companies who select strategy-relevant indicators, evaluate them on at least a half-yearly basis and work with indicators from at least three of the six categories listed in 3.5 (Lingle and Schiemann, 1996).

Jorissen et al. (1997) conducted a study of Belgian SMEs in which 124 companies were interviewed. In order to reach the most meaningful results these companies were divided according to the categories "successful" and "not successful". A company was

considered successful when presenting a Return on Assets of over 15% across a time span of 3 years.

Financial indicators were the most frequently named indices for success. Less than 40% of all companies surveyed ascertained the regular use of compulsory indicators such as "Return on Assets" (RoA) or "Return on Equity" (RoE). In regards to the qualitative component, it was revealed that successful companies make higher use of these indicators than unsuccessful ones: RoA 41% to 13% and RoE 58% to 13%. (Jorissen et al., 1997, p. 13).

According to the study, managers are aware of the importance of positive customer and quality-based indicators, still, they rarely make use of them. The 10 most commonly used indicators are almost exclusively of financial nature (Jorissen et al., 1997). If anything, it is only larger and more successful companies that include and consider non-financial indicators. The study reaches the conclusion that despite the ascertained importance of non-financial indicators, they are used far less frequently than financial indicators - especially in SMEs.

Günther and Grüning conducted a study of German companies in 2002. The 942 surveyed companies spanned across a number of industries not further specified. No indication was made regarding company size. 32% of the companies surveyed stated not using any sort of indicator system.[13] The reasons for not resorting to indicators as tools for planning and management including lack of necessity (41%), excessive use of resources (40%) and an excessive management effort (21%) (Günther and Grüning; 2001).

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[13] This result is coherent with the one reached by Horvath in 1997. Their study showed that 36% of companies surveyed refused the adoption of a indicator system (Horváth, 1999).

3.4.5 Problems arising from implementing indicator systems

The most frequently used classical indicator systems are the Du Pont System of indicators and the RL-system (Engelmann et al., 2012). These traditional systems are focused primarily on financial indicators which, considering the current conditions of the competitive environment is increasingly being considered a disadvantage (Manzoni and Islam, 2009). These systems neglect market and customer-oriented indicators which are becoming increasingly crucial to long-term success. Especially soft-facts such as employee satisfaction or qualifications, supplier, distributor and customer satisfaction are needed for an efficient resource allocation and a meaningful interpretation of a number of business results (Nesller, 2013; Kesten et al., 2013).

Financial indicators are predominantly directed towards the annual report and tempt short-term decision making. Indicators deduced primarily from profit are easily (and subconsciously) manipulated by various methods of evaluation, which negatively affects the meaningfulness of their outcome (Rappaport and Bogle, 2011).

Indicator systems that draw heavily on past values fail to include both the increasingly important customer and competitor orientation as well as a needs-analysis of employees and the quality of their performance (Ladurner and Mäder, 2012). Management strategies based on financial indicators furthermore lack a direct relationship to the essence of the company (Günther and Schomaker, 2012).

These particular points, however, contradict the requirements of SMEs extrapolated in section 2.5, which throws a negative light on the decision to implement these systems.

The BSC counters these problems. The breakdown into four thematic categories that can be filled individually with company relevant indicators allows generating a suitable mix of financial and operative indicators and Soft Facts as well.

> *"Business success is attained when a convincing and market adequate strategy is implemented correctly"* (Gleich, 2011, p. 69).

In literature, the BSC is considered as the link between a strategic outlook and its practical implementation (Pangarkar and Kirkwood, 2012, Heyne and Mönche, 2011). Nonetheless, even the BSC has its weaknesses. In a publication of 2004 the fathers of the BSC, Kaplan and Norton, speak of 70-80% of companies that fail to implement the BSC. Neely and Bourne reach the conclusion, that 70% of all BSC-implementations fail. Both studies reach the same results regarding the reasons behind this high rate of failure. It is not the strategy development but its integration to daily procedures which is critical. This result gains importance when considering the reasons for which companies decide to implement the BSC. A study conducted by PricewaterhouseCoopers reached the result that roughly 90% of all companies implement the BSC out of the sole purpose of receiving support in the practical implementation of their strategies.

The BSC has proven as the most useful template for a system of indicators adequate to the needs of SMEs. The system of indicators developed in this paper will display apparent differences from the BSC but bear parallels as well. Analyzing the weaknesses that appear at the time of implementing the BSC is thus an important step in the development of an SME system of indicators.

According to Kaplan et al. there are four reasons that lead to difficulties in the practical implementation of the BSC: The Vision-, People-, Resource-, and Management-Barrier (Kaplan et al., 2001).

The Vision Barrier describes a lack of communication and clarity. Earlier studies of Kaplan and Norton (1996) resulted in the observation that only 5% of employees understand management's strategies. They frequently lack precision or clear goals thus leaving too much room for interpretation. This is enough to prevent the company from even just reaching sub-goals, which in turns makes the successful implementation of complete strategies near to impossible (Gienke and Kämpf, 2007).

The People Barrier describes the lack of incentives. While focusing on the development of strategies, managers often fail to incorporate triggers that will motivate employees. A strategy can only be implemented successfully when employees can detect a direct link between the strategy's success and their own personal benefit (Waniczek, 2012). A critical aspect of the successful adoption of the BSC is the correct allocation of (financial and human) resources.

The Resource Barrier describes insufficient or completely omitted relationships between precise timetables and budgets plans. The allocation of resources is generally carried out from a short-term perspective. A successful implementation of the BSC, however, requires a long-term approach to resources allocation (Gleich, 2011).

The Management Barrier describes a situation similar to the above. Managers generally spend much time and effort developing strategies and achieving short-term goals and are far less concerned with the long-term implementation of such strategies (Volcic et al., 2013).

> *"It remains….to be noted, that it has not yet been possible to satisfactorily depict an entire business organization in just one control system" (Weiss et al., 2008, p 147).*

This chapter demonstrated that the BSC is the system which, amongst all of the above, most adequately satisfies the requirements of depicting business affairs. From the studies cited above, following conclusion can be drawn: companies that apply the BSC or a similar system of indicators are generally more successful than companies that refrain therefrom. The studies further went to show that a large proportion of managers are well aware of the importance of non-financial indicators but have immense difficulties in applying and evaluating them. Managers that carry out their tasks of planning, managing and monitoring without the support of indicators named a lack of resources and too great an effort as the main reasons for not doing so. Furthermore, they frequently lack the necessary Know How or external support.

In summary, there can be observed parallels between indicator systems in the context of SMEs and modern accounting systems (see section 2.3). Managers are aware of their importance in today's competitive environment but argue against their application on the basis of scarce resources.

3.5 Indicators and Indicator systems in German SMEs

Indicators and indicator systems are widely distributed in large-scale enterprises (Kannegieser and Günther; 2014). Present studies on their adoption in SMEs, on the other hand, result in a rather low degree of utilization (Martinez-Sola et al., 2014, Ihlau et al., 2013). The importance of indicators and indicator systems was made clear in previous chapters. Lingle and Schiemann evaluated a number of studies and succeeded in providing evidence that companies who work with indicators are more successful than those who don't (Lingle and Shiemann, 1996). These studies date back to the 90s.

The following chapter is concerned with evaluating the current state of utilization of indicators and indicator systems in SMEs. In order to obtain information needed to develop a system of indicators tailored to the needs of SMEs the following chapter specifically analyzes barriers to successfully implementing and utilizing indicators and indicator systems.

3.5.1 Spreading of Indicators in SMEs

Popular surveys on the use of indicators and indicator systems prevalently date back to the 70's, 80's and 90's (Gaydoul, 1980; Lanz, 1992; Kosmider, 1994; Niedermayr, 1994; Dintner, 1999). The few current studies that exist include Krol's research from 2009 based on value-oriented management in SMEs. The study was based on an evaluation of 174 filled out questionnaires.

According to the data collected, the three main goals businesses set themselves are (multiple answers were allowed): Customer satisfaction (94%), companies continued existence (92%) and employee satisfaction (82%).

The question regarding the most frequently used indicators resulted in financial indicators occupying the top three positions: cash flow, profit and turnover. Despite the fact that 94% of respondents consider customer satisfaction as one of the most important business goals, less than 5% of them actually use indicators to measure it. Regarding the management tools used to measure specific business goals, 7.5% of all respondents confirmed the use of a system of indicators. In reverse, this means that 92.5% of all SMEs studied make no use of any system of indicators. 30% of them furthermore stated they rarely or never use methods of cost accounting.

Krol's study is not entirely relevant to the target group of this research. Most of the companies that took part in the study are classified as trading or service companies. Industry and manufacturing companies which correspond to the addressees of this present study were represented by roughly just 34%. Rautenstrauch (2006) reached very detailed results in a study regarding the usage of the BSC as a system of indicators in SMEs. Most of the companies analyzed belong to the mechanical and manufacturing industries. Rautenstrauch's study places company sizes in relation to the implementation and usage of the BSC.

Table 3.1: Frequency of the use of the Balance Scorecard depending on the number of employees

Frequency of Balance Scorecard use	Number of Employees					
	<20	20-50	51-100	101-200	201-500	Total
Monthly	0	1	3	4	9	17
Annually	0	4	4	3	2	13
Occasionally	0	4	2	4	3	13
Not at all	0	30	29	26	17	108
Total	0	39	38	37	31	151

Source: Rautenstrauch; 2006, p. 13

The first observation that can be drawn from the table is that only a small share of companies (20%) frequently uses their system of indicators. 71.5% of all the companies analyzed do not use the BSC at all. Looking at the relationship between company size and BSC usage, one notices a slight drop amongst smaller companies. The rate of implementation in companies with 201 to 500 employees lies at about 35%. It drops to about 13% in companies with 20 to 50 employees. No company with less than 20 employees uses the BSC.

Previous studies confirm the trend of the literature review: large-scale companies rely on using systems of indicators for economic reasons and have firmly integrated them into their operations. They are however strongly underrepresented in SMEs. The need for such systems has been recognized. A study conducted by the "Fachhochschule Dortmunt" reached the result, which 32% of SMEs in Germany are planning on making investments in computer-aided indicator collection (Schön, 2010).

3.5.2 Demand to catch-up in SMEs

Why is it that managers of SMEs so rarely make use of helpful systems of indicators? 43% of such managers admitted not being familiar with the use of such systems. 28% of them consider the time-effort required as being excessive, 16% prefer relying on their practical experiences while 11% indicated the lack of required data as the main obstacle. 8% explained the results obtained through indicators have no effect on their business operations (Rautenstrauch, 2006, p. 14).

There is a significant amount of studies regarding the degree of implementation of the BSC as a system of indicators. Most of these studies, however, reach seriously different results. In international studies, the degree of implementation fluctuates between 20% (Ittner et al, 2003), 35% (Marr, 2005) and as much as 43% (Rigby, 2001). The inconsistency of results is even more apparent amongst studies carried out in German-speaking countries. Here the results fluctuate between 7% (Sandt, 2004) and 50% (Becker et al., 2005). These differences can be justified by the different points in time of examination and by distortions created by the choice of companies (Schäfer and Matlochowsky, 2008). More current figures regarding the adoption of systems of indicators in SMEs are not available.

Systems of indicators are strongly underrepresented in SMEs. Managers of small and medium-sized companies display fear of contact with indicators and prefer to rely on their practical experiences than to base planning, managing and controlling on indicators. Classical BSC systems require extensive financial and human resources (Schmutte, 2014; Albayrak and Gadatsch, 2012).

A higher degree of penetration of indicator systems in SMEs can thus only be attained, by developing a reduced system.

Given the low topicality of existing studies on the degree of implementation of indicator systems in SMEs, a new study must be drawn up in order to accurately reflect the current degree of implementation. Such a study must include both the type of indicators or indicator systems currently employed by managers of SMEs as well as the indicators managers would consider relevant to their daily operations.

This observation leads to the following research questions:

RQ 9: Do German SMEs managers consider indicators as important for their decision-making process?

RQ 10: Which indicators systems are currently used by managers in German SMEs?

> *"Those who construct a BSC system of indicators, restructure their management" (Horváth & Partner, 2000, p. 125)*

> *"The prevalent authoritarian leadership and the practice of reserving decision-making to top management levels counteract the effective implementation of indicators as systems of control. If the adoption of indicators in SMEs is to successfully unburden top-level managers it will be necessary to make changes to the organization's leadership structure" (Dethlefs, 1997, p. 32).*

Introducing a system of indicators also requires a number of internal processes and procedures to be adapted in order to generate an effective system of management (Tröndle, 2013). This does not just apply to the SMEs chief executive but to all cost centres of the company. Such restructuring will break managers' habits of making all decisions. It will further also require them to delegate and include employees in the decisions making process. This need for reconstructing management structures might become a further obstacle in the introduction of indicator systems.

This leads to the following research question:

RQ 11: Are German SME managers prepared to replace their current cost accounting system with more advanced and modern systems?

3.6 Summary

The literature review helped to ascertain the current state of research regarding the topic treated in this work. This lead to first results but also raised a number of questions which could not be satisfactorily answered by the current body of research. It has been sufficiently demonstrated, that business managers require systems which aid them in the planning, managing and controlling their businesses (see section 2.5).

In the evaluation of the existing cost accounting systems, the clearing of fixed costs was a disadvantage both for the classic and the modern full-cost systems. In the course of the Literature Review, the multi-level contribution margin calculation turned out to be a possible option (see section 2.3.2). The greatest disadvantage of a margin accounting also lies in the overheads. This analysis, however, separates the allocation of costs into multiple stages thus allowing for the source of individual costs to emerge.

The proper tailoring of such a cost accounting system to the needs and requirements of SMEs must be done in consideration of the results reached through the survey. Particular attention must be paid to the importance of individual indicators and the data required for their use. Should indicators of documentation and appraisal emerge as particularly important from the survey, it will be necessary to fall back on classical methods of full cost accounting in order to generate the necessary data. Should the survey results, however, follow the trend towards individual operational processes; more emphasis can be placed on the model of a margin accounting.

An important criterion in the selection of a system of cost accounting suitable for SMEs is the requirement, that it can be implemented and used despite the scarcity of resources common to SMEs (see section 2.4). In order to increase the ease of implementation and execution, it would not cause major complications if minor compromises are made regarding precision. Plinke (2006) remarks that the most appropriate system of cost accounting must not necessarily be the most precise one. Drury shares this opinion:

> *"…the aim should not be to have the most accurate cost system. Improvements should be made in the level of sophistication of the costing system up to the point where the marginal cost of improvement equals the marginal benefit from the improvement." (Drury, 2008, p. 50)*

The need of precisely tailoring cost accounting systems to the needs and requirements of SMEs emerged in section 2.4. The fundamental need of using cost accounting systems in SMEs was made clear in section 2.5. In summary, it can be stated that the literature review shed light on differences that exist between small, owner-managed and large companies at almost all economic levels. This allows deducing the need for a system of cost accounting tailored to the specific needs and requirements of SMEs.

The analysis cost accounting systems commonly used in practice highlighted a number of deficiencies. Cost accounting systems are generally used on the basis of full costs and have little influence on controlling (see section 2.5). This is primarily the result of a lack of know-how and the fear that an adequate system of cost accounting would engage too many resources (see section 2.5).

In sections 3.1 to 3.3 the efficacy of planning, implementing and controlling strategies via indicators was analyzed parallel to the suitability of different cost accounting systems in SMEs.

The analysis of strategic goals in SMEs focused primarily on financial goals, which are compulsory for business continuation and development. Alongside these, it emerged that soft-facts such as customer and employee satisfaction are also of considerable importance. The ability of companies to satisfactorily meet customer needs and develop long-term bonds between customers and the firm is becoming increasingly important in today's competitive environment (Paul, 2014).

Resulting from all the above and in answer to the quest for a system which builds on hard facts as much as soft facts while simultaneously leaving room for individual adaptations, the BSC emerged as the most suitable template for a system of indicators tailored to the needs of an SME. The implementation of the BSC is, however, a task at which even larger firms fail. A less complex though still precise and valuable alternative must, therefore, be found. Such a system would also help reduce managers' fears discussed in section 3.5.

The importance of indicators in general and in regards to SMEs specifically was discussed clearly in chapters 3.3 and 3.4.

Alongside a summary of the current state of research, the literature review also gave rise to a number of questions that cannot yet be answered to the author's full satisfaction. Answering these questions is a necessary step in the development of a system of indicators suitable to SMEs. The research questions that emerged in chapters 2 and 3 are listed below:

RQ 1: Does the production system affect the choice of the Cost Accounting model in German SMEs?

RQ 2: Is there a correlation between the company's size and the quality of cost accounting in German SMEs?

RQ 3: How important is a cost accounting system for decision making in German SMEs?

RQ 4: Are Cost Accounting systems assessed and updated according to the changing economic environment in German SMEs?

RQ 5: Is German SMEs planning strategy based on future trends or on the costs of the last period?

RQ 6: What are the most common cost accounting systems used among German SMEs?

RQ 7: What information is currently being determined by the cost accounting system in German SMEs?

RQ 8: What is the most important information that needs to be determined with the accounting system in German SMEs?

RQ 9: Do German SMEs managers consider indicators as important for their decision-making process?

RQ 10: Which indicators systems are currently used by managers in German SMEs?

RQ 11: Are German SME managers prepared to replace their current cost accounting system with more advanced and modern system?

CHAPTER 4

Theoretical Framework, Methods and Methodology

4.1 Introduction

In the following chapter, the research design, the methodology and the data collection methods and the population and sampling frame are described. The theoretical framework attempts to present the entire research and to clarify the dependencies between the individual subject areas. This is followed by the methodological assumptions on which the different strategies for this research are based on. There are various methods that need to be described and evaluated. The research design section at the end of this chapter describes the process of the survey developement. It is determined in which form the survey is to take place in order to achieve the best results. The target group for the survey and the minimum size of the sample are identified and justified.

4.2 Theoretical Framework

> *"A theoretical Framework identifies and defines the important variables in the situation that are relevant to the problem and subsequently describes and explains the interconnections among these variables."* *(Sekaran/Bougie, 2016, p. 82)*

The theoretical framework for this work is derived from the findings of the Literature review. The Research Questions and Research Objectives pose an additional influence.

The first section is devoted to the global theory on which concept of this research is based. The second part describes the different relevant concepts for this research. Moreover, it is shown how these concepts relate to each other, where the differences are and how they influence each other.

4.2.1 Decision Usefulness Approach

This research is based on the Decision Usefulness Approach, which was first defined in 1955 by Chambers:

> *"The decision usefulness paradigm is a corollary of the assumption of rational management that there shall be an information-providing system; such a system is required both as a basis for decisions and a basis for reviewing the consequences of decisions." (Chambers, 1955, p. 21)*

Chambers (1955) offers therein two general assumptions. Firstly, the system of logical consistency must be followed. The established rules should not interfere with each other, moreover, the whole system has to be designed towards one goal. Secondly, the information that is provided by such a system should be adapted to the requirements and decisions which need to be made in order to provide exact matching data.

In the 1960s the decision usefulness theory was developed further based on the decision theory. The goal was to incorporate the information needs of investors with respect to their business-related decisions in the development of cost accounting methods. This idea was based on the assumption that the company's success greatly depends on whether the information needs of the users of accounting are sufficiently met.

> *"Accounting, therefore, provides useful information, that is determined by means of decision models, where the value of that information derives its relevance from the meaning to the addressees, by influencing and facilitating their decisions (decision usefulness) and from predictions of future profits." (Oldenburger, 2013, p. 66)*

With regard to the Research Objectives on which this research is founded the Decision Usefulness Approach is an ideal basis. Broadly spoken, the "decision models" mentioned above in the quote from Oldenburger can here be interpreted as the key

indicators in the performance measurement system that is to be developed in addition to a useful cost accounting system which is the core of this paper.

4.2.2 Decision-making process

The most significant task of SME managers is the decision making. This process is repeated continuously at various levels. The quality of the decision making thereby largely depends on what information the decision maker can access at that moment

Figure 4.1: Steps of the decision-making process
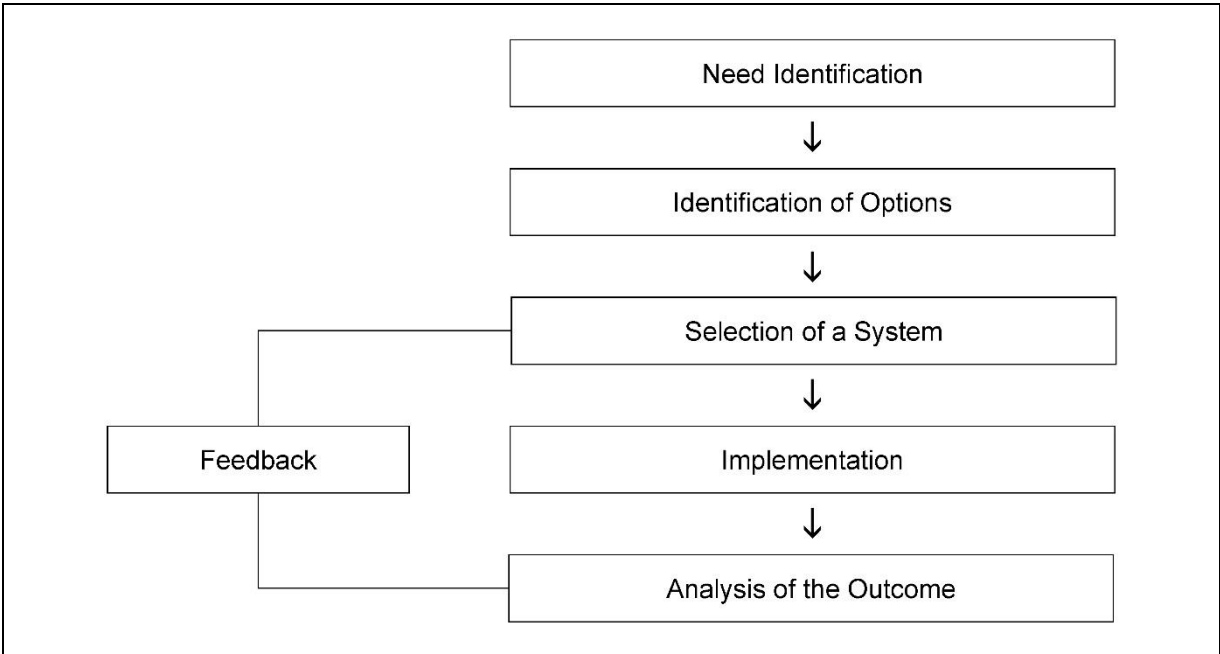
Source: adapted from Miles and Huberman, 2013

In the diagram above, the basic framework of the decision-making is shown. As part of this research, the chart above gives a good insight into the nature of the decision making. In addition, it can easily be seen at which points an indicator supported management accounting system can be supportive of the decision finding. Indicators show changes and developments and thus trigger the process (Need identification).

In the second step, the various factors of an indicator can be turned around to find access points which need changing (Identification of Options). After the election

procedure and the introduction of said change, the indicator will play another crucial role when it comes to the analysis of the results (Analysis of outcomes).

4.2.3 Relationships and interdependencies of the different models

The Research Objectives aim at three key factors: Accounting, Indicators and SMEs. The individual concepts of these key areas have already been worked out in the literature review. Subsequently, the conditions will be shown for the further research. Mostly it will describe the interdependencies and influences of the different concepts.

Figure 4.2: Dependencies of Accounting, indicators and indicator system
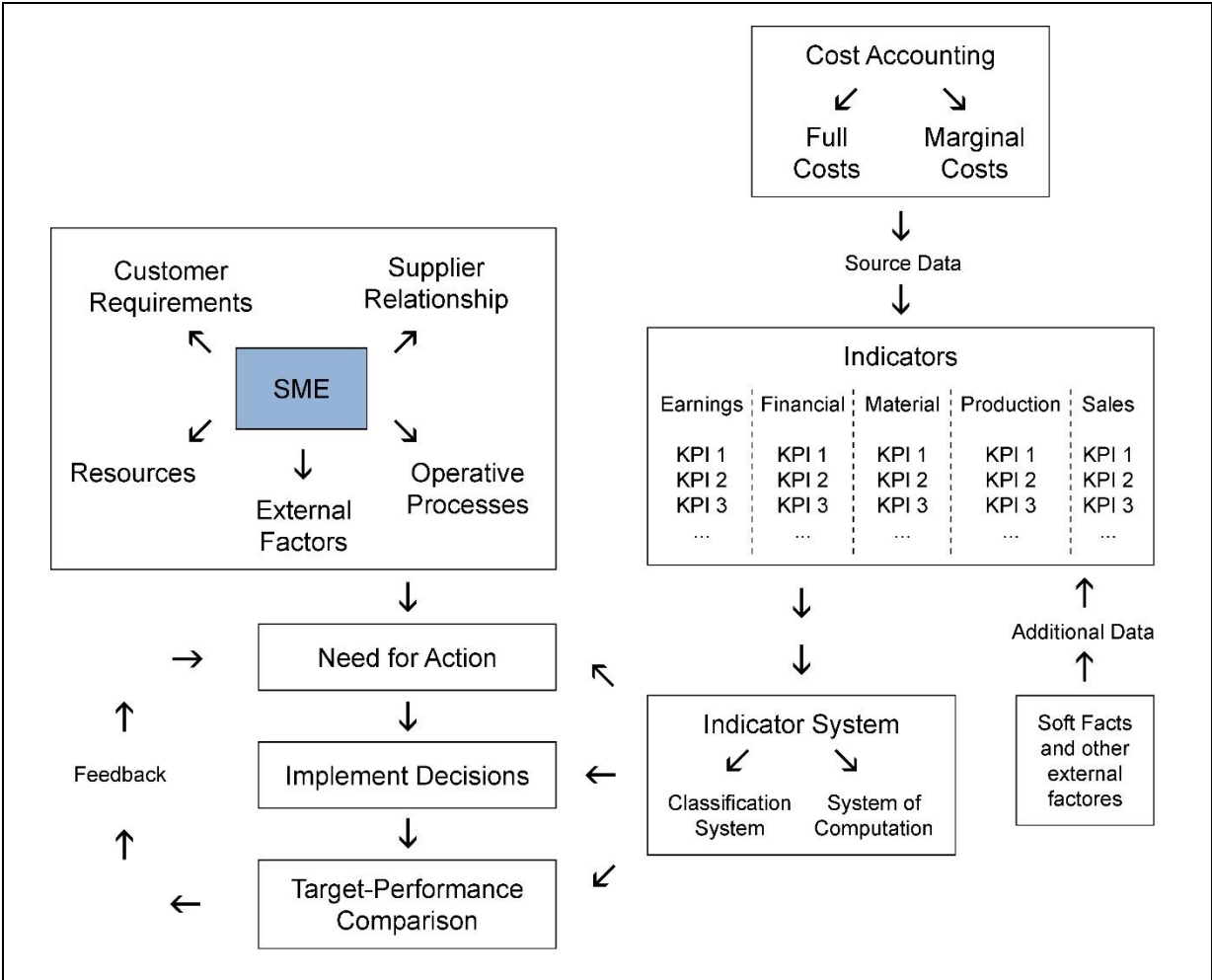
The figure above shows the dependencies of the three core elements to each other. Cost accounting provides raw data for the compilation of indicators. However, this data

is not sufficient to compile a complete array of indicators. For this purpose, additional information from external sources is required. This may be achieved through customer satisfaction surveys or staff meetings.

The indicators are divided thematically into different areas. Here, the Literature Review showed the following distinctions: Earnings, Financial, Material, Production, Sales. The different indicators are bundled in a performance measurement system, which can be organized according to relevant logical or mathematical order (Section 3.3).

SMEs make up the core of the research. Their action is dependent on various factors and influences. In the sketch above the most relevant influencers are shown on business decisions: funding, resources, staff, customers and operational processes. These specifications require permanent action. At the same time indicators also change during processes and may, therefore, trigger action. This is followed by a choice of different options and, ultimately, the decision and implementation of measures. The indicators have a supportive effect. They can specify a direction, or provide useful information in the evaluation of different options. The implemented action must be examined for its effectiveness, which again can be done with the help of indicators in form of a target/performance comparison.

In the literature review ideas and different models regarding the three key areas, Accounting, Indicators and Systems of Indicators, were collected. In the area of cost accounting, there is a broad range of different approaches that can basically be distinguished by either their basic concept is based on a full-cost or marginal cost-system (section 2.2).

The importance of indicators for business decisions is undisputed (Brauchle, 2015 Schmidt, 2016). Different philosophies exist in this field in terms of the number of

necessary indicators and the logical compilation in an indicator system. There are opinions which recommend using less meaningful indicators in order to achieve a quick and clear overview (Wehrlin, 2012), others favour extensive systems such as the ZVEI indicator system with 210 KPIs (Ossola Haring et al., 2016). SMEs and their position were shown extensively in the Literature Review. Their importance for the overall economy in Germany is high, but the professionalization in the range of supporting tools in the management tasks is low.

4.3 Methodology

The starting point of this research are the two Research Objectives. Furthermore, eleven research questions arose in the literature review that needs to be answered for the evaluation of the hypotheses. This chapter aims to present the research strategy and the empirical techniques used in empirical research.

Developing research designs and a research strategy are prerequisites for empirical research concerning hypotheses and research questions. The following chapter introduces and explains the research plan for this research paper.

The initiative the different research paradigms will be specified. This is followed by a presentation of the different research strategies and subsequently the research design. Apart from the listing of the respective approaches, there will also be an evaluation and the selection for this paper in the three sections. The structure of the Methodology section starts with general considerations and becomes more concrete in the context of the objectives of this research.

4.3.1 Philosophic Principles

A theory-based empirical research always follows the scientific goal of creating general, informative and empirical conclusions. The quality of the theory is hereby a

crucial element for the quality of the results which are to be achieved (Bühner, 2011). However, pure theory-based studies only provide a summary of existing information and are not suitable for new or contemporary results. Exploratory research that verifies new theoretical models in a practical environment and compensates theoretical gaps or out of date information is therefore indispensable in scientific research (Schöneck and Voss, 2013).

Before discussing the research methods of this study, it seems reasonable to describe each individual step in a research method plan:

Table 4.1: Research method plan

Research Objectives	
Literature Review	
Research Questions	
Data Collection	
Survey	Interviews
Analysis of quantitative and qualitative data	Analysis of qualitative data
Answering the research questions	
Discussion of hypotheses	
Development of the accounting and the system of indicators	

The following section describes and selects the different research paradigms and explains, why these particular paradigms have been chosen for this paper. Furthermore, there will be a listing of the various research strategies, followed by an evaluation and justification of the selected relevant ideas for this project.

4.3.2 Research Paradigm

"A research paradigm is a philosophical framework that guides how scientific research should be conducted" (Collis and Hussey, 2013, p. 55)

The research paradigm explores the manner in which data on a phenomenon is collected, analyzed and utilized. In the field of research paradigms science distinguishes between positivism and interpretivism (Reid and Scott, 2013).

(I) Positivism

Positivism is an epistemological philosophy, which assumes that all findings are given, meaning that they are based on positive facts. This position originates in the desired accuracy of the natural sciences. The positivist research rejects everything that cannot be observed or recorded by scientific experiments and research. Ethical and theological issues are dismissed as unscientific (Thommen, 2014). In positivism, the issue that is being examined is viewed in isolation. Herein the phenomenon that is to be explained or rather explored is the dependent variable and the possible causal factor is the independent variable (Vossler, 2012).

Positivism by definition establishes, what kind of questions are possible as part of the required scientific consideration. Due to the strict limitations of this definition, however, many questions are excluded, although they are in today´s research on clearly defined issues beyond scientific significance. The main items of the strict positivist approach that need to be criticized are according to Collins and Hussey (2013):

- A highly structured research design imposes constraints on the result and may ignore other relevant findings
- Researchers are not objective, but part of what they observe. They bring their own interests and values to the research.
- It is impossible to separate people or single issues from the contexts in which they exist.
- Capturing complex phenomena in a single measure is misleading.

Recently, several researchers have joined this criticism (Brock et al., 2012; Bitsch, 2013; Reichenbach, 2011), bringing the idea of interpretivism to the forefront, or at least opening up discussion of the principle of a collaboration between the paradigms.

(II) Interpretivism

Interpretative researchers assume that reality is determined through the subjective experiences of people in their environment. According to Willis and Jost (2007) interpretivists are "Anti-Foundationalists"[14] who assume that there does not exist that one singular method or fact. Catlaw (2013) adds that interpretive research is not about right or wrong theories: Rather it is about, how interesting the theory is to the researcher. Myers (2009) gets even more concrete, by talking of an interpretive approach to reality. Reality can only be constructed by social tools such as language, human consciousness or shared views.

Interpretivists says that reality can only be understood in its entirety by subjective interpretation and the inclusion of all involved factors. The study of phenomena in their natural environment is the key to today's definition of interpretive philosophy. This also includes the knowledge that researchers cannot prevent, influencing the issues they examine, themselves (Taylor and Sondergaard, 2014). Contrary to the quantitative methods of positivism interpretivism adopts methods that

> *"…seek to describe, translate and otherwise come to terms with the meaning, not the frequency of certain more or less naturally occurring phenomena in the social world" (Van Maanen, 1983; p. 9).*

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[14] Foundationalism is the theory of knowledge and is based on the view, that anything can be defined or determined with absolute certainty (Greener, 2011)

This means that interpretive research is any form of research in which the results are not mostly based on quantitative data. The interpretive research includes inductive methods aimed at providing basic explanations for social phenomena in a particular context (Collins and Hussey, 2013).

(III) Evaluation of the choices in approach

Both Research theories go back to the classical philosophy (Vorländer, 2012). Throughout history, the theories were substantiated and the branches further differentiated. Among the best-known positivists, there are Bacon, Descartes, Popper and Schopenhauer (Gobrecht, 2014). The interpretivists are led by Kant, Hegel and Marx (Burns, 2011).

One study dating back to the 1990s examined the research approaches of leading American magazines. Here 96.8% of all examined research articles were based on the positivist research and only 3.2% could be attributed to the interpretive research (Orlikowski and Baroudi, 1991).

In recent years, many new paradigms have evolved that are used by researchers. These new research theories mostly operate in an area that is ideally located between positivism and interpretivism (Collis and Hussey, 2013). These two extremes can, therefore, be regarded as the outer limits wherein mixed concepts of the two theories can be derived for today's research.

The pragmatic approach of this research indicates that it should be guided by the positivist approach. Both around cost accounting systems and indicators quantitative data is used. The required data is based on unambiguous numerical values. Therefore, the collection, processing and interpretation follow clear scientific rules.

In the area of cost accounting, the different systems can clearly be categorized and rated by areas and target groups. The majority of the ratio systems is recognized numerically. This includes financial areas, production economy and product sales. All these quantities are subject to the paradigm of positivist research.

In research theory, scientists believe that it is impossible to be absolutely certain about, whether one approach is better than the other. Rather, as now recognized, both theories should be combined in order to increase the quality of the research (Denzin and Lincoln, 2011). The literature review has shown the growing importance of soft facts in the field of indicators. Soft facts cannot adequately be investigated purely positivistic. Rather, the above approach of combining the two paradigms must be followed and when necessary the interpretivist theory should be utilized. Especially the area of soft facts leaves a lot of room for interpretation. This is influenced by research and evaluation as well as personally by the users of the system.

4.3.3 Research Strategy

In the area of research methodologies, a lot of different approaches can be distinguished. Scientists attempt to assign the different methodologies to the two paradigms positivism and interpretivism. The table below is based on the classification of Collis and Hussey (2013). Their taxonomy of research methods covers the same range other authors describe as relevant as well (Silverman, 2013; Flick, 2014; Cohen et al., 2013). Before the selection of the research method for this study is presented, the characteristics of the different methods will be specified.

Table 4.2: Methodologies associated with the two main paradigms

Positivistic	Interpretivistic
Experimental Studies	Ethnography
Surveys	Participative enquiry
Cross-sectional studies	Action research
Longitudinal Studies	Case studies
	Grounded Theory

Source: Collis and Hussey; 2013; p. 74

(I) Experimental Studies

In experimental studies, the relationship between two variables is measured. The independent variable is changed and the effect on the dependent variable is measured. For example, this can be the impact of wage levels on the effectiveness of a worker. Experimental Studies can be conducted in the laboratory or in a natural environment (Flick, 2014). In a natural environment, however, outside influences on the observed variables must be considered, in the laboratory on the other side disturbances can be eliminated or will be fundamentally constant (Bösener, 2015).

(II) Survey

The Survey is a method to collect data from a part of a particular group, where the results can then be generalized to the whole group. As a rule, however, that part of the group must be selected randomly. If the group that is to be studied is very small, it is possible to question all attending persons. Depending on the type of survey a certain size of usable responses is necessary to allow relevant conclusions towards the whole group (Engel et al., 2012.

(III) Cross-sectional Studies

Cross-sectional studies are used to examine variables at a set time or observe a set of sample objects in different contexts (Cohen et al., 2013). Cross-sectional studies are used in unique empirical studies. This creates social snapshots of facts, opinions or behaviours that are relevant now. In this research strategy, random samples are used which constitute a representative cross-section of the entire group, that is to be described. In scientific market research, 95% are cross-sectional studies (Rindfleisch et al., 2008). First, they are cheaper and faster to perform than longitudinal studies (see below). They also lead to easily evaluable data. In many areas of research these snapshots are sufficient (Kraemer et al., 2000).

(IV) Longitudinal Studies

Longitudinal studies are carried out over a longer period. In this case, the same empirical survey is performed at different points in time and is then analyzed to observe the change that has taken place over that time period. In literature, longitudinal studies are often associated with the positivist research approach, but can equally be used in the interpretivist research (Collis and Hussey, 2013).

(V) Ethnography

Ethnography is a method derived from anthropological research, and can be translated as "depiction of the people". The idea of ethnography is to explore and understand social structures, the knowledge of particular groups, the way of life and cultural characteristics from their point of view. Ethnographic experts aim to understand the world of its subjects from their perspective (Carspecken, 2013). The research method most commonly used is the "participant observation", in which the researcher is a member of the community he studies. Research such as this usually extends over a

long period (Collis and Hussey, 2013). Criticism comes from Geertz, one of the leading ethnographic scientists of the United States. He points out that there is no objective ethnography. Ethnographers themselves form even temporarily an intrusion in that community, an alien world that is affected by personal impressions and therefore only creates fiction. (Geertz, 1990).

(VI) Participative Enquiry

The participative enquiry is a method in which the person to be examined is included in the research as far as possible in their group or organization (O'Grady, 2013). The participation even extends into the area of data collection and analysis. Even in regard to processing and developing the research questions an attendee of the examined group or organization can be involved (Stern et al., 2013). The approach is two-fold: The participation ought to lead to better-quality results, as permanent feedback is possible. At the same time, a democratic process of research should arise, which takes into account not only the needs and goals of the researcher (Collis and Hussey, 2013).

(VII) Action Research

The action research was developed as an alternative to the classical empirical social research but quickly found its way into other areas of science too, such as management theory or development cooperation. Contrary to the classical research, which is usually heavily theory-based, action research mostly concentrates on the relationship between theory and practice. It encourages the interaction between researcher and subject (McNiff, 2013; Kemmis et al., 2014).

"Research that produces nothing but books will not suffice" (Lewin, 1946, p. 35).

Action research is less interested in adding new knowledge to the scientific context, but rather to offer (practical) solutions for problems. The research should be organized

in the form of a practical process of change or at least positively influence or change the existing situation practically (McKernan, 2013). The motivation is to collect not just theoretical knowledge but rather practical instructions.

(VIII) Case Study

> *"A case study is a methodology that is used to explore a single phenomenon (the case) in a natural setting using a variety of methods to obtain in-depth knowledge" (Collis and Hussey, 2009, p. 82).*

The aim of case studies is to find a solution to a problem that could not be adequately assessed and resolved with the previous methods.

In the interpretivist paradigm, Scapens (1990), Weber et al. (1994) and Yin (2011) describe the following four different types of case study methods:

- Explanatory Case Study: The Pre-existing theory is used to understand and explain existing facts and events.
- Descriptive Case Study: The objective of this research is to describe current practice.
- Experimental Case Study: The barriers and difficulties that exist in the implementation of new processes in organizations and which advantages might rise out of this introduction are being examined.
- Illustrative Case Study: New and innovative processes are illustrated and evaluated by a practical introduction to a few selected companies.

Case studies are usually expensive and it is not always easy to find companies, organizations or groups of persons who are prepared to undertake the effort and accept the impact a case study will bring on their daily operations or their daily routines (Schmidt-Hertha et al., 2011).

(IX) Grounded Theory

Within the framework of Grounded Theory qualitative data is analyzed followed by generating a theory with the gathered information. The Grounded Theory is not just

based on a single method but a number of parallel or interlocking methods. Based on the results of the research, a realistic theory is developed, which can be applied to practical implementation (Urquhard, 2013; Wolfswinkel et al., 2013). The Grounded Theory can thus be seen as an instrument that tries to bridge the gap between theoretical research and practical application.

According to Charmaz (2014) or Gill and Johnson (2013), the Grounded Theory method pursues the following objectives:

- Development of a theory based on the collection of empirical data
- Modification or extension of existing theories
- Generating explanatory theories for behavioural patterns and practical circumstances

A distinctive characteristic of the Grounded Theory Method is that case selection is not based in their representativeness, but whether the selection of examination subjects will lead to new theoretical knowledge (Glaser and Holton; 2005).

4.3.4 Selected Strategies

This research is aimed at two objectives: establishing an appropriate cost accounting system for producing SMEs and filtering of relevant indicators for management support that will be integrated into the cost calculation. The Literature Review on one side revealed the current state of scientific knowledge, but at the same time provided an insight into the first tendencies to aim for.

Of the above-identified major research strategies - both in the field of positivist and interpretivist research - the following can be discarded for this research:

> - The impact of ratios on two of the variables from experimental studies are not relevant for this research.

- The same applies to longitudinal studies. The current state of affairs and needs regarding cost accounting and indicators is to be determined and not the upcoming or expected development of the topics.
- Clearly, ethnography can also be ruled out as it is highly oriented towards social, cultural and political sciences and does not correlate with the theme of this work.
- The idea of the case study is not applicable to this paper either, as it is rather looking investigating the subject, which is the end result of this research - the implementation and the test results of the developed cost accounting and indicators project.
-The Participative Enquiry approach is good, but in this case, the influence of a few individuals would only distort the overall opinion of the community. If it is not clear how homogeneous or heterogeneous the answers of the target group turn out, this approach is associated with a strong distortion risk. This does not mean the participation of a target group should be excluded. However, it must be limited to a measure that excludes subjective influence on the questions and answers.

All other strategies have approaches that can help improve the quality of this research. Some of which can be utilized to their full extent, other can be used in tandem.

Answering the Research Questions can best be carried out in a survey. According to Schumann (2012) and Schöneck and Voss (2013), a written survey has the following advantages and disadvantages.

Advantages:

- The sample can produce a large amount of information at a relatively low cost
- Anonymity is assured
- Interview errors or differing questions on the same subject can be prevented
- The answers are thought through, as there is no pressure for time
- Answers are honest since a direct face to face situation would influence them
- Depending on the form of the questions exact data can be collected

Disadvantages:

- The low rate of returns
- Systematic failures. People with higher educational levels respond sooner than people with low levels of education.

- Lack of control over who has filled in the questionnaire.
- No way of responding to possible incorrect formulations or missing questions in the written survey.

The benefits are in line with the requirements for qualitative research. Especially the point of generating accurate data is relevant to the results of this research. The disadvantages, however, are only relevant to a lesser extent. The low response rate is always connected with written surveys and regarding the effort of conducting personal interviews the more effective way. The target group of this study will be much more open to filling out a questionnaire, rather than going to a personal interview with the associated time frame, as they just take a few minutes.

Systematic failures are not expected in the context of this survey, as the target group associated with the management of SMEs have the necessary level of education, so answering the questions will not be too great of an intellectual challenge. Controlling who fills out the questionnaires is also negligible as the questions are geared toward a certain thematic qualification. Therefore, it can be determined by the quality of the answers whether they have been given by technically competent persons or not. Only the last point is a problem that can have a negative effect on the results.

Two aspects have to be observed. The obtained data might indicate that an important question or important aspects have been forgotten, resulting in incomplete results or an interruption of subsequent theories (Jacob et al., 2013). This problem can be mostly solved with a pre-survey.

However, the following second aspect cannot be dispelled like this:

> *"As soon as the researchers discover interesting aspects of the data collected and would like to delve deeper into the qualitative backgrounds of the respondents' answers or even wants to ask a new question, the written*

survey reaches its limits. A return to the situation of the data collection is impossible." (Schmidt, 2006, p. 106).

To eliminate this problem, a preliminary survey of a few managers may not be enough. To solve this situation, personal interviews are conducted with a few managers before the survey is dispatched. In these interviews, all questions of the questionnaire are posted, checked and if necessary slightly deepened. These personal interviews will remove several problems. The personal and easily adjustable conversation can quickly shed light on poorly formulated or misleading questions. It can be determined which questions will lead to results and need further input or which questions are not relevant to the research.

The characteristics of the Cross-Sectional Study (section 4.3.3) fit best with this research. A sample of SME managers will be used to draw conclusions to the generality of all SME managers. In addition, it should be a snapshot of the situation, as currently prevails in German SMEs. These criteria are met in the Cross-sectional Study.

The idea of the Action Research is good and influences this research. The pre-interviews should include the researched group. From their feedback, the questions for the written survey will be modified or extended. Participation here, however, should not be as involved as in the Participative Enquiry for the reasons listed above. Nevertheless, the views and ideas collected during the personal interviews of the target group will be included in the survey.

The overall concept of this research corresponds with the Grounded Theory strategy, especially regarding the entire practical orientation of this research. Utilizing the

survey, a theory will be developed from the collected data that has a strong practical orientation.

A key element of the Grounded Theory is to complete the research process starting with planning the literature research, data collection up to data analysis and conclusion not in blocks step by step, but rather by continually switching and correlating between the individual process steps. This way, it is possible to return to previous research sections at any time and make necessary changes (Mey and Mruck, 2007). Due to the dominance of some facts and figures that have already been collected in the Literature Review, this concept is useful for the present research.

4.4 Quantitative and Qualitative Research

The precedent section described different research strategies and their respective database. To specify the strategy of this work, the following section compares quantitative and qualitative data. The different conditions of standardized and non-standardized data collection will be distinguished.

Furthermore, the different methods are bordered according to which the data is generated. As was already clarified in the preceding section, the flat demarcation of quantitative and qualitative methods does not adequately reflect reality. In addition to observing the differences between the two methods, their combinations and overlapping areas need to be considered. Right at this point, it is possible to generate advantages and simultaneously differentiate the dangers of mixing the two approaches.

4.4.1 Different forms of data

Both methods are used to achieve the best results in terms of this research. Analyzing the advantages and disadvantages of both methods, the authors Kronthaler (2014) and Schuster and Liesen (2013) conclude that the combination of interpreting qualitative data and the analysis of quantitative data is used in many of the current research projects because that way the best results can be achieved.

(I) Quantitative data

Quantitative data in the context of this research is numerically reproducible data. This is data resulting from the questionnaires of the survey. This data is initially abstract and non-judgmental because as numerical figures, it does not necessarily produce a statement on the measured content. The data will only receive significance by being analyzed in context with the questions. Quantitative data involves, almost no manipulation or interpretation. Quantitative data are therefore especially suitable for the further development of hypotheses and theories and thus open scientific and practical discussion of the meaning and interpretation of the obtained results. (Barth et al., 2015).

(II) Qualitative Data

Qualitative data are data that have a very specific meaning. In this research, it is content that is dealing with the demands of information for SME managers. This data is not definite in any case and must be viewed in the respective contexts. This room for interpretation, however, marks the significant difference compared to the quantitative data. In the present case, the analysis and interpretation of the data are always in context to the requested result, which is primarily aimed at a practical, indicator-based cost accounting system. Another relevant difference is the objective of

the data analysis. While studies with quantitative data need a clear-cut goal from the start, in qualitative research it often only becomes clear during the investigation (Witt, 2001).

(III) Transformations

The contemporary literature increasingly mentions mixed forms of quantitative and qualitative data (Przyborski, 2013; Hofte-Fankhauser and Wälty, 2013). In fact, data can always only be assigned to the quantitative or qualitative class; it is possible to obtain quantitative data from qualitative data. As a rule, this means foregoing some of its important issues and reducing its content to such an extent that it can be assigned quantitatively to a scale (Gukenbiehl, 2013).

This research performs such a transformation as well. Here, qualitative data is assigned to pre-formulated categories (such as Indicators, Systems of Indicators, Management, Planning, etc.) and to weight their significance. However, the individual needs of the SME managers must ultimately be expressed numerically. As can be seen from the above descriptions it is not possible to switch this transformation around. Quantitative data cannot subsequently be "filled" with meaning and content to produce qualitative data.

4.4.2 Collecting the data

With regard to the objective of the analysis and the result, before collecting the data, it has to be clarified whether it is quantitative or qualitative data. The necessary arrangements for data collection that are relevant to this research paper are presented and discussed below.

(I) Collection of quantitative data

> *"Certain quantitative data can be analyzed quantitatively, meaning aggregated and interpreted with statistical methods. However, this requires the right preparation during data collection: the data must be obtained standardized, it must have a certain minimum quality and the sample must be representative "(Witt, 2001, p. 3)*

The standardization of the data enables a direct comparison, in other words, gathering data in a standardized format creates the necessary conditions to evaluate the data in itself. Only when these conditions are met, it is possible to gain meaningful averages, variances or correlations from that data (Mochmann, 2014). It is the method described above that is of great importance to this study, and the analysis of its data. The need for the standardized collection of data is therefore obvious. The question of the right method is discussed in section 4.4.3 in detail.

The question of the representativeness of the sample must always be seen in context with the entire group for which the end state of the research should concur. This work with its target group of SME managers has a very large subject base, but in terms of their needs and expectations towards this paper can be described as very homogeneous regarding the results. This has already been explained in detail in the Literature Review. The exact requirements for the sample size will be discussed in section 4.6.2.

(II) Collection of qualitative data

The collection of qualitative data is subject to similar restrictions as the collection of quantitative data. With the qualitative data the evolutionary history of the data collection also plays an important role as supplementary information. The conditions under which qualitative data is obtained, have an even more significant influence on the quality that is the case with quantitative data.

When obtaining qualitative data, however, rather than the representativeness or standardization, the comprehensiveness of the responses and the openness of the subjects is pivotal. The quality of the gathered data also depends on the right frameset and requirements. However, these conditions cannot be set or standardized, but depend on the question (Zander and Zender, 2015).

The qualitative data collection has two different research approaches. While the hermeneutical method primarily concentrates on viewing known material in a new light, qualitative heuristics aim to discover new things (Mey and Mruck, 2014). The new interpretation contradicts the requirements of this work, which have emerged from the literature review. The weaknesses of the existing systems are known. Rather, it must be aimed at developing new approaches that meet the needs of the current economic environment and challenges of SMEs.

Kleining, who designed the methodology of qualitative heuristics lists four special conditions (Kleining, 1986):

1. The openness of the researcher who must be ready to adapt his own knowledge if the collected data requires it.
2. The openness of the subject, which must be regarded as preliminary and may change in the course of the research.
3. A maximum structural variation of the object that needs to be illuminated from all different sides in order to avoid a one-sided perspective.
4. Analysis of similarities. The data collected must be analyzed on similarities. This can be obtained not only through matching premises but also through opposites. The goal of the analysis is to find a structure that integrates all data collected.

4.4.3 Strategies for the research

The quality of the data is highly dependent on the conditions under which it is obtained. The strategies that are used to establish quantitative and qualitative data are quite different. The strategy must be geared toward the kind of data being collected because only the conversion of a specific strategy will lead to the required data for each analysis (Witt, 2001).

The strategy that needs to be selected depends primarily on the current state of knowledge on the subject and the proposed method of analysis. Particularly, the globally accessible knowledge on a subject dictates whether it makes sense to formulate and evaluate a hypothesis, or not, hence, it is necessary to do empirical research first before collecting the necessary information (Dexheimer, 2011). The strategies are distinguished by a linear approach, which is usually used in quantitative research and a circular approach, which is common in qualitative research (Naderer and Balzer, 2011).

(I) Linear research.

In linear research, a comprehensive plan is designed at the start, after which the pattern of the entire research proceeds and the questions are carried out. This begins with the formulation of the questions, moving on to the implementation and finally to the analysis of the obtained data. The individual steps of the planned research are gradually processed which represents the linearity of this strategy (Naderer and Balzer, 2011). It is crucial to this strategy that no modifications are made during the research as it would compromise the data comparability. Being able to compare the data is a prerequisite for gaining a mathematical summary and statistical analysis of the

quantitative data. The linear approach is therefore imperative for a quantitative approach to the research.

(II) Circular research

The circular strategy of qualitative research differs significantly from the linear strategy. The circularity describes here, how the successive research steps are repeated several times one after the other and always depend on the respective preceding results. As part of this research, this means that for the quantitative research part only a few interview questions are prepared in advance. Then during the interview, the areas that need further discussion will emerge. After the interview, the questions will be evaluated, which will already have consequences for the following interview (Krabbe, 2014).

This relects the four rules of qualitative research, shown at the beginning of this section. This approach allows a maximum of different perspectives (Rule 3) and helps to overcome any prejudices as best as possible (Rule 1). The interaction with the interviewees also enables the researcher to confront the respondents with a situation where he is forced to look at the questions and issues from different perspectives (Rule 2). Of course, circular research has to follow a certain structure as well. The fourth rule of qualitative research already requires this regarding finding common ground among the different interview results.

Figure 4.3: Schematic difference of the research strategies

Linear Strategy	Circular Strategy
Formulation the Hypotheses ↓ Selection of the Methods ↓ Selection of the People ↓ Data Collection ↓ Data Evaluation ↓ Testing Hypotheses	Pre-understanding ↓ Selection of the Method / Selection of the People / Data Evaluation / Data Collection / ↓ Theory Developement
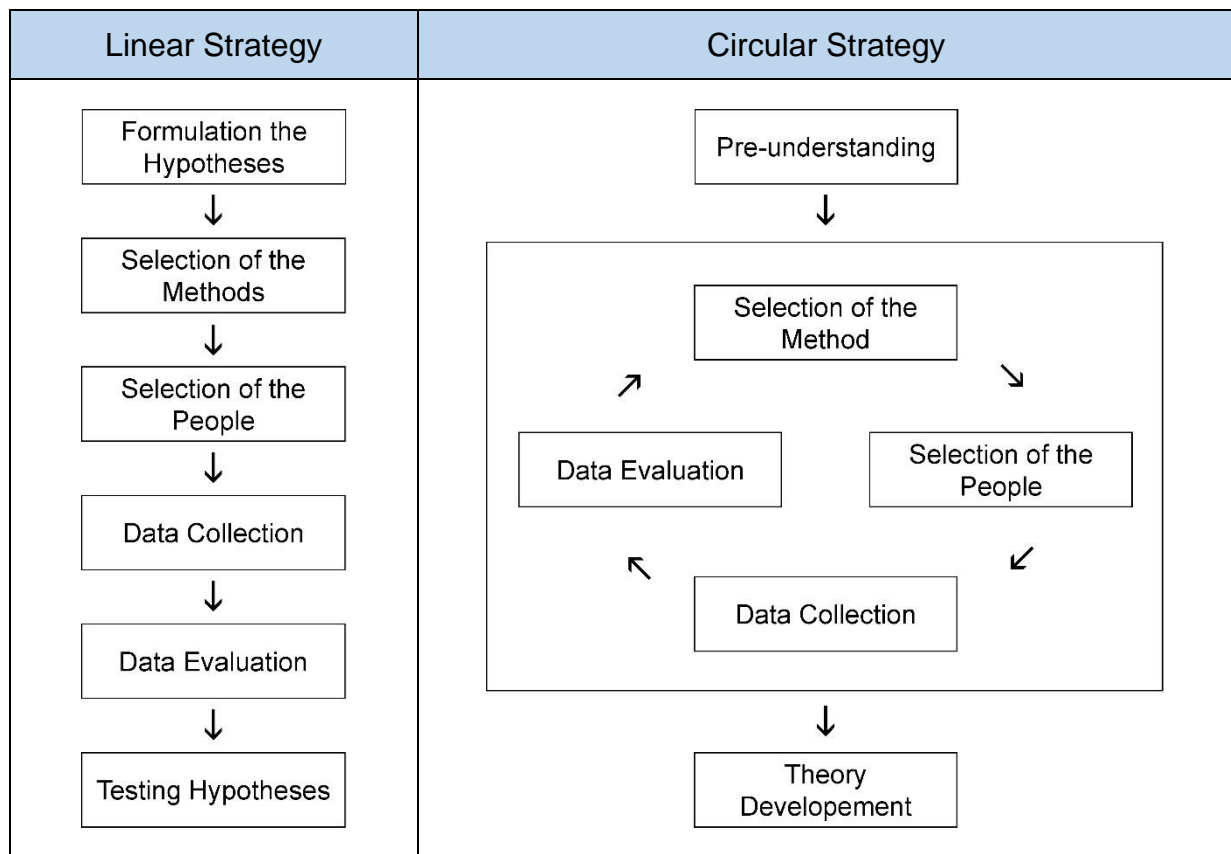
Source: *adapted by Witt; 2001*

The scope of the investigation or the size of the sample, here the interviewee, only come to light during the research. The investigation should only be completed if no additional information can be expected (Baur and Blasius, 2014).

Data gained through circular strategy is difficult to compare. But this must not be the goal of qualitative research anyway, as it is about observing the subject of the investigation from different angles and all possible perspectives. The variation of this perspective is always based on the insights gained before. This ensures that there will not be a flood of differing variations, but a focus on the object of the research (Witt, 2001). This way a maximum of information can be gained with little effort.

Witt (2001) describes the strategic combination of linear and circular research and the advantage of this twofold strategy: By utilizing a focused variation of the circular

research representativeness takes on new meaning. While quantitative research is about the choice of the sample, to represent the whole of a specific target group, qualitative research rather aims at representing the problem by the selection of its target group. This is easier to achieve by choosing extremes rather than averages in subjects. This inevitably leads to the fact that not only the average and most common facets are represented by those extreme representatives, but also an awareness of the marginal and extreme ranges is gained. What these extreme facets mean to the general populace can, in turn, be represented in the context of qualitative research.

For the present research, this confirms the assumption of conducting a pre-test of the survey through face to face interviews. Not only can erroneous questions in the survey be discovered this way, but also these interviews can show so far unknown facets and topics, which will then be added to the survey.

(III) Mixture of the two strategies

The Linear strategy follows a standardized plan for data collection in a specified research design. This way comparable data can be obtained, which can be quantified. The circular strategy is all about capturing heterogeneous data to be able to map the research field in its entirety.

> *"A strategy wastage - as is unfortunately quite often observable - results from the unfortunate combination of both strategies" (Witt, 2001, p. 8)*

This can be done in two ways: A circular strategy for the collection of quantitative data or a linear strategy in the context of qualitative data. Whereby the former is unlikely, the second variant appears in research practice frequently (Mey and Mruck, 2010). The use of qualitative methods in a linear strategy rarely leads to the desired results. The approach of the strategy is determined in advance and feedback isn't possible. To

obtain qualitative data in its entirety, exactly this is necessary. This procedure, only shows in retrospect, at which points deviations from the linear approach would have been necessary. But then the study is usually completed and it is too late for corrective action.

According to Witt (2001), a reason for this frequent error is that it is assumed, the use of qualitative methods would be sufficient to ensure qualitative research. It is important in qualitative research to gear the questions strongly toward qualitative data and to choose a strategy that ensures a quickly developing dynamic of its own and therefore, maximum feedback.

The quantitative part of the data collection is carried out via survey. Quantitative data is of paramount importance for the objectives of this research. However, to ensure all relevant parts are considered in the survey, a qualitative research is carried out in advance based on personal interviews. Preparing and conducting the interviews will foremost be in accordance with the four rules of qualitative research. A few, loosely worded questions about the various topics will be answered in the dialogue. If new aspects arise during the interview the questions will be changed accordingly.

4.5 Statistical analysis

The main component of the preparatory work for the analysis is the acquisition of relevant data. Objective data will be collected for this work by means of a common postal survey as well as pre-tests in interviews. The addressees were carefully selected to ensure a homogeneous distribution regarding various operating variables within the chosen definition of SMEs (chapter 3).

For data processing and its interpretation, these will undergo a process of analytical statistics which will be described below.

"Statistics is the development and application of methods for the collection, processing and analysis and interpretation of data." (Bourier, 2014, p. 1)

The analytical statistic describes the particular subject which is being examined. As a first step, the relevant data for the examined object is collected in its entirety. This gets done in this study via a survey and in some areas via the Literature Review. The second step sees the data processed in the form of tables and scales to create a better overview without changing the information content of the data. In the third step, the data gets analyzed. Here, it is paramount to identify the essential characteristics and conclusions regarding the examined subject towards its purpose. In this study, the obtained data is analyzed to answer the Research Questions. In addition, a model of an indicator-based cost accounting system will be developed from the results of the analysis.

4.5.1 Descriptive vs. Analytical Statistics

A central aspect of data analysis lies in a clear and suitable summary and presentation of the data. Therefore, relevant information must be accumulated from the extensive and complex raw data of the survey. Compressing the data without loss of information, enables a better overview and as a result, a targeted analysis and interpretation are possible (Runkler; 2010).

Quantitative observations and measurements and their descriptions are usually performed based on descriptive or analytical statistics (Braun and Saam, 2014). Descriptive models present actually observed or from observations derived facts. This way certain characteristics of the sample are determined that can then be transferred

to the original whole. These purely descriptive statistics do not draw conclusions beyond the observed facts (Schmidt, 2014).

Analytical statistics aims to determine how the data can be interpolated from the sample results towards the entire group. The established facts are not just described. Rather, the aim is to formulate a general statement as a hypothesis that needs to be rechecked through an additional sample (Raab-Steiner and Benesch, 2012).

4.5.2 Measurements and frequency distribution of data

Steyer and Eid (2001) divided the research process into a theoretical and an empirical part. In the theoretical part characteristics or features are structured and defined. The present work formulates questions, by analyzing the results and Research Questions gained in the Literature Review that can then be answered by means of a survey. The empirical part of the research includes the evaluation and conclusion e.g. the formed hypotheses on the data obtained. For this, the theoretical findings need to be viewed in conjunction with the results of the survey. In order to make these results readable, it is necessary to present the data obtained in measuring tables.

In analytical statistics, the measurements are regularly presented in a scale. Hereby, the scale serves as a tool for measuring and reporting the data. The aim of forming a scale is the assignment and summary of various scale values in terms of the researched subject (Raab-Steiner and Benesch; 2012). Depending on the considered type of feature, there are different models and measuring scales for the assessment of the characteristic value. This distinction is important in terms of applying statistical methods because different scales can generate different conclusions and interpretations (Rohwer, 2014).

The following table shows the most common scales and their characteristics (Eid et al., 2013; Mittag, 2012; Bourier, 2014.)

Table 4.3: Different scales for qualitative and quantitative data.

Type of feature			
Qualitative		Quantitative	
Nominal scale	Ordinal scale	Interval scale	Ratio scale

(I) Nominal scale

A nominal scale assigns a number to the respective empirical data. Thereby objects with the same characteristic attributes get the same number. With nominal scale hierarchies can not be formed, therefore only qualitative features can be added.

Relevance to this work: One question in the survey refers to whether a company is independent or a subsidiary. Therefore "independent" is marked as 1, "subsidiary" as 2. The allocation of numbers is done without any value towards ranking or rating.

(II) Ordinal scale

In the ordinal scale, empirical data is also assigned a respective number. Here, however, the object with the larger, more frequent or more powerful characteristic value receives the higher number. However, nothing is said about the distance between two values.

Relevance to this work: The survey questions whether the cost calculation is adapted to the development in production. The answers are "regularly", "partially" and "never". The ordinal scale is applied as follows: Never = 1, partially = 2, regularly = 3. Depending on the frequency higher numbers are assigned. This is not to say that the gap between "never" and "partially" is of equal importance or weight as the gap between "regularly" and "partially".

(III) Interval scale

In the interval scale, the sequence of characteristics is fixed and it can be clearly stated, which gaps are between each of them. The interval scale is a metric scale. Thus, the differences of the characteristic values can be quantified by subtraction. The zero point and the distance between the groups, however, are set arbitrarily.

Relevance to the survey: The survey asked for the weekly expenses for cost accounting. The intervals are always the same. The lowest value that could be marked, and thus the artificial zero point, in this case, is one hour.

(IV) Ratio scale

The ratio scale is also a metric scale different to the interval scale, in terms of having a very definite zero point.

Relevance to the survey: The companies will be asked about the indicators that are already established. Possible answers here are 0 to 20 identified indicators.

The above examples highlight that the analysis of the survey is done by utilizing the qualitative nominal and ordinal scale and the quantitative interval and ratio scales. Of particular importance is the interpretation of the values that are not clearly quantified in the survey via the scales. That, for example, is the case when evaluating individual indicators. These require defined values such as "very important", "important", "average", etc. to count and sort them, to make an interpretation towards a certain goal possible.

4.5.3 Editing the data in SPSS

The questions were entered into an SPSS-enabled format in Microsoft Excel for evaluation and then imported into SPSS 22. To ensure a logic in the subsequent

evaluation, the data was then laid out in the respective scales, the ratio-, linear- and ordinal scales.

In order to investigate the relationship between the metric variables, the correlation is calculated. Two values are determined: the correlation coefficient and the p-value. The correlation coefficient indicates the strength and direction of the relationship. He lies between -1 and 1. A value close to -1 indicates a strong negative relationship. A value close to 1 indicates a strong positive relationship. No relationship exists when the value is close to 0.

The p-value indicates whether the correlation coefficient is significantly different from 0 and therefore, indicating a significant relationship. In most cases p values less than 0.05 are designated as statistically significant (Schuster and Liesen, 2013).

The statistical correlation was determined depending on the chosen scale by the Pearson or Spearman method. The Pearson correlation coefficient was used in the survey data that is normally distributed and where a linear relationship exists between the variables. The Pearson correlation coefficient represents the strength of the relationship between metric scaled variables. It is always within the limits of -1 and +1.

Here, in order to value the strength of the association, only the amount of the correlation coefficient is crucial. Minus or plus provides information about whether the relationship is negative or positive. The closer the correlation coefficient is towards the limits of -1 and +1, the stronger the connection. Values that are close to zero show evidence of a weak correlation. If the correlation coefficient lies at exactly -1, this testifies to a perfect negative correlation.

The Spearman rank correlation coefficient is a measure of the strength of a monotonic relationship between ordinally scaled variables. In contrast to the Pearson correlation coefficient, no linear relationship is assumed for the calculation. The results also move within the limits from -1 to +1 (Kronthaler, 2104). After setting the scales and correlation coefficients the Research Questions were linked to the respective survey responses in SPSS and evaluated.

4.6 Research Design

The fundamental goal of a research is closely linked to the research design (Töpfer, 2012). The present study investigates whether all management accounting tasks in SMEs such as planning, management and monitoring can be achieved by means of an indicator-based cost accounting system, and what framework this system should be based on. In the Literature review, it has shown that this system must be adapted to the specific needs of SMEs and cannot be taken from the general research without connection with the addressee.

This research work will take place in two stages. This first stage of the empirical research is related to the collection of data and results of previous research on the topic 'cost accounting and indicators'. This enables to narrow certain areas down. In addition, first results were obtained and facts collected and will be used for the advancement of this study.

To answer the Research Questions, it is necessary to review the experience and the everyday economic activities of the addressees. In order to achieve the best results, the following chapter deals with a brief consideration of the best type of survey. Here, the question is explored, what sample size is necessary for a relevant representation

of reality and how to choose the managers that will be interviewed. This is followed by a description of the study design of the survey.

In addition, the survey strategy is demonstrated and justified. This section will conclude with ethical aspects that must be considered in the survey, as well as design and content components that can guarantee the highest possible response rate and quality.

(I) Type of Survey

Regarding the type of survey, it is differentiated between written and oral interviews. Usually, these are carried out as postal surveys or online surveys; personal interviews or telephone interviews. The general trend shows a decreasing utilization of personal interviews and an increase of online surveys[15].

Fundamentally, telephone interviews and personal interviews achieve the highest response rate, however, they are associated with the highest financial and personal effort. In the field of scientific surveys, written interviews are considered most promising and objective. It is up to the subject himself as to when he answers the questions. In addition, the results are expected to be more truthful, because there is no (unconscious) influence by an interviewer. A farther positive impact on the result is the certainty of anonymity and the assurance of no consequences (Aebi, 2014).

When weighing online and postal survey in the research, no clear trends can be detected for or against a method (Hennig, 2014; Jacob et al., 2013; Alig, 2013). Postal

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[15] The ADM (Association of German Market and Social Research Institute eV) has collected data in 2013 that shows how the percentage of personally guided interviews has decreased between 1990 and 2012 from 65% to 21%. Online surveys that launched in 1998 registered with a share of 1%, rose by 2012 to 35%. The proportion of telephone interviews is constant around the 40% mark, while postal surveys also initially decreased and then leveled off in the last 10 years at about 6% (Wiegand, 2013).

surveys indicate a more serious nature but are associated with higher costs for the initiator of the survey and with the greater effort for the respondent. Online surveys are favourable to implement and enable fast results.

> *"Experience has shown that most people receiving surveys decide immediately whether or not to participate once they have received the invitation" (Jacob et al., 2011, p. 117).*

Reliability has the highest priority in this survey. The above statements indicate that the best results can be achieved with a professionally designed postal survey.

(II) Minimum Samples

Surveys usually aim to determine the opinion of a collective and not individual persons. To obtain representative results for the survey, the target group must be precisely defined and it must include a certain minimum sample size (Hoops et al., 2013).

The target group was defined in detail in section 2.4 of the study. Jacob et al. (2013) recommended the following minimum sample size in a study:

survey in specific homogeneous groups.

The authors speak here of usable returns. Considering that surveys might not be answered by all the recipients, the number of people receiving forms must be significantly higher. The survey of this work has a partly descriptive, partly normative character. For a representative result, the return should reach an average of the two above-mentioned groups. Depending on the design of the survey, in postal surveys of a selected target group with specific questions, the response rates will be between 15% and 35% (Jacob et al., 2013; Engel et al., 2012). If the median is rated at 250 people and the return rate at 25%, 1000 managers of the defined target group should be contacted for this work.

(III) Procurement of Relevant Addresses

The selection of the addresses is randomly distributed throughout Germany. When putting together the addresses the following restrictions, developed during the literature Review must be met:

- Sector: manufacturing industry
- Legal form: independent company (no subsidiaries)
- Number of employees: between 10 and 250
- Annual sales: between 2 and 50 million euros
- Contact: Manager
- Addresses: Postal Address

For the procurement of the addresses in addition to the German Postal service, several service companies can help. For the relevance of the results, current data is important which can be ensured by the German post with a monthly data update (German post, 2014).

(IV) Interviews and Surveys

Fundamentally, it is necessary to meet the scientific and methodological requirements of market and social research as defined by the ADM, worded as follows:

> *"The scientific method of the approach, the voluntary nature of the participation, the anonymity of the data collected and the strict separation of research and non-research activities" (ADM, 2007, p. 1)*

The scientific approach is given by the immediate context of each reference in the research background of this work and is clearly emphasized in the letter to the addressee.

The voluntary nature of participation is given in the context of written surveys in the absence of direct interviewing. In addition, every participant can withdraw participation in the survey at any time or skip certain questions. The questionnaires are not provided with addresses or markings, whereby the anonymity and secrecy of the postal surveys

is assured. For this work, all data is collected and evaluated in summarized form only, which excludes conclusions about individual companies or persons. A strict separation of research and non-research activities is ensured, as no non-academic content such as commercial surveys and advertising will be included in the research surveys.

Formal graphical recommendations for letters and questionnaires in a survey are described extensively in the respective literature and are not listed here, the same applies to the number of questions or the time allotted, to gain the best response rates. (Fowler, 2013; Schumann, 2012; Vaus, 2013).

The postal survey is done with only a single contact via the cover letter and questionnaire. In order to achieve the maximum return rate, a stamped and addressed envelope is attached, which is explicitly referenced in the letter. In addition, the recipient is guaranteed online access to the results of the study to create a value for the participation.

4.7 Summary

This chapter sets out the theoretical framework of this research. Following the strategy of the Decision Usefulness Approach, the core areas of this research (cost accounting system, indicators and their order in a system of indicators) were specifically addressed and put into a context with the decision-making process of SME managers.

Basically, this research is subject to a positivist paradigm. However, it also includes topics that are subject to the interpretive paradigm. In this chapter, the research strategies (positivistic and interpretivist) were described. Subsequently, the strategies were selected that is best suited for the research objective. Subsequently, the type of data collection and its analysis was described and evaluated.

The second part of the chapter dealt with pragmatic questions for the concrete implementation of the survey. Here, recommendations from the literature on survey design were collected and modified for the purpose of this research.

CHAPTER 5

Data Collection and Analysis

5.1 Introduction

This chapter describes the realization and evaluation of the survey and interviews. The first section examines the research questions and turns them into concrete questions for the survey. In addition, it is being investigated whether questions arise from the research objectives that can be answered by means of the survey. The survey is compiled and discussed with three managers before distribution to supplement any missing topics or clarify ambiguities. This is followed by the evaluation of the survey.

For some of the questions, there are already assumptions from previous studies (for example, the main use of full cost systems in SMEs, see Section 2.5.3). Based on these assumptions, hypotheses are formulated for the appraisal of the survey. According to the postal survey, some interviews with managers took place in order to gather qualitative data in addition to the quantitative data. The chapter concludes with the analysis of these interviews.

5.2. Layout and structure of the survey

The following section focusses on the survey design in terms of its content. The survey aims to generate current statements from the target group of SMEs. In doing so, the focus lies on collecting data with which this study's research questions can later be answered. Furthermore, data that will allow additional inferences should also be collected .In the following section, a determination of data needed to answer each of the research questions will be conducted.

5.2.1 Required data

The following table lists the key messages of the research questions. Furthermore, there is another column with potential further information that would be helpful to know about answering the particular research question more precise. Another column shows

interdependencies of research questions among each other. This could help to pool data and to create questions for the questionnaire that provide answers that could be useful for different research questions.

Table 5.1: key messages of the research questions and interdependencies

RQ	Core question	Potential further information	Interdependence with other RQ
1	Custom-made, small scale, large scale or mass production	Extent of the range of products	5 and 6
2	Number of employees	Usability of Cost Accounting	5 and 6
3	Importance of cost accounting systems	Which resources are used	4
4	Investments in the businesses daily operations	Topicality of cost accounting	3
5	Time reference of the used data	-	
6	Suggestion of cost accounting systems, frequency of usage (frequently, often, rarely, case-by-case)	Which systems are known to the SME	1, 2 and 7
7	Which information is generated by the cost accounting		6 and 8
8	Recommendation of tasks with an assessment of the perceived importance		7
9	Time invested by managers	Number of used indicators	11
10	Usage of indicators?	Which and how frequently	
11	Reorganising the management system		8

Survey questions are going to be formulated in the following paragraphs. After individual questions have been formulated and revised, additional information needed

to fully answer the research questions and develop a new system of cost accounting and performance indicators will be presented and discussed.

5.2.2 Development of the questionnaire

The following eleven RQs were used as the basis of the development of a questionnaire to collect the necessary data

RQ 1: Does the production system affect the choice of the Cost Accounting model in German SMEs?

This question arose in the context of the type and size of businesses considered in this study. Previous studies and researches of businesses did not take into account a company's portfolio of services. Developing an effective system of cost accounting it is, however, crucial to identify whether SMEs respond to a broader range of products (i.e. an increase in operative complexity) with more complex or more versatile cost accounting systems.

Answering this question requires two pieces of information: 1) what type of production do SMEs offer and 2) which cost accounting system do they currently use? This question links to RQ 5 in which the kind of cost accounting system will be queried.

In relation to RQ 1, this question will enquire about the types of production used by the company (see section 2.4.6), multiple answers allowed:

- Custom-made
- small-batch (1-10 Units)
- large-batch (more than 10 units)
- mass production

A further differentiation of the type of production also has an influence on the complexity of operative organization as below:

- Production according to order intake

- Stock production of middle-parts, assembly i.e. fitting of final products after order intake
- Stock production.

RQ 2: Is there a correlation between the company's size and the quality of cost accounting in German SMEs?

The scope of companies with 10 to 250 employees is already much focused (see section 2.4.3). Still, it is expected that even within these limits, there will be considerable variations in the use and perceived importance of accurate cost accounting systems.

This RQ is best answered by a combination of 1) the exact number of employees and 2) the type of cost accounting system used (RQ 6)

RQ 3: How important is a cost accounting system for decision making in German SMEs?

The need for a cost accounting system tailored to the needs of SMEs has been demonstrated beyond doubt. This RQ is best answered by a combination of the exact number of employees and the type of cost accounting system used (RQ 6)

This question cannot be clearly quantified. The best alternative is to ask survey participants to assess the importance of cost accounting in their SME on the scale of:

- None
- Low
- Average
- High
- very high

RQ 4: Are Cost Accounting systems assessed and updated according to the changing economic environment in German SMEs?

The timeliness of cost accounting is determined by RQ3. Moreover, the degree of development of the industry must be queried. It could be formulated as: How strongly do you perceive the pressure to change in terms of technical developments to be in your industry:

- low
- average
- high
- very high

RQ 5: Is German SMEs planning strategy based on future trends or on the costs of the last period?

This question can be answered by determining the common references of time (Fresow, 2014; Fischbach, 2013) of the used data:

- actual costs (costs of the previous period)
- normal costs (the average of a number of previous periods)
- standard costs (future expected costs)

RQ 6: What are the most common cost accounting systems used among German SMEs?

To answer RQ 6, the most common systems of cost accounting will be proposed as potential choices. The different theories and systems of cost accounting have already been discussed in chapter 2.4.

The following systems, identified by the literature, are relevant (Schmidt, 2014; Coenenberg et al., 2012; Friedl et al., 2014):

- Full Costs
- Contribution Margin Accounting
- Target Costing
- Process Cost Calculation / ABC
- Life-cycle Accounting

RQ 7: What information is currently being determined by the cost accounting system in German SMEs?

RQ 8: What is the most important information that needs to be determined with the accounting system in German SMEs?

These two RQ can be combined in the survey.

As was shown in section 2.4 cost accounting fulfils both an internal and an external function. Externally, the identification of past data necessary for tax collection plays a vital role. It is assumed that this function is mandatory therefore, it will not be investigated in the survey.

Internal cost accounting follows the central aim of securing the continued success of the company. Several issues must, therefore, be planned, managed and monitored. This includes a company's financial issues, its operative processes, customer and sales perspectives as well as the personnel and innovation matters.

The financial department is the most important amongst the areas named above (see section 2.2.3). Data material for cost accounting is generated through financial transaction. A firm's financial condition is ultimately the main factor influencing its long-term continuity. Its current financial condition and prospects play a decisive role in this. Fundamental questions regarding the firm's efficiency, rentability and liquidity stand in the foreground.

Following topics were reached through an analysis of the requirements of an effective cost accounting system (see section 2.4) and will allow answering RQ 7 and RQ 8.

Finance department
- Monthly, quarterly and annual earnings
- Sales and return on equity
- Liquidity and cash flow
- Fixed costs analysis
- Cost planning and cost control

Operational matters
- Cost of individual processes
- Quality, error or complaint rate/costs
- Availability and degree of utilization of fixed assets
- Make-or-Buy decisions, sales pricing
- Material turnover, storage costs

Customer and sales perspectives
- Gross margin and profit contribution per individual product or department
- Turnover and gross margin per customer
- Profit margin
- Breakeven Point
- Market coverage / Market share

Personnel and Innovation matters
- Personnel cost ratio
- Labour productivity
- Research and innovation intensity and costs

RQ 9: Do German SMEs managers consider indicators as important for their decision-making process?

This question can be queried directly in a form of self-assessment by the managers about the importance of indicators for their management responsibilities:

- unimportant
- rather unimportant
- average
- important
- Very important

In addition, the number of assigned indicators in the company concerned is queried.

The following areas are offered:

- None
- 1-3
- 4-9
- 10-20
- over 20

RQ 10: Which indicator systems are currently used by managers in German SMEs?

To answer this question, the indicator systems are listed, which have been shown in the Literature Review (section 3.4.1) as the best known and most used:

- Balanced Scorecard
- RL Kennzahlensystem
- Du Pond Kennzahlensystem
- ZVEI Kennzahlensystem
- Non of the above

RQ 11: Are German SME managers prepared to replace their current cost accounting system with a more advanced and modern system?

Managers and theorists similarly and consistently share the opinion that the introduction of a system of cost accounting automatically requires a restructuring of management levels (see section 3.4.5). Given that in SMEs, leadership is often concentrated on one person, it remains unclear how this process is supposed to work in practice.

The question here will request whether managers are ready to focus more strongly on classical tasks of management and delegate operational tasks to lower levels of hierarchy. In such, the question will investigate whether, from a structural point of view, it is even possible to realign tasks so that a new system of cost accounting can be implemented: are there competent employees in the various departments who could be assigned with decision making responsibilities? Is there really a possibility to delegate managerial tasks in order to be able to focus on strategic issues (planning, managing and controlling)?

Because of the complexity and diversity of these questions, they may not be answered by the survey but during the personal interviews with SME managers.

5.2.3 Necessary additional information for the Research Objective 2

The starting point of this study have been the following two Research Objectives:

RO 1: To explore and investigate the potential impact of the use (or lack of use) of a sufficient cost accounting system and indicators on the efficiency of German SMEs by seeking and analyzing managers perceptions.

RO 2: To develop a potential model which provides a combination of a modern cost accounting system with appropriate indicators relevant to the requirements of German SMEs.

The first research Objectives (RO 1) is an assumption regarding the condition of SMEs. In this case, it is indeed possible to reach an answer directly through the survey. As has been discussed in the Literature Review chapter, LSEs work far more efficiently than SMEs and they also seem to be overall more successful seeing as their rate of insolvency is lower than in SMEs. Higher efficiency, higher turnovers, higher profits per employee and a stable financial structure are often put down to the greater chances for external funding and a higher level of technological adaptation (mechanization) common amongst LSEs (see section 2.4). Moreover, the literature review provided evidence for the lower supply of information to managers of SMEs than LSEs to also be a reason. In the survey, some questions will specifically be asked to managers: to what extent they reach strategic decisions based on accurate information and to what extent do they rely simply on past experiences.

5.3 Pre-test of the survey

In section 4.3 "Selected strategies", the written survey was crystallized as a reliable instrument for the data collection necessary for this paper. In order to optimize the

questionnaires, the need to carry out a pre-test of the survey in the form of informal discussions has also been shown.

To this end, the collection of prepared questions was discussed with SME managers in a personal appointment. These talks were held in October 2014 with three managers of German SMEs who meet all the criteria laid out in section 2.4 (size, turnover, self-employment, etc.). The content of the discussions will be limited to the sequences which influenced the questionnaire.

The survey begins with general questions about the company. In all three conversations, it became clear that the SMEs had some difficulty indicating the annual turnover. In personal interviews, however, this point should be viewed differently than in the written and, above all, anonymous questionnaires. In order to enable a comparison in the survey on whether the respondents also meet the criteria of SMEs (section 2.4) in terms of turnover, this question is relevant but will be placed at the end of the survey. If this question is listed too early, the interviewee could cancel the questionnaire and possibly not return it. If, on the other hand, it is only at the very end, this risk is minimized.

Furthermore, during asking the first questions, a formal error emerged, when two issues were addressed in one question. All three participants agreed to the length of the survey and the necessary effort in answering it. Also, all three found the questions were clearly formulated and logically presented. However, some deficits have been identified in the area of the parameters that are relevant for the planning, management and monitoring of the company. Each of the three managers had suggestions about which indicator should be included in the list.

The first version of the survey included the following indicators, those are also listed in the literature as the most important and decisive indicators (Kaschny and Nolden, 2014; Legenhausen, 2013).

(I) Financial department: Current Operating Profit, Return on Sales, Analysis of Fixed Costs, Cost Planning and Product Costing.

Proposals for additional indicators in the financial sector of the SME managers were: current solvency, cash flow, cost reduction and liquidity

Cost reduction plays a decisive role in SMEs, especially in view of the increasing globalization and transparency of the markets (Garrel and Tackenberg, 2013). In order to secure the company's success long term, it can, therefore, be vital to keep up-to-date with cost reductions. Cost reduction potential, therefore, will be incorporated into the survey.

Current solvency can be seen synonymous with liquidity. According to the definition, liquidity is the result of the comparison of liquid funds and short-term payment obligations (Weber et al., 2013). In other words, it indicates the current solvency. Cash flow is the cash surplus at the end of a certain period (usually one year) (Disatnik et al., 2014). In terms of daily or weekly demand, the cash flow is ultimately also determined by the current payment capacity at the respective due date.

It is advisable to add a measure for determining the current solvency. As the literature review has shown (section 3.3.5) it is much more difficult for SMEs to find external finances than for large companies. To determine the solvency on a regular basis is therefore important for SMEs.

(II) Operational matters: improvement of processes, costs of individual processes, make-or-buy decision, price determination.

Additional suggestions of the managers were: error rate of the processes, storage costs, processing time, complaint rate and cost, costs resulting from errors, error delivery rate.

The points error rate, error costs as well as complaints rate and costs were mentioned in all three conversations. The significance of these figures is also confirmed in the literature (Zehnder, 2013). SMEs generally work in smaller lots with specialized employees (Hamann, 2013). The risk of errors is greater in these processes than in industrial, higher-technology series and mass production. Error avoidance, as well as avoidance of complaints, help the SME to build a good image and thus strengthens the position of the respective market.

The error delivery rate is a special issue that only emerged in one discussion in the course of speaking about error costs with the manager. Ultimately, just adding the overall error rate is the better option since all errors are listed. False deliveries are also reflected in the complaint rate. The indicator of the error delivery rate will therefore not enter the survey.

The storage costs and the stock turnover, i.e. the intensity with which the stocks are used or handled in the company's production process, play a major role in any company, whether it is SMEs or industrial companies (Hausladen, 2014). As a rule, the industries determine the stock turnover ratio easier since IT-supported storage maintains this indicator as an accessory (Hendrich, 2016). However, computer-assisted storage is not available in all SMEs, although it is disproportionately expensive to determine the turnover without the corresponding tools.

In order to acknowledge the importance of storage anyway, it will be asked whether SMEs survey the storage costs or whether this would become a helpful indicator in the future.

(III) Indicators for profitability: The profitability of a company or a single product usually describes the return on capital used. The indicators for this are return on equity and return on assets. These indicators are generally collected annually (Reichmann, 2014). Next to these indicators, more specific metrics could have been proposed for SMEs, which are determined in shorter cycles and keep the manager up to date on the latest developments.

Unlike profitability, cost-effectiveness is a figure that must always be seen in relation to the resources deployed. If a company makes a profit of one Euro it is profitable. However, if the original investment was one million euro the company may be seen as profitable but not cost effective.[16]

Proposals for this section of the indicators were the cost-effectiveness of individual products, the profit margin, the break-even point of new products and the market share. All three surveyed managers considered these points important.

The figure for the cost-effectiveness of individual products led to a discussion during which the need for savings potential in purchasing emerged. The selling price is usually regulated by the market. Savings potential for processes as an indicator has already been selected. A further decisive possibility to influence the profitability of individual

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[16] According to a survey by the Federal Statistical Office an average ROI for SMEs in Germany, for example was an average of 8% between 2000 and 2012. (Welter and Malshe, 2013)

products is strategic purchasing. To generate competitive advantages, ultimately all three managers opted for an indicator to identify potential savings in purchasing.

(IV) Sales and labour perspectives: Gross margin and profit contribution per individual product, Make-or-Buy decision, employee costs, labour productivity, fluctuation rate and innovation rate.

The interviewees agreed on the importance of Gross margin and profit contribution per individual product, Make-or-Buy decision, worker productivity and the costs of individual employees. The fluctuation rate and the innovation rate, on the other hand, were viewed sceptically. With regard to the innovation rate, its meaningfulness has been questioned. As a rule, SME managers keep a close eye on innovations coming from employees. As a rule, however, this is relatively rare, so as an indicator it is rather secondary.

The same applies to the fluctuation rate. Here, too, it is an advantage that the manager is close to the day-to-day business in SMEs and has an overview of employee fluctuation in the company. Adding this point as an indicator certainly would not hurt according to the SMEs, but is not urgently needed.

One issue which still mattered to the managers was the constant determination of the behaviour of the employees. This topic was agreed upon as a "soft fact" which is difficult to determine, but whose importance is substantial in terms of reliability and disposition among employees.

The informal discussions regarding the survey have turned out to be an important and correct step. All three managers interviewed were very interested in the topic and have contributed valuable input to improve the survey and to more precisely coordinate the target group.

With this information the survey could be finished (see appendix II) and sent to the managers.

5.4 Analysis of the survey results

The purpose of the survey is to answer the Research Questions and to develop indicators for the SME-specific cost accounting system.

The overall structure of the data collection is based on the following framework:

Step 1:   The two Research Objectives are the starting point.
Step 2:   During the Literature Review Research Questions have come up that are necessary for the determination of the two Research Objectives
Step 3:   Hypotheses have been developed for the Research Questions, which will be checked by a survey.
Step 4:   Test of the hypotheses provides the data and information to identify and develop the key indicators. The data needs of those indicators in conjunction with the results of the Literature Review will help to determine the appropriate accounting system for SMEs.

Of the eleven research questions, hypotheses are formed from these Questions where the addressees have the choice between different options. Here, a hypothesis can be formed based on the information and literature review. These hypotheses can be evaluated on the basis of the results of the current survey for this research. This is the case with Research Question 1, 2,3,4,5 and 9. In the case of research questions with only a list of data (for example, which cost accounting system is used) not suitable for hypothesis formation, since this is only about the determination of frequencies. This is the case with Research Question 6, 7, 8 and 10.

5.4.1 Hypothesis formation for Research Question 1,2,3,4, 5 and 9

RQ$_1$: Does the production system affect the choice of the Cost Accounting model in German SMEs?

H_{01}: Companies with a higher range of products do not use a more advanced cost accounting system.

H_{a1}: Companies with a higher range of products use a more advanced cost accounting system.

In the literature review, section 2.5.3 it was discussed that there is a deeper understanding of cost accounting in larger SMEs. In these companies, more modern and more specific methods of cost accounting are used than in small SMEs, which are often only using full cost accounting methods (Schultz 2013; Ossadnik, 2004). According to Pleschak et al. (2013), larger companies often have more complex organizational and production structures than small SMEs. However, If surveys are taken into account, which deals with the semantic content of cost accounting for classical management tasks, they show that even large companies with a greater variety of products don not necessarily use a more modern or more extensive cost accounting system than small SMEs with lesser product variety (Ulrich et al., 2016; Becker et al., 2008).

H1 - Analysis of the survey results:

First, the complexity index of cost accounting is calculated. It is determined by the arithmetic mean of the questions 12 to 16 of the survey. The complexity of cost accounting increases with the increased use of modern cost accounting systems.

To answer the hypothesis, the correlation between the product variety and the complexity index is calculated. For this, the correlation by Spearman is considered. The scope of the power spectrum ($r = 0.001$, $p = 0.99$) shows no significant effect on the complexity of the cost accounting system used.

Table 5.2: Results of product variety.

Product variety	1-10	11-30	31-100	Over 100
Number of respondents (%)	38 (17.9)	34 (16.0)	44 (20.8)	96 (45.3)

The result shows that the null hypothesis is not rejected.

There might be different causes. The hypothesis is that companies with more complex structures in the operational area and a larger product portfolio accordingly use a more comprehensive and meaningful cost accounting system. Small businesses, however, do not practice this. On the one hand, it is possible that now even small businesses have recognized the importance and the benefit of a meaningful and modern cost accounting system and subsequently use them and therefore there is no significant difference in the results of the survey on this point.

A second possibility is that, as assumed, small SMEs operate with a small variety of different products and only use an inadequate cost accounting system for today's competitive economic environment. And the same is true for larger SMEs with a more comprehensive range of products. A view at the Literature Review section 2.5.5 "extension of modern cost accounting systems in SMEs" speaks for the second case. In several diverse studies, it becomes clear that SMEs of all sizes from 10-250 employees are dissatisfied with the existing accounting systems, view it as maladjusted to their needs and simply do not have the resources to adequately deal with this topic.

The cost accounting system for SMEs must be improved. Regardless of the size of SMEs and the complexity of the operational processes, there is room for considerable improvement. In many SMEs, the potential to improve is thereby implementing an easy

to practice cost accounting system and therefore improve the field of management tasks, like planning, management and monitoring.

H₀₂: *Companies with mixed production methods do not use a more advanced cost accounting system*

Hₐ₂: *Companies with mixed production methods do use a more advanced cost accounting system*

In the literature review, sections 2.4.4 to 2.4.6 the production methods by SMEs were examined. A study by Jacobs et al. (2009) concluded that SMEs manufactured small batches and custom-made products rather than mass products. And they showed in the study that customized production has other requirements for cost accounting than serial production. The production methods in SMEs are usually considerably more heterogeneous than in industrial plants, especially in relation to the numbers produced (Stütz, 2011). Heterogeneous production methods - meaning constantly changing demands on production by individual customer requirements - make the organizational processes within the company more complex. The second hypothesis is based on the assumption that this higher degree of organizational complexity is reflected by a better-developed cost accounting system.

H2 - Analysis of the survey results:

First, the complexity of cost accounting of the survey results will be used. This number was already calculated for the evaluation of hypothesis 1 in the complexity index. To answer the hypothesis the correlation between the percentage of customized products and the complexity index is calculated. For this, the Pearson correlation is considered. The scope of the individually tailored products (r = -0079, p = 0.253) shows no significant effect on the complexity of accounting used.

Table 5.3: Results of the degree of customization

Amount of customized products	Very low	Low	Average	High	Very high
Number of respondents (%)	2 (0.9)	13 (6.1)	21 (9.8)	54 (25.7)	122 (57.5)

Therefore, the null hypothesis is not rejected with regard to German SMEs.

Almost all articles that deal with the further development of cost accounting systems reccomed the use of modern forms of cost accounting (see Section 2.3). Section 2.5 has shown that in 79% of all bankruptcy cases of SMEs a lack of the ability to purposeful plan, manage and control the operating procedures was essential for the failure of the company. Therefore, the importance of a relevant accounting system and indicator system is proven. From a theoretical point of view, it is not clear why the null hypothesis has not been refuted by the survey results. SME managers of the present generation are informed. They have extensive and unlimited access to knowledge and the ability to absorb this knowledge.

However, the unexpected results of the analysis of the second hypothesis can be explained by the findings of section 2.5.1. Here studies were cited, which date back to the 1990s. Grieco and Pilachowski (1995) conducted a study on the use of modern cost accounting systems and the most common answers were:

> "We don't have the money and resources necessary to do the job right", "People will not accept change" and "We don't have the time" (p. 158)

This statement is consistent with other recent studies (for instance, Leidig, 2001; Jacobs et al., 2009). It is surprising, however, that this attitude, especially with more complex organizational structures that were relevant in the second hypothesis, has not changed in recent years. It seems reasonable to suppose that today the same reasons

apply for the poor circulation of contemporary cost accounting systems that have been identified in previous studies: Lack of resources, lack of knowledge, lack of acceptance of partly theoretical and little and unclearly addressed systems and models.

RQ 2: Is there a correlation between the company's size and the quality of cost accounting in German SMEs?

H$_{03}$: *Company's size has no impact on the choice of Cost Accounting system in German SMEs.*

H$_{a3}$: *Company's size has an impact on the choice of Cost Accounting system in German SMEs.*

In section 2.5.3 the Literature Review has clearly demonstrated that modern cost accounting systems in SMEs are clearly understated whereas in LSE, usually, separate departments are employed with the issue of cost accounting and its development (Sewering, 2013; Friedl et al., 2014). This is not surprising. However, the question arises whether bigger SMEs, with a higher number of employees, have an increased focus on the development of their own cost accounting compared to small SMEs. That would mean that SMEs would have to be divided into different classes in order to develop appropriate cost accounting systems for the respective sized classes. In this case, small SMEs have a much greater need for support than large ones, which are already active in these matters. Previous surveys have shown a tendency within SMEs that support the alternative hypothesis (Schultz, 2013).

H3 - Analysis of the survey results:

The number of employees has been determined by the answer to Question 1 of the survey. For the complexity of the accounting, the already determined RQ 1 complexity index can be used. To answer the question, the correlation is calculated from a number

of employees and complexity index. In correlation with Spearman. With a result of r = -0064, p = 0.356 it shows that the number of employees has no significant effect on the complexity of the cost accounting.

Table 5.4: Correlation between the company's size and the quality of cost accounting

Number of employees	1-25	26-50	51-100	101-200	Over 200
Number of respondents (%)	84 (39.6)	50 (23.6)	30 (14.2)	20 (9.4)	28 (13.2)

The analysis shows that the null hypothesis is not rejected.

This result contradicts a previous survey of Schultz, carried out in the period between 2011 and 2012. Running their own departments for cost accounting is appropriate and mandatory for large and industrial companies. Large and complex structures need a clear framework and a regular flow of data to inform the managers. Therefore, monthly data is collected and their variations analyzed (Reichmann, 2014). Those responsible must be up to date on all financial and productive movements in the company in order to make the correct decisions.

However, this also applies to SMEs. That there is no discernible difference between large and small SMEs is puzzling. In smaller SMEs, managers are more involved in the daily business so they can estimate the situation of the company using the most current numbers such as orders, monthly operating accounts and evaluation of the progress in production. For companies that are located at the upper end of the employee portion of the SMEs, this is unlikely. Leading a company with 250 employees and only relying on the information of a full cost accounting system is difficult to imagine in today's fast competition, however in the majority of the companies surveyed, it is a reality.

The new to develop cost accounting system needs to reach the full range of SMEs. The survey results show that regardless of their size in the frame of 10-250 employees contemporary cost accounting is underrepresented on all SMEs. The cost accounting system, which needs to be developed, must, therefore, be based on the needs of small SMEs to help with their available resources and know-how and at the same time, it must have the potential to provide all necessary information for the organizational aspects of large SMEs.

RQ 3: How important is a cost accounting system for decision making in German SMEs?

H_{04}: The cost accounting system is not important for decision-making processes in German SMEs.

H_{a4}: The cost accounting system is important for decision-making processes in German SMEs.

In a survey conducted by Joos-Sachse (2002), about 80% of German SME managers stated they work with a standard cost accounting system based on full costs. The majority merely views cost accounting as a tool to control all modalities. In section 2.2 on the other side, it became clear, that economists attribute high importance to cost accounting with respect to the generation of relevant figures and information for management tasks. The surveys go back a few years, also it was not asked about the importance attributed to cost accounting by the managers, but rather which cost accounting system they actually used.

However, this is not relevant to this hypothesis. Rather, it is about finding out whether SME managers at the present time incorporate information from cost accounting systems into their decisions. Regardless of which cost system was used.

H4 - Analysis of the survey results:

The survey specifically asked about the importance of cost accounting to the managers. The possible answers to question 10 on the significance of cost accounting in the company ranged from "very important = 1" to "rather unimportant = 4". ("Not Important = 5" was marked in none of the questionnaires). The average showed 1,882, i.e. between "very important = 1" and "important = 2". The standard deviation was 0.860.

Table 5.5: Importance of cost accounting

Importance of cost accounting	Unimportant	Rather unimportant	Average	Important	Very important
Number of respondents (%)	0 (0.0)	8 (3.8)	43 (20.3)	77 (36.3)	84 (39.6)

The results show that the null hypothesis is rejected.

SME managers use the numbers of cost accounting for their work. However, according to the results above, these data come from a standard full cost accounting. Section 2.2 of the Literature Review has clearly shown, the requirements of management accounting needed to presently provide adequate numbers, in order to make decisions. This is difficult with a full cost system. The survey shows a fundamental understanding of SME managers of the importance of a valuable accounting. Therefore, a basis is created, one which to build a functional and accessible accounting system.

H05: *Managers of German SMEs have insufficient knowledge in the field of cost accounting.*

H$_{a5}$: *Managers of German SMEs have sufficient knowledge in the field of cost accounting.*

In section 2.4 of the Literature Review, it was shown that especially in SME decisions are often made on the basis of past experience or partly by the state of mind. Modern accounting systems have so far hardly found their way into SMEs. At the same time, the importance of accounting is indisputable regarding the company's success. Managers of SMEs are aware of this fact. However, according to previous studies they avoid the additional resources required to modernize their accounting system. If SMEs managers know about the importance of accounting, it can be taken for granted that they also have sufficient expertise to use the data of accounting for their work.

H5 - Analysis of the survey results:

The self-assessment of the manager in relation to their know-how in the context of accounting was directly queried:

Table 5.6: Assessment of the knowledge regarding cost accounting

Knowledge	Very high	High	Normal	Low
Number of respondents (%)	24 (10.4)	74 (34.9)	98 (46.2)	18 (8.5)

The result shows the null hypothesis is rejected.

Almost half of SME managers estimate their know-how in the field of management accounting as "normal". Only 8.5% believe it is too low and 45.3% considered it as "high" or "very high".

Viewed isolated, this constitutes a desirable outcome. However, this result must be viewed against the background that 80% of all SMEs have a full cost accounting-system, consisting of type of costs, cost centre and cost units. The full costing system

is required for tax purposes in Germany and relatively easy to use and evaluate. This is not to be compared with the effort needed to work with, for example, a process cost calculation.

H06: *Managers deal less than 3 hours per week with their cost accounting information in German SMEs.*

Ha6: *Managers deal more than 3 hours per week with their cost accounting information in German SMEs.*

To develop an accounting system to support the SME managers in their daily work, two conditions must be met. Firstly, the accounting has to be structured so that it generates all relevant data for planning, management and monitoring. Secondly, the system must be adapted to the needs and resources of the companies in which it is to be used.

To understand how much time SME managers, take to cope with information from the Accounting, four different time stages were determined in the survey: Up to one hour, up to three hours, up to 5 hours, more than 5 hours. This classification is not done by recommendation but rather based on the input from the informal talks with SME managers to pre-test the postal survey. The talks showed that a certain minimum level of review is needed to fully understand the data and analyze it. The proposals of the managers interviewed in the pre-tests fluctuated between 45 minutes and one hour per day as a minimum of time needed to work with the management accounting (section 5.3). If these estimates are averaged, a minimum requirement of about 4 hours per week is calculated, which a manager must be willing to invest in accounting and indicators to adequately use it.

H6 - Analysis of the survey results:

These values were directly queried in the survey and the weekly time spent with the examination of the cost accounting is described as follows:

Table 5.7: Time required for cost accounting per week.

Time per week	Up to 1 hour	Up to 3 hours	Up to 5 hours	Over 5 hours
Number of respondents (%)	56 (26.4)	94 (44.37)	32 (15.1)	30 (14.2)

The results show the null hypothesis is not rejected.

70.7% of all surveyed SMEs managers invest less than three hours a week in their accounting, only 29.3% need three hours or more. In the three personal interviews to pre-test the survey, managers have consistently represented the opinion that accounting and indicators can only be used profitably if the decision makers invest a certain amount of time into it. In that particular case, the answers given ranged between 45 and 60 min a day (3:45 and 5 hours a week).

The fact that 73.6% of all respondents worked more than an hour with the cost accounting system is a good basis. This confirms the results on which hypothesis number 4 is based, namely that managers attach a certain importance to cost accounting and utilize it - though perhaps not as sufficiently as possible.

However, this also shows that managers should not be overburdened with the accounting and indicator system. The number of indicators must be kept to a minimum. Here the basic idea of the RL indicator system could provide a suitable template. The RL indicator system has a compulsory pool of indicators that need to be determined to get the basic data for management decisions. In addition, there is a recommended block of indicators that can be utilized only if required (Fischer and Möller, 2015).

RQ 4: Are Cost Accounting systems assessed and updated according to the changing economic environment in German SMEs?

H$_{07}$: *German SMEs do not update their cost accounting system to meet the changing economic environment.*

H$_{a7}$: *German SMEs update their cost accounting system to meet the changing economic environment.*

Economic operators in the globalized world are increasingly pressured to innovate. In addition, its own processes must constantly be adapted to rapidly changing and more and more individual customer requirements (Erlbeck, 2013). These economic conditions force entrepreneurs to permanently adapt to the economic environment. It seems necessary that even accounting should adapt to these changes.

H7 - Analysis of the survey results:

This question can be concretely answered from question 21. The choice given ranged from "Yes = 1", "Partial = 2" and "No = 3". From 212 usable responses figures were as follows:

Table 5.8: Updating of the Cost Accounting according to changes in the economic environment.

Update	Yes	Partial	No
Number of respondents (%)	83 (39.1)	93 (43.9)	36 (17.0)

The mean value is 1.78 with a standard deviation of 0.717. Most SMEs surveyed, therefore, adjust their cost accounting system to the changing economic environment.

The results show the null hypothesis is rejected.

83% of respondents adjust the cost accounting used to the changing environment. This result offers good background information for creating the SME specific management accounting. Seeing as it shows yet again that SME managers are quite prepared and capable to invest resources in accounting. However, the survey results don't show what motivated the changes in accounting. There are two possible reasons. On the one hand, the recognized need for changing information needs for management tasks. On the other hand, a simple adaptation of the accounting system because of legal regulations. This may be, for example, changes in tax law or reviews of financial statements.

The system, which is developed under this research must take this result into account. The compulsory indicators that will be chosen must be as universal as possible and in prospects towards future use should be as long-lasting as possible. Additional key information should be clearly marked and it should be noted which measure should be taken in which developmental step or in what specific situation. So the SME manager can respond to changing influences with the use of matching indicators (for example, employee productivity, customer exit rate, process indicators).

H08: *The market pressure of product innovation has no impact on updating the cost accounting system in German SMEs.*

Ha8*: The market pressure of product innovation has an impact on updating the cost accounting system in German SMEs.*

In section 2.2 the shift from a seller's market to a buyer's market in the 1950s and the resulting change in requirements for cost accounting have been described. New challenges in the economic competition were driving the development of new and specialized cost accounting systems. Different demands on companies, therefore,

always go hand in hand with an adaptation of cost accounting. The hypothesis assumes that such interdependence can be traced into the area of individual SMEs. SMEs that are confronted with higher competitive pressure in terms of innovation do not just adjust their product lines but all company processes. This generally includes the development of management accounting.

H8 - Analysis of the survey results:

The result is calculated by variance analysis. Hereby the pressure to innovate on the entrepreneurs is compared to the adaptation of cost accounting. (The data was determined by direct questions in the survey.) It is checked whether the groups that have responded "Yes" or "Partly" are also under a higher pressure to innovate and thus are forced by the industry to adapt their accounting more often than the group that answered "No".

The variance analysis revealed no significant association ($p = 0.281$). The frequent updates of cost accounting used in each case are not directly related to a higher pressure to innovate in the processes and products in SMEs.

The null hypothesis is not disproved.
The first null hypothesis of RQ4 was disproved. The majority of companies surveyed adapt their management accounting to changing economic conditions. This adaptation of the accounting happens, however, regardless of whether there is a higher or lower pressure to innovate in an SME.

In the SME, there is a basic understanding to keep the management accounting up to date. That was shown by the results of the analysis of hypothesis 7. At the same time, however, the willingness to adapt one's costing to the company's own needs beyond

that initial pressure is missing. This result is consistent with previous findings, based again on the presumption SME managers do not see any need for additional cost accounting systems to them or are just overwhelmed with this topic.

RQ 5: Is German SMEs planning strategy based on future trends or on the costs of the last period?

H_{09}: *The planning strategy in most of German SMEs is based on future trends.*

H_{a9}: *The planning strategy in most of German SMEs is based on the costs of the last period.*

In section 2.3.1 it became clear how important time-cost reference is to a meaningful cost accounting. Actual, normal and standard costs are differentiated in this section. The disadvantages of cost accounting based on actual and standard costs became clear. For a future-oriented accounting system, this data on planned figures is essential.

Previous studies such as König et al. (2012), Paul (2014) and Kiederer (2011), have shown that in the companies surveyed, the cost accounting primarily plays a determining function. For that, the data of the previous period, i.e. actual and standard costs are mainly used. With the help of the research question, it should be determined whether this is still valid currently.

H9 - Analysis of the survey results:

To answer this question, the frequency of question 11 (Which costs do you use for cost accounting) is determined.

Table 5.9: Time reverence for planning strategy.

Costs	Returns of the previous period	average costs of several past periods	Planned costs based on future trends
Number of respondents (%)	84 (39.6)	100 (47.2)	28 (13.2)

The results show that the null hypothesis is rejected.

Actual and normal costs result from ongoing accounting. Taking care of this past-related accounting is mandatory for German companies for fiscal reasons. Especially for SMEs, which typically have fewer resources, it is much easier and faster to access this data than it is to determine future plan costs. Moreover, defining planned costs based on the past data associated with anticipated future trends can only be meaningful and useful when the data is determined with the greatest precision and all possible influences should be considered (Matz, 2013).

The prevailing situation in the German SME has been extensively discussed in the Literature Review, therefore, that result is not surprising. Lack of resources and lack of understanding can be traced as reasons for the outcome of this analysis. It needs a great effort to generate standard costs. Thus, this could overtax the resources and possibilities of SMEs in Germany.

RQ 9: Do German SMEs managers consider indicators as important for their decision-making process?

H_{010}: *Managers make decisions without KPIs in German SMEs.*

H_{a10}: *Managers make decisions with KPIs in German SMEs.*

SMEs that identify indicators are more successful than SMEs that do not (see section 3.4.4). This striking conclusion of a study published by Jorissen et al. in 1997 leaves the question for the causes unanswered. However, it is possible to assume that companies that make the effort to fundamentally familiarize themselves with the identifying indicators have a better understanding of the work in the company than an entrepreneur that does not. It seems elementary, to detect major changes early on that for instance processes suddenly take longer, the complaint rate increases or decreases in employee productivity. Situations that inhibit the company's development are detected earlier and it is possible to search for specific causes and solutions.

Throughout the entire literature review, it became clear again and again how little aware German SME managers are towards the context of modern cost accounting and the indicators. However, there is also a trend toward a greater understanding of the use of indicators. For this paper, a general acceptance of indicators is crucial. In the alternative hypothesis, it is assumed that the positive trend has continued on through to indicators.

H10 - Analysis of the survey results:

This question was asked directly towards the definition of indicators for planning, management and monitoring of business decisions.

Table 5.10: Importance of indicators for decision-making.

	Very important	Important	Average	Rather unimportant	Unimportant
Number of respondents (%)	27 8 (12.7)	76 (35.8)	63 (29.7)	23 (10.9)	23 (10.9)

The results show the null hypothesis is rejected.

Indicators and their significance are increasingly noted in German SMEs (Fischer, 2015). This hypothesis is confirmed by the survey results. For the development and competitiveness, this can have an increasingly positive effect. In the following questions, it has to be determined how many and what kind of measures in SMEs are identified, in which cycles this data is determined, and whether they are analyzed with the necessary know-how.

H_{011}: *Managers use 10 or more indicators through their decision-making process in German SMEs.*

H_{a11}: *Managers use less than 10 indicators through their decision-making process in German SMEs.*

In the literature, opinions are divided whether there is a specific number of indicators that are needed to make a meaningful indicator system. Pohl (2015) describes a performance measurement system as a unique topic which cannot be determined by a concrete set of indicators. He names

> "a manageable set of KPIs, which is taking into account the factors scope, time, cost, consistency, validity." as a decisive success factor (p. 16)".

Vollmuth and Zwettler (2015) believe a fixed number of KPIs should be used by SMEs, "It makes sense to limit the indicators to 10 to 20 KPIs" (p. 21). According to the authors, the main point is in which logical context the indicators are related to each other, and what kind of information they should provide. In the pre-test interviews to the survey, a tendency has shown that the surveyed managers believe a minimum of 10 indicators should be a prerequisite for a functioning indicator system.

H11 - Analysis of the survey results:

To answer this question, the frequency of the indicators from question 23 is used "How many indicators are determined in your company"

Table 5.11: Amount of indicators used

Indicators	None	1-3	4-9	10-20	Over 20
Number of respondents (%)	36 (17.0)	27 (12.7)	77 (36.3)	44 (20.8)	28 (13.2)

The results show the null hypothesis is rejected.

Only 34% of the surveyed SME managers identify 10 indicators or more. With these figures, the result of hypothesis 10 is somewhat put into perspective. Here 48% have testified indicators were "very important" or "important" to their decision. However, without an idea about which indicators are meant or on what number of indicators they build their decisions. In this context, it would be interesting to determine what the relationship is between the number of detected indicators and the information concerning the importance of indicators in the respective companies surveyed there.

Table 5.12: the relationship between the number of detected indicators and assessment of the importance of indicators.

Amount of detected KPIs	Very important	Important	Average	Rather unimportant	unimportant
Non (%)	1 (2.8%)	4 (11.1%)	9 (25%)	9 (25%)	13 (36.1%)
1-3 (%)	2 (7.4%)	9 (33.3%)	8 (29.6%)	5 (18.5%)	3 (11.1%)
4-9 (%)	2 (2.6)	30 (39.0%)	36 (46.8%)	4 (5.2%)	5 (6.5%)
10-20 (%)	10 (22.7%)	22 (50.0%)	6 (13.6%)	4 (9.1%)	2 (4.5%)
More than 20 (%)	12 (42.9%)	11 (39.3%)	4 (14.3%)	1 (3.6%)	0 (0.0%)

This table shows a significant correlation ($r = 0.556$, $p < 0.01$) between the number of identified indicators and the importance of indicators in the company. That is to say, the more important the managers surveyed judge the use if indicators, the higher the number of indicators they identify and use in their companies.

5.4.2 Evaluation of the research questions 6, 7, 8 and 10

In the following, the research questions that are not suitable for hypothesis formation are statistically evaluated.

RQ 6: What are the most common cost accounting systems used among German SMEs?

To answer this question, the frequencies of question 11 (Which costs accounting system do you use) were determined. The table below shows the results. Multiple answers were possible.

Table 5.13: Most common cost accounting systems.

	Always	Regularly	Seldom	never
Full cost accounting	83 (39.4%)	84 (39.8%)	22 (10.4%)	22 (10.4%)
Contribution margin	37 (17.5%)	86 (40.8%)	48 (22.7%)	40 (19.0%)
ABC	15 (7.1%)	46 (21.8%)	76 (36.0%)	74 (35.1%)
Target costing	13 (6.2%)	42 (19.9%)	72 (34.1%)	50 (23.7%)
Product life-cycle costing	7 (3.3%)	34 (16.1%)	50 (23.7%)	120 (56.9%)

The results are similar to previous surveys (see 2.5.3). Most companies use full cost accounting systems. However, the fact that many companies also work at least partially with a contribution margin calculation means that you need the meaningfulness of this system and secondly that there is no fear of partial cost systems.

RQ 7: What information is currently being determined by the cost accounting system in German SMEs?

Here a plausibility check is performed first. All people that have ticked nothing in this column are omitted from the evaluation. It will only consider those questionnaires in which at least one of the fields has been ticked. Of the 212 usable questionnaires, 103 are omitted after this check. 109 can be evaluated.

The table below shows the answers; the sorting is done by frequency and does not match the order in the questionnaire.

Table 5.14: Currently determined information with cost accounting.

	No		Yes	
	Number	%	Number	%
Current operating result	1	0.90%	108	99.10%
Solvency	21	19.30%	88	80.70%
Product calculation	27	24.80%	82	75.20%
Fixed costs	51	46.80%	58	53.20%
Profit margin	51	46.80%	58	53.20%
Return on sales	52	47.70%	57	52.30%
Sales price	53	48.60%	56	51.40%
Complaint rate / cost	55	50.50%	54	49.50%
Cost planning	57	52.30%	52	47.70%
Profitability	57	52.30%	52	47.70%
Cost of employees	64	58.70%	45	41.30%
Cost of individual processes	67	61.50%	42	38.50%
Error rate	69	63.30%	40	36.70%
Worker productivity	70	64.20%	39	35.80%
Improvement of processes	72	66.10%	37	33.90%
Cost reduction	74	67.90%	35	32.10%
Make or buy decision	75	68.80%	34	31.20%

Savings	83	76.10%	26	23.90%
Storage cost	86	78.90%	23	21.10%
Employee behavior	87	79.80%	22	20.20%
Break Even	89	81.70%	20	18.30%
Market share	96	88.10%	13	11.90%

Three of the proposed indicators (Current operating result, Solvency and Product calculation) are ranked by a large proportion of managers. But already the fourth-placed indicator is estimated by only about half of the managers as important. This clearly shows how different the requirements are even in the strongly limited target group of this research.

RQ 8: What is the most important information that needs to be determined with the accounting system in German SMEs?

In the questionnaires the most relevant indicators could be rated as "very important =1", "Important =2" "worth knowing =3 ", "4 rather unimportant "and "unimportant =5". To answer the question, the mean values and standard deviations are determined. The table shows the responses. Sorting is done by frequency and does not match the order in the questionnaire.

Table 5.15: Information that should be determined by cost accounting.

	Minimum	Maximum	Average	Standard deviation
Current operating result	1	4	1.472	0.6488
Worker productivity	1	3	1.472	0.5457
Product calculation	1	3	1.575	0.6596
Solvency	1	4	1.585	0.8417
Employee behavior	1	5	1.608	0.7925
Profitability	1	5	1.689	0.8909

Profit margin	1	5	1.712	0.7587
Costs of employees	1	4	1.722	0.6973
Improvement of processes	1	5	1.769	0.7404
Retail price	1	5	1.832	0.9830
Savings	1	5	1.887	0.8634
Return on sales	1	5	2.000	0.9029
Complaint rate / cost	1	5	2.000	0.9539
Error rate	1	5	2.014	0.9106
Cost reduction	1	5	2.033	0.8674
Cost planning	1	5	2.151	0.9111
Fixed costs	1	5	2.245	0.8239
Cost of individual processes	1	5	2.250	0.9281
Make or buy decision	1	5	2.462	1.0411
Break Even	1	5	2.675	1.1935
Storage cost	1	5	2.972	1.2427
Market share	1	5	3.009	1.1601

The most important indicators show a homogeneous picture. The average of the score is between 1 (very important) and 2 (important) and the standard deviation is not large, the majority of respondents are in a narrow range around the mean. For the indicators at the bottom of the table, the managers' estimates are more variable and the standard deviation around the mean is much larger.

RQ 10: Which indicator systems are currently used by managers in German SMEs?

The frequencies are determined via question 25 "Which of the following performance measurement systems do you use".

Table 5.16: Indicator systems currently used in German SMEs

Indicator system	Balanced Scorecard	RL-system	Du Pont-system	ZVEI-system	No system
Quantity (%)	37 (17.5%)	10 (4.7%)	2 (0.9%)	2 (0.9%)	161 (75.9%)

Out of 212 usable questionnaires, only 51 indicate a use for performance measurement systems. Most of them use the Balanced Scorecard.

After the statistical evaluation of the postal survey, the next section of this chapter deals with the evaluation of the personal interviews conducted between December 2016 and February 2017.

5.5 Interviews

With the help of the survey, elementary data for coordinating an indicator system towards the needs of producing SMEs could be obtained. In this context, clear trends were identified for certain parameters, which are used as a guideline for the system that is to be developed. In order to gain even deeper insights into certain subject complexes, personal interviews with managers of SMEs were conducted after evaluating the written survey.

In the following sections, first, the method of the interview analysis is presented. This is followed by the evaluation of the three interviews.

5.5.1 Qualitative content analysis according to Mayring

The basic concept of qualitative content analysis according to Mayring is to "systematically analyze texts by processing the material step by step with Theory-developed categories" (Mayring, 2002, p. 114). It is about developing a summary and structuring the text and categorizing it. For the practical approach of the interview

analysis, Mayring proposes a "general content analysis model" (Mayring, 2003, pp. 53-55). In this model, all individual steps are structured and explained.

- Determining the material
- Analysis of the formation situation
- Formal characterization of the material
- Determination of the analytical direction
- Theoretical differentiation of the question
- Determination of the analysis technique
- Analysis steps using the category system
- Interpretation of results

The first step in the evaluation of the personal interviews is the analysis of the basic material. From here, the following steps can be summarized (Mayring, 2007):

Determining the material: Which material is analyzed, only the relevant parts of the interviews are selected.

Analysis of formation situation: Who collected the material or led the interviews. What were the motives and objectives of the interviewer?

Formal characterization of the material: in which form is the material presented. According to Mayring, a written text is elementary to ensure the permanent traceability. In addition, notes on reactions or behaviour of the interviewees can be added.

In the three interviews that were conducted, first general data was noted to ensure the interviewed company matches the target group of this work in size and independence. The second part of the interviews focused on the core areas of cost accounting and indicators. The interviews were well prepared due to the time constraints of the managers to be interviewed and were reduced to the most important subject areas. The motives of the interviewer were to collect deeper qualitative data on cost accounting and indicator systems. This was the focus of the interview. The interviews were recorded and subsequently transcribed.

Determination of the analytical technique: Before the analysis, it is necessary to determine the aspects under which the material is to be examined.

Theoretical differentiation of the question: is tied to the determination of the analytical direction by questioning the content, substantiating and differentiating it.

On these two preceding points, a pragmatic analysis is carried out in the course of this work. The state of the interviewee or the scope for interpretation of the talk, which could be cited as points of interest, are not being viewed. The question is differentiated according to the categories that need to be determined. In addition to the qualitative, quantitative data can also be determined in the interview, depending on the respective category.

Determination of the analysis technique: For the analysis of the material the category system is developed in the first step. The categories are derived from the thematic areas and have already been sketched for the written questionnaires. Of course, a revision is possible after completion of the analysis of the three personal interviews.

5.5.2. The analysis techniques: paraphrasing, explication and structuring

Mayring (2007) defines the three analytical techniques: paraphrasing, explication and structuring as follows: The goal of the paraphrasing is to reduce the material to its essential contents without influencing the respective statement. In several working steps, the material is paraphrased and shortened to reduce it to its essentials. This allows the specific passages to be grouped into categories.

The following steps are proposed for the completion of the summary (Mayring, 2003):

- Paraphrasing
- Generalization to the level of abstraction
- Reduction in two steps

In the first step, redundant embellishments are deleted in the text and a re-formulation is carried out to a brief, uniform language level. In the second step, the paraphrases are generalized. The aim is to bring all content to a uniform abstraction level[17]. Paraphrases, which are below the level of abstraction, are generalized, and those above that level remain. In the first step of the reduction, paraphrases with the same meaning are deleted, and in the second step similar contents are bundled and reproduced in a new form. Incomprehensible or contradictory texts are clarified by additional material in the explication. For this purpose, adjacent texts or content from additional external sources can be used (Mayring, 2007)

In structuring, the individual statements are assigned to the categories. Through the classification of the texts into the category system, content for the evaluation can be clearly structured. Moreover, individual representations can be brought into a generalized structure (Mayring, 2007)

5.5.3 Evaluation of interviews

Subsequently, the three interviews will be summarized according to the technique described above. Firstly, the analysis focuses on the most relevant categories "cost accounting", "indicators" and " system of indicators". Further categories are then determined or result from the contents of the respective statements.

The first part summarizes general statements of the three interviewees. These are topics relating to indicators and cost accounting that are currently used in the company. At the same time, however, the managers' visions for the future and their application

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[17] The level of abstraction is therefore a level in the process of conceptual formation. The higher the level of abstraction, the more general a concept, the lower, the more specific a term (Raue, 2013).

of these. The interviews were successively paraphrased. Similar or identical answers were eliminated straight away.

The interviews were conducted in December 2016 and February 2017.

Interview 1 (05.12.2016):

Table 5.17: Summary of interview 1

Paraphrase	Generalisation	Reduction	Category
Cost calculation is very relevant for me. I look at the numbers every day	Cost calculation is relevant and used daily.	Cost accounting provides daily information for management.	Cost accounting
We sometimes work with indicators and have the possibility that every employee has access to them.	Some indicators are determined and made available to all employees.	Indicators are determined and are available for all.	Indicator
Sometimes, it is a disadvantage if the colleagues see all the indicators because this leads to discussions over again, but at least it is always clear where we stand and what needs we are talking about.	The disadvantages of transparent indicators are possible conflicts among the employees, but it gives a clear basis for discussions.	Transparent indicators create a clear basis for actions but can lead to conflicts between employees.	Indicators
Unfortunately, we don't consistently determine these things but only occasionally, which annoys many employees, who then say: Why me, why this time, etc.	Indicators are only determined case by case and not continuous. This situation disturbs the employees.	If indicators are determined, this should be done constantly.	Indicators

We absolutely need performance statistics for all processes but have not yet found a workable way that does not cost too much time. For example, by repeating the same procedures during the determination.	Indicators for all processes must be determined, but here it is still unclear which ones and, additionally, the time required by routine processes should be low.	Process characteristics are important. However, their determination must follow a routine which is applicable to different processes and should require little effort.	Indicators
I believe in a multi-level system. For example, quality as an indicator. If that's always on par that's good, if not I look deeper and check indicators that may influence quality.	A multi-level indicator system is useful. Only if negative signs are recognized in a superior field, the underlying indicators are analyzed.	A hierarchical indicator system is sensible. If the top one is ok then there is no further need. Subordinate indicators are only relevant if the indicator above changes negatively.	System of Indicators
We work with full and marginal cost accounting systems. For me, however, only the data of the partial costs are relevant for management purposes.	Full and marginal costing systems are used in parallel. The data from the partial cost calculation is used for management purposes.	For the management tasks, only data from the marginal cost calculation is required.	Cost accounting
Of course, I would always like to get information about the fixed costs, but we lack a system of proper division. But I also believe a lot could be done in the fixed costs area.	For the fixed costs, more detailed information should be available as there are still possibilities for optimization.	The fixed costs in a structured form could show potential optimization.	Cost accounting

For the cost of the products, I take the variable costs and allocate a fixed percentage of cost using a key.	For product costing, variable costs and a fixed cost percentage are used via a key.	The product costing is carried out using variable costs and a key for fixed costs.	Cost accounting
Especially marginal cost calculation is important for me because I know the variable costs. I always have to cover those, but the fixed costs I can change, depending on the utilization of the production.	The marginal cost calculation is important in order to know the variable costs and to be more flexible in the case of cost estimates in the area of fixed cost coverage.	The marginal cost calculation enables flexible costing based on the usage.	Cost accounting
Planning is not really possible with us, we are too diversified and to make predictions here is simply impossible with the many products.	Planning can't take place because of the product diversity predictions are too risky.	Planning is not possible due to product diversity.	Planning
Generally, I have 10 indicators that I always have, are enough. Only when something is not right I go deeper.	10 indicators for the top priority are sufficient, after which there are further indicators, each representing the top priority in more detail.	System with 10 indicators, to which there are further indicators, which are determined only in the case of need.	System of Indicators
However, under no circumstances should there be too few indicators as important areas should not be left out.	It is not allowed to calculate too few indicators in order to reliably map all areas.	The indicator system must map all relevant areas.	System of Indicators

Absolute elementary are indicators for production, sales, the material and, of course, financial indicators.	Elementary are indicators for production, sales, the material and, financial indicators.	Production, sales, materials and finance must be mapped with indicators.	Indicators
Is there a possibility for me to see if investments are profitable if we want to grow? I would need figures about the market volume for a growth-prespective	An indicator to show the market potential to justify investments in company growth.	An indicator for growth potential and market potential.	Planning and Inicators
It would be ideal if I had to spend as little time as possible with the indicators. So just by pushing a button getting a kind of map where I see where we stand.	The indicators should not take much time for the manager, he should be able to see an overview at any time.	The indicator system must not cost any time but must be available at the push of a button in an overall overview.	System of Indicators
I'd rather have a system that is a little faster and effective and perhaps not perfect in certain places. It must be justifiable.	The system should be fast and effective, even if the accuracy suffers a little.	Compromise of effectiveness and accuracy is important	System of Indicators

Interview 2 (19.01.2017)

Table 5.18: Summary of interview 2

Paraphrase	Generalisation	Reduction	Category
I'm trying to use relevant data from the cost calculation when making my decisions, but often it takes too long until I have all the information.	Relevant data from the cost calculation should support decisions but are not always available at the required time.	Accounting should be an aid to decision-making, but it does not provide timely information.	Cost accounting

We are still concentrating too little on costing and indicators. The whole know-how is missing and the day-to-day business is already hard to manage.	The know-how and the time are missing for a targeted determination and maintenance of the cost accounting and of indicators.	The cost calculation and indicators are not adequately determined and used because of too little time.	Cost accounting
We have cost calculation with the help of which I am able to separate fixed costs and variable costs. This information is extremely important for my daily work.	Cost calculation with the possible splitting of variable and fixed costs provides information which is extremely important for the daily work.	Cost calculation provides data on variable and fixed costs which are very important for the management work.	Cost accounting
Financial planning is an extremely important topic for me but still not possible. It is a time problem and I need help.	Financial planning would be important but is not applied because there is no time or know-how.	Financial planning is important but is not done for a lack of time and know-how.	Planning
Right now, I'm planning on gut feeling.	Right now, planning is done by gut feeling.	Planning is done by gut feeling	Planning
I need default times for the processes to be able to control my people somewhat better. To have the time and to comply with them is an elementary prerequisite for cost calculation.	Default times are a prerequisite to determined time and control employees and processes. From these times, sales prices are derived.	Employee and process control through specific times and the price determination of the products.	Indicators
I need financial indicators to help with budgeting.	Financial figures for budgeting	Financial figures for budgeting	Indicators

And, of course, a more transparent coverage fee calculation in which I have the fixed costs in different stages.	A transparent cover fee calculation in several steps is extremely important.	Multi-level coverage calculation is extremely important.	Cost accounting
In addition, I would need to see at a glance which products contribute what for making better decisions in production.	The contribution of the different products must be visible and comparable for the production-planning	Comparability of the contributions of the individual products	Indicators
Ultimately, I would like four indicator areas: mapping processes, finance, sales and returns. And furthermore something to evaluate marketing	The key areas are processes, finance, sales and returns as well as marketing efforts	Indicators for processes, finance, sales, returns and marketing are required.	Indicators
I need to know if it's profitable at all. There is a lot of money in the company that has to pay interest. This indicator is a must.	An indicator for the return on the investet capital is strongly needed.	Return on equity is very important to know.	Indicators
A system with which we can work must be limited to a few indicators, which is clear to all concerned. If there is something wrong, everyone must be able to see it.	The system must be reduced but meaningful and understandable for all involved. Problems must be recognized quickly.	It must be a clear reduced system, which quickly reveals faulty developments.	System of Indicators
Currently, I have no time to worry about it. I would have to distribute parts of my tasks differently or have a good indicator system that saves so much time, so I can compensate for it.	Currently, there is a lack of time for the system. Either labour should be distributed differently or the invested time has to be compensated by the indicator system.	There is a lack of time to introduce an indicator system.	System of Indicators

Interview 3 (06.02.2017)

Table 5.19: Summary of interview 3

Paraphrase	Generalisation	Reduction	Category
The cost calculation has no effect on my daily work because I can't really see much from it.	Cost calculation has no influence on daily work since it does not provide necessary data.	Cost calculation does not provide any decision-relevant data	Cost accounting
To be honest I've never heard of process costs or target costs.	Process and Target costs are not known.	Progressive cost accounting systems are unknown	Cost accounting
We have full-cost accounting and a cost distribution sheet with which we can declare general costs.	General costs are cleared through an operation billing sheet in a full-cost calculation	Standard full-cost accounting	Cost accounting
There is no planning at all. We are a small company and can't really predict things.	Prediction planning doesn't take place in the company. The development is too difficult to predict.	The company estimates that it is too small to plan.	Planning
Clearly, indicators would help me, but I am too much involved in the daily business. Things need to run smoothly.	Indicators would help, however, the tasks in the day-to-day business are already too big.	Indicators could be helpful, but the effort to develop them is considered as too high.	Indicators
For me it is just too much, to also have to deal with this topic besides the daily tasks.	With the operational activity, there is no time to deal with indicators.	There is no basic know-how regarding indicators	Indicators
As meaningful indicators, I can only think of cover contributions, market penetration and cash flow right now.	Significant indicators are cover contributions, market penetration and cash flow	The interest is limited to a few key indicators.	Indicators

At the moment I do not know the contribution margins of my products and therefore cannot compare them. A clear presentation would be the most important for me.	Clear presentation and information about the contribution of the different products to make them comparable	Contributions of the different products must be easily comparable	Indicators
I could, however, need some support with my material availability and the individual workstations.	Support in the internal material flow and the processes of the production is needed.	Demand for indicators for the material flow and process control	Indicators
The ability to pay is essential. If I am low on money that would be the end.	The ability to pay is a prerequisite for ongoing operations in the future.	The ability to pay is an elementary indicator	Indicators
What I would also need would be a way to control my sales.	Need for a way to control the effectiveness of the sales activities.	Indicators for sales and control are important.	Indicators
Basically, I do not believe that such a thing is realistic. Keeping the system running would simply cost too much time.	An indicator system would cost too much time in the ongoing operation.	Effort for the indicator system is too high	System of Indicators
The introductory expenses would be of secondary importance to me, the cost of ongoing operations would have to be as low as possible.	The expenditure on the ongoing operation of the indicator system must be low. Implementation can be somewhat more complex.	The ongoing operation of the indicator system must be possible with little resources.	System of Indicators

The system would have to be reduced to the really essential things, but still meaningful, then perhaps the system would work.	The system should be restricted to few, but meaningful indicators.	The system must be reduced and supported by clear statements.	System of Indicators

The three interviews have led to a significant gain in qualitative data, and at the same time underpinned the results of the postal survey. In the following section, elementary core statements are bundled and analyzed. All relevant data are considered when selecting the cost accounting systems and the KPIs. For the purpose of the evaluation, the paraphrases were already summarized in two steps, so that the core statements are now bundled in the reduction. The summary is structured according to the categories: cost accounting, indicators, system of Indicators and planning.

(I) Category of Cost Accounting:

If a full cost accounting is used, the data that managers need to support their decision making cannot be generated. According to the managers interviewed, the marginal costing is particularly well suited for these requirements. On the one hand, this allows a fixed cost analysis in which much savings and optimization potential is suspected, on the other hand, the variable cost delivers a lot of data to the individual products. As shown in the above interviews, the direct costing is very useful for the managers who use it in their company. The managers who work with a full-cost calculation, however, consider a marginal costing as too costly in relation to the benefit.

(II) Category of Indicators:

As in the case of the direct costing above, indicators are also estimated in the companies in which they are deployed. Companies that do not determine the indicators do this because they are not convinced of their relevance or consider the determining

effort to be too great. Indicators should be accessible to all employees or responsible persons, be transparent and determined according to communicated rules and on a regular basis. In addition, the number of indicators should be limited to a manageable level. Knowledge about the contributions of individual products and a way to compare them has also proved to be very important.

The interviewed managers propose the sections: production, sales, material and finance. Specifically, the material flow, processes, error rate, sales control, solvency, employee control and budgeting are mentioned here.

(III) Category of the System of Indicators:

In the area of the indicator system, the opinions all go in a similar direction. A clear system is required, which at a glance gives an overview of the relevant business areas. In this case, there can be higher-level indicators, which are only discussed in detail with the aid of supported indicators, as soon as the superordinate indicator shows an undesirable development. An ever-recurring factor is a relationship between time and benefits. The most important focus in the system must be user-friendliness and it must be feasible with little effort.

(IV) Category of Planning:

Planning plays a subordinated role in the surveyed companies. The reasons are complex. One manager states that his company and the product variety is too complex for a future planning, another is planning on gut feeling, and the third of the interviewed managers classifies his company as too small as planning is necessary and realistic. These data are consistent with the findings of the survey (section 5.3). The trend for the cost accounting system is clearly in the direction of the direct costing. Indicators are regarded as important and relevant but are often not used due to the high level of

development- and running costs. The key indicator system should be limited to a few relevant indicators and should provide a clear and comprehensible overview of all relevant business areas.

In the second section of the personal interviews, the addressees were asked to evaluate the indicators determined by the postal survey and their prioritization. For reasons of clarity, the reduction of the statements is reproduced in the same way.

Table 5.20: Evaluation of the indicators detected in the survey.

Indicator	Interview 1	Interview 2	Interview 3
Current operating result	Top priority	Not so important, once a month	Important indicator, but not a top priority
Solvency	Not so important has nothing to do with successful work	Not so crucial	Important, but I see that with a look at the account
Product calculation	Definitely important, possible via partial cost calculation	Extremely important, so far only through market comparisons and estimates	For this, indicator support would be extremely important
Fixed costs	Absolutely important, more detailed information is necessary	There is a great potential for savings	Very important. Support for the analysis of fixed costs is necessary
Profit margin	Important to focus on products with high-profit margins	This is important, it needs a good solution	Elementary important
Return on sales	Rather not so important	Secondary	Not important
Retail price	Important in market comparison	Is determined by product calculation	Too little differentiation to product costing
Complaint rate / cost	Important	That would be very important.	Good to know, but secondary

Cost planning	Very important	We do not make it, but I would like to	Have no clear opinion
Profitability	Similar to profit margin	Products must be profitable, which is made by product calculation	No more profit compared to the profit margin
Costs of employees	Important as it is the largest cost block	Elementary indicator when it comes to costs per output	Are generally known
Cost of individual processes	Very important	That would be very desirable, but unrealistic in the multitude of different processes	Ideal, if to determine with little effort
Error rate	Unimportant, that is part of the quality	Is determined during operation but not with indicators	unimportant
Worker productivity	Seen in the area of process costs	In this case, the costs per output are more interesting	Rather unimportant
Improvement of Processes	Is seen in the area of the process costs	For this an indicator is too elaborate, therefore we are in direct contact	would be very important
Cost reduction	Important in the area of fixed costs and purchasing	Runs through processes and the fixed costs above all, however, via purchasing Here is a more specific number for purchasing important.	Not important
Make or buy decision	Extremely important	Not relevant to us	Extremely important, is considered a top priority
Safings potential	Seen in the field of cost reduction	Compare. cost reduction	unimportant

Storage cost	Depending on the size of the stock	For us not relevant	unimportant
Make or buy decision	No indicator is required for this purpose	An indicator would be used here only as a control tool that makes a bad mood	Important, but no indicator is required
Break Even	Can be seen in the Make or by section	This is generated from the product costing and sales price	unimportant
Market share	Unimportant	Is relatively unimportant	Is considered important

In this second part of the personal interviews, the assessments of the interviewed managers are very similar in some cases, but in others very different. This is a clear indication of the individual requirements and wishes of the managers. This must also be considered when compiling the indicator system for German SMEs from the manufacturing sector. An evaluation as in the postal survey will not take place in the above results since the personal interviews did not ask for a clearly comparable weighting.

Alternatively, the managers should assess, if they agree with the weighting of the indicator, the results of the postal survey. However, the above data will be included in the selection of indicators for the creation of the system of indicators in the next chapter.

5.6 Summary

This chapter described the implementation of the study. For the research question, specific questions were formulated, which were sent in a survey to 1000 SME managers. The response rate returned 212 usable surveys. After statistical evaluation via SPSS, the evaluation was carried out based on hypotheses. The subsequent

interviews generated additional information that is relevant to the development of the model of accounting and indicators. With this basis and the data from the literature review, the selection of the cost accounting system and the indicators for SME managers in Germany can be made in the next chapter.

CHAPTER 6

Findings for the cost accounting and indicator system

for German SMEs

6.1 Introduction

The following two research Objectives were the starting point for this research:

RO 1: To explore and investigate the potential impact of the use (or lack of use) of a sufficient cost accounting system and indicators on the efficiency of German SMEs by seeking and analyzing managers´ perceptions.

RO 2: To develop a potential model which provides a combination of a modern cost accounting system with appropriate indicators relevant to the requirements of German SMEs.

The following section deals with the RO1. The findings from the Literature Review, the survey and the results of the personal interviews are incorporated. The first step is to bundle the needs of managers from the surveys and interviews. In the beginning, categories are developed under which the different requirements can be sorted logically. This part is strongly inspired by the Literature Review, which has clearly shown the most important categories in terms of management requirements. The needs of the interviewed SME managers are linked to the categories and subsequently, indicators are searched or developed in each individual category, with which these requirements can best be solved. It will also be checked which requirements the indicators assign to the accounting as a data source. Here, a comparison is made between an absorption costing and a marginal costing.

The subsequent two sections focus on the RO2 with the development of the accounting and a system of indicators. In section 6.3 the accounting model is developed based on the results of section 6.2. First, fundamental financial issues are clarified in order to implement the practical implementation in the context of German commercial law. This is followed by an evaluation of the data requirements of the selected indicators. In this

process, it is determined which basic accounting system (absorption costing or marginal costing) is selected and in which form it provides the best data for determining the indicators.

In Section 6.4, the model of indicators will be presented. This is followed by a detailed description of every single indicator, including their interdependencies, meaning, data requirements from the cost accounting and measures to be taken if the indicator shows a negative development.

6.2 Information needs of German SMEs managers for management tasks

The RO1 poses the question of the influence of cost accounting and indicators on the work of managers of German SMEs. The literature review has shown that scientific research in the areas of cost accounting and indicators rarely has a clear link to SMEs. The relevance of indicators as a planning, management and monitoring instrument has clearly emerged in the Literature Review. In SMEs, almost all responsible tasks and decisions often focus on the views and actions of the manager. In order to be able to react adequately to changes in the market and in the company, it is therefore absolutely necessary to provide the manager with up-to-date information on all the data of his company.

The Literature Review and the interviews have highlighted the particularities of SMEs in Germany, the indicators and the system of indicators must therefore organizationally and personnally be based on these particularities in order to find the necessary acceptance. First and foremost, this system addresses the company's owner or manager. The accounting must be constructed to provide the necessary data on a monthly basis to determine the most important indicators. In addition, the indicators must be chosen so that they can be determined with little effort, ideally from the data

of cost accounting. The large variety of different indicators that have been developed in economics must necessarily be limited to a level with which the manager is not overwhelmed, but at the same time receives all the necessary information.

6.2.1 Categories for the classification of indicators

The Balanced Scorecard assigns indicators logically to the following areas: financial perspective, customer perspective, production perspective and growth perspective. The Literature Review has shown that the Balanced Scorecard is the most widely accepted of all the popular systems of indicators and is also predominantly regarded as the best system in economics. However, many studies show that the implementation of the Balanced Scorecard is often overwhelming for smaller companies (see section 3.4.5).

For this reason, the Balanced Scorecard cannot be adopted as a model for SME managers one-to-one, but the system should be based on the idea of the logical order of the indicators. Based on the literature search and the requirements resulting from the interviews and the survey, the following categories are included in the system:

The livelihood of a company has the highest priority. In addition to the financial perspective, the earnings situation also play an important role here (Link and Hemel, 2017). The data relevant to the livelihood of the company can be determined using indicators from the company's earnings and the financial position.

Another part that has a decisive influence on the profitability of a company is material management (see section 3.3.7), which ranges from purchasing to warehousing. Therefore, indicators from the field of materials management must find their way into the system of indicators.

The production perspective as a measure of the individual operational processes is proposed in the Balanced Scorecard and must be included in the system of indicators for SMEs. Production processes must be optimally coordinated in order to produce economic and qualitative results. Controlling with goals and indicators is crucial in the area of a company's production. Sales of the products are responsible for the success or failure of a company. The sales area must be continuously monitored so that deviations from the planned values can be recognized early. This area must be taken into account in the system of indicators.

In summary, this leads to the following five blocks in which the most important indicators can be summarized and arranged logically:

- Earnings situation,
- Financial position,
- Materials management,
- Area of production and
- Sales.

6.2.2 Information on the earnings situation

The most important piece of information in the field of earnings is the operating result, which is determined on a monthly basis. Nearly all managers' surveyed had already identified this ratio and consider it as the most important measure for their company. Following the determination of the operating result, the return on sales can be determined. According to the survey, many companies want reliable information on return on sales (see section 5.4.2). It indicates the percentage of profit in terms of total turnover. This indicator plays a major role in pricing. The higher the return on sales, the greater the scope for compensating price decreases or cost increases. For the analysis of individual products in a company, this indicator can be extended to a return

on sales per product. In order to obtain reliable data, however, a detailed knowledge of the cost structure of the individual products is required.

In addition, the surveyed managers indicated an urgent need to determine the profitability of each product (see section 5.4.2). This information must also be located in the area of earnings.

For the determination of the profit contribution of the individual products the model of Reichmann (2014) is useful:

Formula 6.1: Contribution margin accounting

Contribution Margin 1 and 2
Turnover - Material costs - Sales Costs = Contribution margin 1 - Staff costs - Other costs = Contribution margin 2

Source: Reichmann (2014)

The above formula enables the calculation of the gross profit (contribution margin 1) and the contribution margin 2. The gross profit indicates the contribution margin, which is available after deduction of the costs that are regarded as a variable[18] in the short term. The gross profit must always be positive. It serves to keep an eye on the material costs in relation to the products. It also shows products with a higher margin that could be promoted and on the other hand products that need to be revised or optimized in terms of their design and material usage.

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[18] The labor costs are not necessarily fixed costs, they can be adjusted to the demands on a longer term period.

The contribution margin 2 indicates the profit contribution made by the respective product to cover the unallocated fixed costs. This shows which products contribute to the success of the company and which can be removed from the product portfolio in a bottleneck situation caused by a high order situation (Reichmann, 2013). This indicator is particularly important in sales because it shows the sales staff which products generate a high contribution margin and should, therefore, be given special support. The profit contribution should be determined on a regular basis and in the event of a negative development, all gross profit data must also be included in the cause analysis.

With these indicators, the manager has a good overview of the current earnings situation. If these numbers remain stable or develop positively, no further analysis is necessary. On the other hand, if there is a negative trend, the causes must be investigated. For this purpose, on the one hand, a more detailed cost analysis in the individual areas is recommended, that is, an analysis of the cost types in which a market change has occurred.

On the other hand, a performance analysis must be made. This requires information about the sales volumes and sales prices of the individual products. Here, a recourse to the indicators from the sales area is necessary. The sales figures are good indicators for planning and management and should always be evaluated in the context of the indicators from the earnings.

One of the indicators that need to be analyzed in a second, subordinate level is the return on equity. This ratio was not mentioned by the surveyed managers but has been a very relevant indicator in the literature review (see section 3.4.4) and was strongly recommended by an interviewed manager (see section 5.5.3). It expresses the return on capital employed and should be used both as a snapshot and as a comparative

indicator. A low return on equity may be an indication of overvalued fixed assets or unprofitable tied-up capital (for example, too high stock level) and trigger the management for corrective action. Compared with earlier periods, there is a good overview of the overall economic situation of the company.

However, caution is advised as this measure is error-prone. For example, a short-term reduction of equity leads to a higher return on equity. However, the manager, who uses this metric to evaluate his own performance, must be aware of these effects and exclude them for a transparent analysis.

In summary, the following requirements arise in the area of earnings:

Table 6.1: Indicators in the area of earnings

Indicator	Formula	The source of data supply
Operating result	Turnover - Expenses *(production, distribution, administration)* + Other operating income - Other operating expenses **= Operating result**	The determination of the operating result is ideally fed by the data of a multistage contribution margin accounting. In addition, different revenue levels can be quickly determined and analyzed here. The absorption costing does not provide the necessary data, especially for an inter-periodic determination.
Return on sales	$$\frac{ANP * 100}{T}$$ *ANP: Annual net profit* *T: Turnover*	To calculate the return on sales on an annual basis, both an absorption costing and marginal costing are suitable. As soon as there is a need for an inter-periodic determination, only a marginal costing provides usable data.
Gross profit	See formula 6.1 above	The gross profit can only be determined using a multistage contribution margin accounting as suggested in Formula 6.1
Profit contribution of the individual products	See formula 6.1 above	Based on the gross profit, a multistage contribution margin accounting is also required to determine the profit contribution of the individual products.

Return on equity	$\dfrac{A_{NI} * 100}{A_e}$ A_{NI}: *Annual net income* A_e: *Average Equity*	The annual net profit can be taken from the profit and loss statement; the amount of the equity is calculated from the balance sheet as the average of the starting and ending balance. This calculation works both with an absorption costing and marginal costing.

6.2.3 Information on the financial position

The central task of financial indicators must provide information for a livelihood security and financial optimization for the enterprise. As the Literature Review has shown, SME financial indicators are considered critical as they only provide a statement of the company's static liquidity and do not show any data for future development.

However, the survey of this study has shown that SME managers desperately need information on their solvency. Among all requirements, solvency was named as the fourth most important date. Thus, this indicator should be reflected in the system of indicators for German SME managers. In order to keep this indicator as simple and practical as possible, the first degree of liquidity is used, that is, the funds that are immediately available:

Formula 6.2: Liquidity

First-degree liquidity
Cash and cash equivalents   - Current Liabilities   = Surplus

Source: Preißler (2008)

The company is insolvent as soon as the surplus becomes negative. On the other hand, liquidity is given as soon as the surplus is greater than or equal to zero. Since the time of the payments cannot be influenced and also carries a certain risk, it is

advisable to include a buffer in the liquidity calculation that must not be undercut. This minimum reserve of positive liquidity must be determined on a company-specific basis and should include a payment default risk.

As a supplementary indicator, the current ratio (third-degree liquidity) should be determined. The current Assets are divided by the short-term liabilities. This indicator is often an important indicator for banks when it comes to granting loans and should be at least "2" (also known as a two-to-one rule) (Ditges and Arendt, 2002).

Table 6.2: Indicators in the area of liquidity

Indicator	Formula	The source of data supply
Cash ratio (1st-degree liquidity)	$$\frac{C_{CE} * 100}{S_L}$$ C_{CE}: *Cash and cash equivalents* S_L: *Short-term liabilities*	These data can be taken from the current accounting and are to be determined independently of the type of cost accounting.
Current ratio (3rd degree liquidity)	$$\frac{M_A + S + A + I * 100}{S_L}$$ M_A: *Monetary assets* S: *Securities* A: *Accounts Receiveable* I: *Inventories* S_L: *Short-term liabilities*	These data can be taken from the current accounting and are to be determined independently of the type of cost accounting.

Section 3.2.5 has shown the importance of financial planning. Liquidity analysis can create a sensitivity for the topic in order to motivate the entrepreneur on a longer-term basis for financial planning.

6.2.4 Information about materials management

Materials management encompasses the entire material flow in the company, from purchasing to the distribution of the sales items. The costs for the material, the material flow and the capital tied up in stocks offer good starting points for an optimization in terms of the operating result and the adherence to delivery dates and deadlines.

The survey showed that German SME managers classify information on materials management as lower priority (see section 5.3.2). Here, the cost reduction was mentioned very generally, which must be taken into account both in the material area and in the production area. In addition, the managers want data on the storage costs. However, this indicator is also of lesser importance for them.

Especially in the area of cost reduction, however, great priority should be given in the context of materials management, as the following example shows. The following key formula illustrates the direct relationship between materials management and the operating result of a company.

Formula 6.3: Profit contribution

Profit contribution through a decrease in material costs in %
$$\frac{CM * CRM}{R_S}$$ *CM = share of material costs in sales in %*   *CRM = reduction of material costs in %*   *R_S = return on sales in % (profit / turnover x 100)*

***Source**: Preißler (2008)*

If the cost of materials in the company is 45% and the return on sales is 3%, a material cost reduction of 2% would lead to an improvement in earnings, for which an increase in sales of 30% would be necessary. This example illustrates the great potential that can result from controlled materials management for an SME. Especially against the background that in largely saturated markets increase in turnover through expansion is usually only to be realized with great effort and high use of resources (Henke, 2015).

The goal of materials' management is to ensure the availability of the required material in the right place at the right time. These processes must also be realized under an

economic aspect. In order to keep an eye on the profitability of purchasing, an indicator is useful that relates the purchasing volume of a certain period to sales in this period. This indicator allows a monthly control of the development of the purchasing volume in monetary terms. Prerequisite for the meaningfulness, however, is a very homogeneous distribution of the purchase over the year. If certain materials in large batches are purchased as an annual stock, these items must be spread over the individual months or periods according to their useful life.

The managers wanted information about individual processes and products. It is difficult to reproduce all processes in SMEs, as has been the case in the Literature Review. However, an indicator that relates the material costs of a product to the total production costs of the product would be helpful. This ratio of material cost is relatively easy to determine in the context of a contribution margin accounting. Here, however, a monthly survey is not necessary. Rather, this measure should be used in a second step if there is an imbalance in the overall development and a more detailed analysis of the costs must be carried out. In this case, all factors must be taken into account. For example, if the material costs remain constant, but the overall manufacturing costs are reduced by improved processes, this results in a "negative" development of the indicator although the overall situation has actually improved.

The storage costs include the personnel costs for the handling of the warehouse, the rental costs for the storage space and the capital costs of the tied capital. However, warehousing is always in a field of tension between high storage costs on the one hand and safety stocks and fast reaction times for orders on the other hand. The literature points to many studies that have shown that indicators cannot be economically raised in the materials area because the effort of investigating this indicator is considered too large relative to the benefit (Weber, 2013).

In order to meet the wishes of the managers, an alternative to the existing indicators has to be found. The manager knows the storage costs in relation to the space requirement and the employees with him or can determine this with little effort. The stock itself is not really meaningful as a measure of any relationship to the output is missing. This would provide an indicator that compares the current inventory in monetary terms with the turnover of a selected period. This can be used, for example, to determine a meaningful ratio with a quarterly survey. If the turnover increases, there is a reasonable potential to raise inventory levels too, but if sales will fall, that savings potential should also be sought in the warehouse, which then reflects in this indicator.

From the interviews, it has been shown that meeting deadlines is also given high priority. Above all, the managers see disruptions in the production chain or material that is provided too late as the cause of errors. For this purpose, an indicator must be developed, which provides information on whether all production processes are delivered on time and thus can run successfully and as planned. This is about ensuring a continuous process in the production. This ratio depends very much on the architecture of the individual companies. Basically, it makes sense to introduce an indicator that indicates how often the production cannot produce as planned because individual parts are missing or delivered incorrectly. This makes it initially impossible to avoid mistakes. However, the discussion about the monthly result of this measure will lead to raising awareness and improvements. Especially the balancing of a low and economical inventory with a secure material supply of the processes makes a continuous control necessary at this point. The determining of this indicator can include e.g. the shell construction, the paint and the final assembly. If 100 products are manufactured monthly, the total control quantity in the three departments mentioned

above is 300 processes. If in 20 cases delays are detected due to the faulty or missing material, the deviation of this month is 6.7%

Formula 6.4: Nonconforming processes

Proportion of nonconforming processes
$$\frac{M_{ME} * 100}{P_T}$$ M_{ME}: *malfunction due to lack of material or errors* P_T: *total number of processes analyzed*

Target values have to be specified for these indicators how many disturbances the production can compensate for each observation period before delays in the process chain occur and thus scheduling delays.

For materials management, the following indicators result:

Table 6.3: Indicators in the area of materials management

Indicator	Formula	The source of data supply
The proportion of procurement volume in the turnover	$$\frac{PV_P * 100}{T_P}$$ PV_P: *Purchasing volume per period under review* T_P: *Turnover in the period under review*	These data can be taken from the current accounting and are to be determined independently of the type of cost accounting.
Ratio of material costs	$$\frac{C_M * 100}{C_{TP}}$$ C_M: *Material costs of the product* C_{TP}: *Total production costs of the product*	A multistage contribution margin accounting of the detrimental contribution is recommended for the easier allocation of the individual blocks of fixed costs to the production costs. This cannot be determined automatically with an absorption costing.

Storage costs proportion	$$\frac{S * 100}{T_P}$$ S: *Stock* T_P: *Turnover per period*	Stock is updated using the Annual Inventory. In the case of sub-periodic surveys, the data from the inventory management as well as the current turnover are used. The cost accounting is not important.
Disturbances in the process chain	$$\frac{P_D * 100}{P_T}$$ P_D: *Disturbance per process* P_t: *Total number of processes*	This indicator is independent of cost accounting.

6.2.5 Information on Production

The degree of technology in SMEs is much lower than in large companies, as has been clearly shown in the literature review (section 2.4.8). As a result, production in SMEs is more labour-intensive than in LSEs and SMEs are more affected by high wage levels in Germany (Seehausen, 2014). Therefore, in SMEs, special attention should be paid to labour costs.

The productivity of employees is particularly important. Elementary areas are already covered by the indicators "Employee productivity" and "Costs of the individual processes", which were ranked among the most important by the interviewed SME managers (section 2.4.3). Employee productivity, in its simplest form, indicates the amount of output relative to the time it took an employee to produce them. Due to the small batches and high variety of products within SMEs, it is difficult to compare employees or different workplaces with this indicator. Rather, an economically meaningful statement can only be achieved by a multi-periodic time comparison. This indicator, therefore, informs rather about fluctuations in employee productivity than actually measuring them in terms of their effectiveness. For this reason, the indicator can only provide subordinate information if weaknesses are found in the area of production.

Determining the process costs plays a dual role in SMEs. Of course, it is superficial to investigate the costs of individual processes and to make an attempt to transfer a precise proportion of the fixed costs to the process. The determination of the process costs helps the SME manager to monitor the efficiency of the plant used compared to the output. In addition, they reveal fluctuations in the efficiency of process execution compared to the same period of the previous year. The positive side effect is the joint involvement of the management with the individual employees in the analysis of the processes. The joint process of formulating the work steps into defined processes and looking for improvements here binds each employee to participate in the definition of the indicator. This increases the acceptance of the indicator and motivates at the same time to reach these target values.

Process costs can best be determined as ratios over a longer period of time. For this, the individual processes will be defined and, together with the responsible worker, the ideal conditions for the process and the time required for it are determined. This can be used to determine what costs the process generates per observation period and with which output size this is connected. Not only can this indicator be used to measure fluctuations that are directly related to the production of the process, but also upstream disturbances can be identified. Thus, the responsible worker will communicate e.g. material bottlenecks, which he is not responsible for, but which certainly disturb his continuous production flow. As a result, weak points in other areas can be uncovered and resolved accurately.

In addition, an indicator on the throughput time of the products should be implemented. During the design and planning of production, a continuous reduction of the throughput time has to be worked on. On the one hand to provide the customer's order in the

shortest possible time and, on the other hand, it is, of course, important to avoid a high capital commitment through short lead times. Surveys have shown that in the manufacturing sector up to 80% of the total production time consists of lying and transport times, while the value-adding activity only takes up 20% of the total time (Eversheim and Klocke, 1998). An indicator in this field would support the production planning.

On the one hand, the optimal coordination of the individual production stages in an optimal chronological order is necessary; on the other hand, it is important to keep transport routes and intermediate storage as low as possible. When determining the default values, all workers in the affected process steps must be involved. During the interviews, it became clear how important it was for the managers to serve the customers as ideally as possible and to achieve maximum customer satisfaction with the products. The reason given was the specialization for niche products typical for SMEs and the associated long and intensive customer loyalty.

However, customer satisfaction is difficult to measure but is largely determined by delivery reliability, product quality and aftersales service (Weber, 2013). For their indirect monitoring, an indicator for the error rate can be introduced. This indicator must be adapted very individually to the needs of the company. Errors that occur in an intermediate or final inspection must be documented. Thus, in addition to a purely statistical error rate, this measure also serves the purpose of analyzing errors. This creates a greater pressure on all parties involved to question these mistakes and develop strategies to avoid them in the future. This indicator should be used in all areas where semi-finished or finished products undergo quality control. An indicator of errors in the production process and the products is an essential element for implementing

the quality objectives of a company. The documentation and analysis of errors is an indispensable part of the continuous improvement efforts that are fundamental for a company in the competitive market environment.

In a further step, there is also the possibility of assessing errors in monetary terms in order to obtain more sound statements on the costs that result from errors.

In summary, the following indicators result from the area of production:

Table 6.4: Indicators in the area of production

Key Indicator	Formula	The source of data supply
Employee productivity	$$\frac{O \text{ or } PR}{T}$$ O: *Output* PR: *Process repeat* T: *Time*	Cost accounting is irrelevant for this indicator. Only if the output and the required time is to be evaluated in monetary terms the cost accounting has to provide data. In an evaluation of all costs (variable and fixed cost share), all cost accounting systems have the difficulty in the distribution of fixed costs.
Throughput time	Measurement of the total time required from the start of production to completion.	Cost accounting is not relevant here.
Error rate	$$\frac{E * 100}{P}$$ E: *Errors* P: *Products*	Cost accounting is not relevant here.
Error Costs	Determination of the total costs of the errors	The material and labour costs can be determined in the absorption costing and the marginal costing. Surcharges for fixed costs cover only the absorption costing

6.2.6 Sales Information

Successful sales are a prerequisite for the continued existence and development of a company. Therefore, indicators are of particular importance in this area. The niche

policy usually pursued by SMEs is based on the limited possibilities of small businesses and from the specialization in certain market requirements. As a study by VEND Consulting Gmbh (2008) showed, broad-based market research or national advertising campaigns are usually seen as too expensive for SMEs. SME managers receive feedback on products and requirements through direct customer contact or specialized trade fairs.

During interviewing one of the executives, the product costing or sales price were mentioned as most important. In addition, a need for an indicator to manage and monitor sales is required.

There is no indicator to directly support the determination of sales prices. Here, the accounting must provide supporting data. This applies both to the initial product costing and to the determination or adjustment of the sales price. These two requirements will later be subjected to an analysis, which type of cost accounting (absorption costing or marginal costing) provides better results in this case.

In order to forecast the development of income, an indicator can be derived from the structure of existing orders or the general development of new orders. The structure of the order backlog results from the proportion of order stocks of a product type and the total order stock. From this, measures can be derived for distribution, promote products with lower demand, or compare price policy with competition in this area. The general development of incoming business or order backlog results from a comparison of incoming orders in the comparable previous period. It is precisely this indicator that

enables early detection of possible undesirable developments, which can be counteracted by targeted actions.[19]

For the estimation of the growth potential, as mentioned by an interviewed manager, an indicator to the market shares of the company can be determined. A close consultation with the individual sales staff is necessary in order to be able to estimate the potential market size. The easiest way to determine market share is the ratio of own customers to the total number of potential customers or the ratio of products sold to the total market demand for that product. Since this measure is based on the experience and expectations of the salesman in terms of the size of the market as a whole, it is only of limited significance, but can at least provide a decision-making aid for future efforts in specific areas or for specific products.

As a further key element that arose in the interviews in this area, an indicator should be implemented, that provides information on the success of offers submitted, mailing campaigns, sales force visits or other promotions. As a rule, the ratio of the advertising expenditure to the resulting orders is decisive. Here are two interesting ways. On the one hand, a purely quantitative evaluation, e.g. the number of offers submitted in a single observation period to the number of resulting orders. In addition, however, a monetary analysis of profitability may be made if the financial burden of the operation is known and correlated with the contribution margins of the products sold in that operation.

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[19] It should be noted that SMEs generally do not have full control over the distribution of their products. As a rule, SMEs organize their sales from a mixture of self-distribution and a large proportion of external sales partners. Only 15% of German SMEs organize their sales autonomously (Kleimeier, 2017). In the analysis of sales indicators, sales partners must be involved.

In the sales area, the following indicators can be summarized:

Table 6.5: Indicators in the area of sales

Indicator	Formula	The source of data supply
Structure of the order backlog	$$\frac{OBP * 100}{OBT}$$ OBP: *Order backlog of a product* OBT: *Total order backlog*	This indicator can be determined independently of cost accounting.
Development of the order backlog	$$\frac{BCP}{BPP}$$ BCP: *Backlog of orders current period* BPP: *Backlog of order in the prior period*	This indicator can be determined independently of cost accounting.
Market share	$$\frac{C_A \text{ or } P_A}{C_{TA} \text{ or } P_{TA}}$$ C_A: *Amount of customers* P_A: *Amount of products* C_{TA}: *Total amount of potential customers* P_{TA}: *Total amount of potential products*	This ratio is based solely on market research and estimation.
Marketing success	$$\frac{AA_N \text{ or } AA_C}{O_N \text{ or } O_{CM}}$$ AA_N: *Number of advertising activities* AA_C: *Costs of advertising activities* O_N: *Number of orders* O_{CM}: *Contribution margin of orders*	Data supply through a contribution margin accounting

No indicators can support the calculation of product costs and selling prices, but it is necessary to examine which type of costing provides better data for this purpose. As discussed above the calculation of product costs and selling prices is very important for SME managers. Following there is a comparison of marginal and an absorption costing in relation to their support for determining product costs and sales prices.

Table 6.6: Required data supply for product calculation and sales price determination.

	Marginal Costing	Absorption costing
Product Calculation	**Insufficient data supply** In the case of the contribution margin accounting, the determination of the cost price is initially associated with uncertainties. In addition to the unambiguous variable costs, a fixed cost component must be charged which cannot be determined exactly (Diller, 2007)	**Good data supply** The absorption costing is suitable for calculating a price for a new product. The overhead costs are broken down according to the determination of sales expectations and allocated to the number of products (Großklaus,2011)
Sales Price	**Good data supply** SMEs have their core competency in individual production or small numbers. Especially in this context, it is important to know, whether or not an order is to be accepted for the conditions offered by the customer. This decision is facilitated by a known contribution to cover. Depending on the utilization of the company, an order which does not cover the full costs, but still covers a part of the contribution margin can be better than reject the order (see section 2.2.3)	**Insufficient data supply** Pricing is only possible within limits with the absorption costing. Especially when it comes to adjustments in a market with price pressure of the competitors. Even if the distribution of the fixed costs of the products has been calculated with great care, it leads to false conclusions in the case of variations in the utilization of capacity (see section 2.2.3)

6.3 Management Accounting Model

In the survey among German SME managers, it revealed that 76.9% of managers still rely on full cost accounting (see section 5.4.2). These data are consistent with previous surveys and the reasons have already been adequately explained in the Literature Review. In section 6.2, the most important and the most relevant indicators for SME managers were compiled and at the same time, the data requirements from accounting were determined. Subsequently, these results will be analyzed and lead to the accounting for SMEs. Starting with the basic requirements in terms of German commercial law.

6.3.1 Commercial law and fiscal requirements

The proposed cost accounting model in this PhD project is designed to provide the SME managers with the most comprehensive and meaningful data available for their management tasks. The pragmatic approach of the entire research calls for a usable system. The result of this is that, in addition to the requirements of the managers, legal effects on accounting have to be considered. The Commercial Code, § 242, obliges all merchants in Germany to prepare an annual financial statement. This serves, among other things, to determine the commercial results (Wöhe et al., 2016). The scope of the annual financial statements depends on the legal form of the company. Individual firms and limited companies are obliged to draw up an annual balance sheet as of a certain reference date (generally, the annual change of 31.12.).

In doing so, the assets are placed on the equity and loan capital. In addition, a profit and loss account must be provided to show the success of the year (Jung, 2010). Corporations are also obligated to submit an appendix from which more detailed information on the individual items in the balance sheet can be found. This includes valuation and depreciation methods, participation and long-term liabilities (Wöhe et al., 2016).

In the literature review, an earlier study of Lengenhausen was quoted which shows a clear tendency of German SMEs to an absorption costing (section 2.5.3). This trend was confirmed by the survey in which approximately 80% of all companies interviewed indicated using an absorption costing (section 5.4.2). Both in the studies and in the interviews, it became clear that SME managers prefer this system because it is very easy to apply and assume that it is compulsory for tax purposes.

In fact, however, the German legislature does not make any provision for the determination of the profit and loss account. The absorption costing provides all necessary information from the point of view of commercial and tax law, but:

> *"Legal provisions can never be comprehensive instructions for internal control. From the point of view of business management, the establishment of further instruments is therefore recommended" (Schommer, 1999, p. 35).*

In the literature review, section 2.5.2, the question was raised that a pure absorption costing could not provide sufficient data for management tasks. At the same time, specialized cost accounting procedures are often not used because of their complexity in SMEs. As a compromise of applicability with the limited resources in SMEs and a supply of meaningful data, it is necessary to check whether the contribution margin accounting is suitable, which has already proved itself in the literature review as the best alternative (see section 2.3).

The following table shows a brief comparison of the profit determination by means of a contribution margin accounting and a profit and loss account at full cost. The left-hand column shows the peculiarities of the profit plan of a partial cost accounting, the right-hand part shows the special features of the profit loss account of a full cost accounting. In the middle, the overlaps of both systems are shown.

Figure 6.1: Profit plan in comparison with the profit and loss account

Profit Plan in the Marginal Accounting	Profit and Loss Account in Full Cost Accounting

Profit Plan → ... ← Profit and Loss Account

↓ ↓

Turnover

↓

- Material Costs

↓ ↓

= Contribution Margin

↓

- Employee Costs

↓

- Depreciation

↓

- Other Expenses

↓

= Operating Profit

↓ ↓

- Interest | + / - Financial Success (Interest)

↓ ↓

= Corporate Profit | = Result of the Ordinary Business

↓ ↓

- Income Tax

↓ ↓

= Corporate Profit after Taxes | = Annual Net Profit / Loss
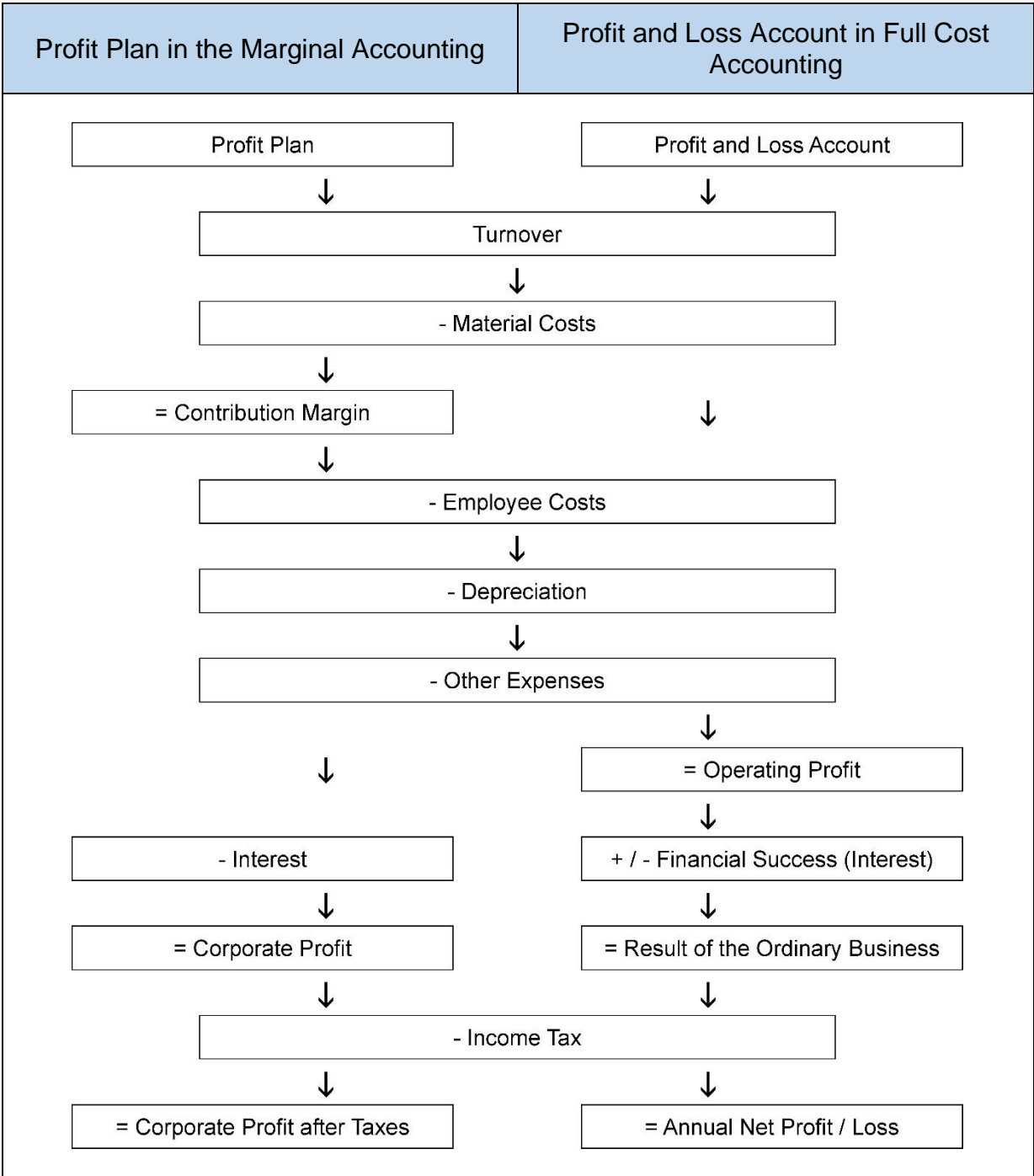
The formal proximity of the two systems with respect to the profit determination of the results is shown. The commercial law and tax requirements represent an important aspect of the choice of cost accounting, but can only be dealt with in this study by reference to the most important parameters. The suitability of the contribution margin

accounting for these requirements has been briefly clarified in the above illustration. In the literature, there are many documents on the use of the contribution margin accounting in a commercial and tax-legal context (Hagenloch, 2013; Schmitt-Schreiner, 2001).

With respect to legal requirements, both the contribution margin accounting and the absorption costing fulfil all the necessary requirements.

6.3.2 Suitability of the Accounting Model as a data source for the indicators

To be able to specifically determine indicators, a reliable data source is required. In addition to structured indicators in an indicator system, an accounting system is also to be made available which provides the best possible database for determining these indicators.

In the following, all indicators determined in Section 6.1 are summarized in a table. The most important is the extent to which a full cost accounting or partial cost accounting has proven to be a useful source of data.

Table 6.7: Comparisons between the contribution margin accounting and the full cost accounting in the relation to the determination of key indicators.

Key Indicator	Marginal Costing	Full Costing
Operating result	Good data supply (Multistage preferred)	Insufficient data supply
Return on sales	Good data supply	Good data supply (not for inter periodical determination)
Gross profit	Good data supply (Multistage preferred)	Insufficient data supply

Profit contribution of the individual products	Good data supply (Multistage preferred)	Insufficient data supply
Return on equity	Good data supply	Good data supply
The proportion of procurement volume in the turnover	Information available from both types of accounting	
Ratio of material costs	Good data supply (Multistage preferred)	Insufficient data supply
Storage costs proportion	Information available from both types of accounting	
Disturbances in the process chain	Information available from both types of accounting	
Employee productivity	Insufficient data supply	Insufficient data supply
Throughput time	Information available from both types of accounting	
Error rate	Information available from both types of accounting	
Error Costs	Information available from both types of accounting	
Development of the order backlog	Information available from both types of accounting	
Market share	Information available from both types of accounting	
Marketing success	Good data supply	Insufficient data supply
Product Calculation	Insufficient data supply	Good data supply
Sales Price	Good data supply	Insufficient data supply

In the following table, the above results of data supply are distributed for comparison to the Marginal Costing and the Full Costing:

Table 6.8: Analysis of the different systems

Accounting	Good data supply	Insufficient data supply	Information available from both types of accounting
Marginal Costing	8 *(4 x Multi level preffered)*	2	8
Full costing	3	7	8

The above-listed comparisons between the contribution margin accounting and the full cost accounting show a clear advantage in the contribution margin accounting. There is a clear trend towards a multi-level contribution margin calculation. The great importance of source data for the determination of the indicators suggests developing a multistage contribution margin accounting for SMEs in Germany.

However, many SME managers have been keen to get a good tool for price calculation of new products. This requirement cannot be solved satisfactorily with a contribution margin accounting. This requirement must be considered following the determination of the contribution margin system.

6.3.3 Development of the contribution margin accounting

In the contribution margin accounting, a separation of the variable costs takes place that is clearly attributable to the respective product and the remaining fixed costs that are not directly influenced by the output volume of the products (see section 2.3.1). This block of fixed costs is split into hierarchical layers in the multistage contribution margin accounting. The goal of this splitting is to localize areas to which these fixed cost shares can be assigned according to the cause. Stages need to be identified for this step, which are relevant in SMEs and whose apportionment brings a gain in information. The following classification is inspired by the suggestion by Schweitzer and Küpper (2015):

In the first stage, the variable costs that are clearly attributable to the product are deducted from the product revenues. These are usually only the material costs and possibly even auxiliaries such as coolants, lubricants or similar. In the second stage, the fixed costs are deducted, which are clearly attributable to a product. These are depreciations for machines or employee wages that can be assigned to this product

as well as costs for advertising measures or R & D. The next level includes all fixed costs that can be assigned to a product group. This includes machinery, promotional activities, and possibly sales staff of this product group or parts of the rent of manufacturing plants. The last stage subsumes all other fixed costs.

The following table shows the above staggering on an example company that produces three different trailers for car transport and three for goods transport. All values are fictitious and are for illustrative purposes only.

Table 6.9: Basic contribution margin accounting model

Product	Car-transport trailer 1	Car-transport trailer 2	Car-transport trailer 3	Freight transport trailer 1	Freight transport trailer 2	Freight transport trailer 3
Turnover	10.000	20.000	15.000	15.000	20.000	10.000
Variable costs	- 3.000	- 5.000	- 4.000	- 3.000	- 4.000	- 3.000
Contribution margin 1	7.000	15.000	11.000	12.000	16.000	7.000
Product fixed costs	- 1.000	- 4.000	- 3.000	- 2.000	- 2.000	- 1.000
Contribution margin 2	6.000	11.000	8.000	10.000	14.000	6.000
Product group fixed costs	- 8.000			- 12.000		
Contribution margin 3	17.000			18.000		
Corporate fixed Costs	- 16.000					
Operating result	19.000					

In the interviews, the managers stated that they needed to know the contributions of the individual products to facilitate a comparison. It should be noted at a glance which product makes which contribution. This information was considered very important in

terms of production planning and production control (see section 5.5.3). The individual contributions are already represented by the above-illustrated system. To simplify comparability, a percentage comparison variable can be added to the system. The contribution margin 1 is recommended as a reference as it is the first stage before the distribution for fixed costs. The percentage breakdown shows how the contribution margins are distributed at the respective levels for the products and product groups. The higher the percentage, the higher the contribution margin at this level. This data helps to compare the products and product groups and helps to identify the blocks of fixed costs that burden disproportionately the contribution margin.

Table 6.10: Advanced contribution margin accounting model

Product	Car-transport trailer 1	Car-transport trailer 2	Car-transport trailer 3	Freight transport trailer 1	Freight transport trailer 2	Freight transport trailer 3
Turnover	10.000	20.000	15.000	15.000	20.000	10.000
Variable costs	- 3.000	- 5.000	- 4.000	- 3.000	- 4.000	- 3.000
Contribution margin 1	7.000	15.000	11.000	12.000	16.000	7.000
Product fixed costs	- 1.000	- 4.000	- 3.000	- 2.000	- 2.000	- 1.000
Contribution margin 2	6.000	11.000	8.000	10.000	14.000	6.000
CM 2 in % from CM 1	**85.7 %**	**73.3 %**	**72.7%**	**83.3 %**	**87.5 %**	**85.7 %**
Product group fixed costs	- 8.000			- 12.000		
Contribution margin 3	17.000			18.000		
CM 3 in % from CM 1	**51.5 %**			**25.7%**		

Corporate fixed Costs	- 16.000
Operating result	19.000

With this model of the multistage contribution margin accounting, a large part of the indicators developed in Section 6.2 can be determined. However, the need for support for the price calculation of new products, which was shown at the beginning of this section, cannot be solved satisfactorily with this form of cost accounting. As the Literature Review has shown in section 5.4.1, it is necessary in this case to distribute the fixed costs via allocation keys to the individual products. The problems that result from this distribution in the full cost accounting have been extensively discussed in the Literature Review.

6.3.4 Further development to a hybrid model.

For the isolated or inaccessible case of the price calculation, the above model of the multistage contribution margin accounting could be extended to a hybrid model of marginal costing and an extension for allocation of fixed costs to facilitate a price determination without having the disadvantages of absorption costing.

For this purpose, the blocks of fixed costs of the product groups and the corporate fixed costs are analyzed and the respective surcharge rates will be allocated to the individual products by the help of an expenses accounting sheet. The allocation keys must be adjusted as precisely as possible to the planned quantities. General rental costs may for example be distributed in the same proportion as the area required to produce each product, insurance, administrative staff salaries and office supplies can be distributed in percentage terms to the expected turnover of each product. The more precise the work here, the more accurate is the distribution of overheads.

Once the allocation keys have been determined, the product group fixed costs and the corporate fixed costs can be distributed among the individual products.

Table 6.11: Hybrid accounting model

Product	Car-transport trailer 1	Car-transport trailer 2	Car-transport trailer 3	Freight transport trailer 1	Freight transport trailer 2	Freight transport trailer 3
Turnover	10.000	20.000	15.000	15.000	20.000	10.000
Variable costs	- 3.000	- 5.000	- 4.000	- 3.000	- 4.000	- 3.000
Contribution margin 1	7.000	15.000	11.000	12.000	16.000	7.000
Product fixed costs	- 1.000	- 4.000	- 3.000	- 2.000	- 2.000	- 1.000
Contribution margin 2	6.000	11.000	8.000	10.000	14.000	6.000
CM 2 in % from CM 1	85.7 %	73.3 %	72.7%	83.3 %	87.5 %	85.7 %
Product group fixed costs	- 8.000			- 12.000		
Allocated product group fixed costs	- 2.000	- 4.000	- 2.000	- 4.000	- 6.000	- 2.000
Contribution margin 3	17.000			18.000		
CM 3 in % from CM 1	51.5 %			25.7%		
Corporate fixed costs	- 16.000					
Allocated corporate fixed costs	- 1.000	- 4.000	- 2.000	- 3.000	- 3.000	- 3.000
Operating result	19.000					
Share of the operating result	3.000	3.000	4.000	3.000	5.000	1.000

In order to determine the share of the individual products in the operating result, the distributed fixed cost shares are subtracted from the contribution margin 2 of the respective product. This enables a retrograde determination for a product selling price, with which all fixed costs and the variable costs are covered and in addition still, a desired operating profit can be obtained.

This hybrid model is based largely on a multistage contribution margin accounting, but also provides information that is characteristic of the absorption costing. The SME manager has several opportunities to adapt the model to his needs and resources. He can allocate the block of fixed costs following a very fast and rough procedure and gain initial experience here. With a bit of routine and initial results, a more detailed system can be installed.

This model is very closely aligned with the determined needs and wishes of the SME managers. It is flexible, easily customizable to individual companies, and provides data to identify most indicators.

6.4 The proposed model of the indicator system

In this section, all results are merged into one model. The indicators are sorted logically in the specified categories and separated according to their meaning in the mandatory and the optional part. The indicators of the optional area are not necessarily required by the manager. He can use them if he wants additional information, or if one of the obligatory indicators indicates a negative development and the manager, therefore, needs further investigation. The individual indicators are described in detail after the model.

6.4.1 The model at a glance

Figure 6.2: Framework of the Proposed Cost Accounting and Indicator System

	Earnings	Financial	Materials	Production	Sales
Hybrid Accounting Model — Basis: Multistage Contribution Margin Accounting extended by a Breakdown of Fixed Costs					
Recommended	Operating Result	Cash Ratio	Proportion of Procurement / Turnover	Throughput Time	Developement of the Order Backlog
	Return on Sales		Disturbances in the Process Chain	Error Rate	Marketing Success
	Profit Contribution per Product				
Optional	Gross Profit	Current Ratio	Ratio of Material Costs	Employee Productivity	Structure of the Order Backlog
	Return on Equity		Storage Costs Proportion	Error Costs	Market Share

6.4.2 Indicators in detail

The individual indicators from the model are described more precisely below. This analysis is based on the following frameworks:

Table 6.12: Framework for the presentation of the proposed indicators

Indicator	Formula
Evaluation period	
Informative content of the indicator	
Necessary data from the cost accounting	Interdependencies to other indicators
Recommended actions in case of a negative trend	

Indicators of the earnings situation

Operating result	Turnover - Expenses *(production, distribution, administration)* + Other operating income - Other operating expenses **= Operating result**
Monthly	
The (ordinary) operating result reflects the income and expenses that are directly related to the business operations of the Company and are expected to be incurred on a regular basis	
The multistage contribution margin accounting automatically delivers all data	- Sales prices - Procurement volume / turnover
This indicator can be directly influenced by all quantity and price policy measures in the company. Examples: cost digression when purchasing larger lots, promoting products with a high contribution margin, potential savings in fixed costs.	

Return on sales	$\dfrac{\text{ANP} * 100}{\text{T}}$
Annually	ANP: *Annual net profit* T: *Turnover*

| The return on sales indicates the proportion of sales the company generates as an economic result. This can (and will be used in the case of bank lending) as an industry benchmark. Too low return on sales is an indicator of too low contribution margins. ||

To be taken directly from the annual financial statements of accounting	- Return on Equity

| Focus on the contribution margin. A declining return on sales must be corrected by higher contribution margins. If enforceable on the market by higher sales prices, otherwise the gaze must be directed inward on the purchase and the individual fixed cost levels. ||

Profit contribution of the individual products	Turnover - Material costs - Sales Costs - Staff costs - Other costs **= Contribution margin**
Continuous for all products	

| Indicates the contribution margin the individual products deliver. In the field of directly attributable costs, the hybrid system of cost accounting can be used to provide allocated fixed costs for this purpose. Important indicator to decide in bottleneck situations, which products should continue to be produced, or which products sales should be preferentially treated. ||

The hybrid cost accounting provides necessary data.	- Gross profit - Operating result

| In the case of a negative development of a product, it is possible to analyze very specifically: processes of this product, development of material costs, sales costs. ||

Gross profit	Turnover with a particular product - material costs - sales costs **= Gross profit**
Optional	

| The gross profit must always be positive and is a good comparative indicator of different products in terms of their direct contribution margin. ||

To be taken directly from the data of the multistage contribution margin accounting	- Sales prices - Procurement volume / turnover

A negative development indicates price increases in the purchase of materials or higher sales expenses. Hereby, all financial influencing factors must be examined

Return on equity	$$\frac{A_{NI} * 100}{Ae}$$
Optional	A_{NI}: *Annual net income* Ae: *Average Equity*

Indicates how high the return on equity is.

Annual net profit from accounting, equity from the balance sheet (average of the opening balance sheet and the closing balance)	- Return on sales

Balancing measures by reducing equity capital with the help of increasing loan capital (financial leverage) is not expedient. Useful measures catalogue see "Return on sales".

Indicators of the financial situation

Cash ratio (1st-degree liquidity)	$$\frac{C_{CE} * 100}{S_L}$$
Monthly	C_{CE}: *Cash and cash equivalents* S_L: *Short-term liabilities*

Indicates whether all short-term liabilities are covered by short-term funds.

To be taken from the current accounting	- Current ratio (3rd-degree liquidity)

If the cash ratio falls, immediate action must be taken to convert longer-term liabilities values into immediately available funds. Alternatively, loans can help in the short term.

Current ratio (3rd degree liquidity)	$\dfrac{MA + S + A + I}{SL} * 100$
Optional	MA: Monetary assets S: Securities A: Accounts Receivable I: Inventories SL: Short-term liabilities
Indicates the ratio of short-term liabilities to short-term current assets (cash, receivables, inventories, semi-finished and finished products)?	
From the current accounting and the balance sheet. Semi-finished products and inventories by estimating the actual values	- Cash ratio (1st-degree liquidity)
This indicator should always be 2 or above (see section 6.2.3), i.e. short-term liabilities must be covered by 50% of current assets. If the value is significantly higher, assets from the company can be reallocated to higher-yielding assets outside the company.	

Indicators for the materials management

Proportion of procurement volume in the turnover	$\dfrac{PVP}{TP} * 100$
Monthly	PVP: *Purchasing volume per period under review* Tp: *Turnover in the period under review*
The high impact of material costs on the company's profits necessitates regular monitoring of the development of purchase prices.	
Data can be taken from the current accounting	- Operating result - Profit contribution of individual products
Strong changes in this indicator should result in a more detailed analysis of the individually purchased parts.	

Disturbances in the process chain	$\dfrac{PD}{PT} * 100$
Continuous	PD: *Disturbance per process* PT: *Total number of processes*
Quality and performance-relevant indicator with the goal of permanent improvement. Very important in the context of a quality management system.	

Determination from operational processes, independent of cost accounting	- Throughput time - Error rate

Deterioration of this indicator may indicate reduced employee performance or deviations from non-compliant machines and tools. In addition, the punctuality of the individual pre-production and supplying bodies must be analyzed.

Ratio of material costs	$$\frac{C_M * 100}{C_{TP}}$$
Optional	CM: *Material costs of the product* CTP: *Total production costs of the product*

Displays the share of material costs in the total cost of the product.

The hybrid cost accounting provides necessary data.	- Operating result

Error-prone indicator. A better value can be achieved by reducing the material costs, but also by increasing the other production costs. Therefore, all the individual values of the indicator must be considered in the analysis.

Storage costs proportion	$$\frac{S * 100}{T_P}$$
Optional / quarterly	S: *Stock* TP: *Turnover per period*

Shows the relationship between the monetary valuation of the inventory and the revenue of a period. This indicator can be determined in order to get a feel for a suitable ratio of sufficient inventory and the lowest possible fixed capital on a long-term basis.

All data can be taken from the current accounting	- Purchasing volume per period

A worsening of this indicator can indicate too high stocks or declining sales. In the first case, the stocks are to be analyzed and compared with earlier periods. Falling sales fall within the range of indicators for sales.

Indicators to production

Throughput time	Measurement of the total time required from the start of production to completion.
Continuous for all products	
The duration of the operative activity makes good statements about the productivity of the employees and plants. In addition, downtimes make a statement about the effectiveness of production planning and show optimization potential.	
Determining the total time of the production and remove the operational production time from the time recording.	- Employee productivity
If the through times worsen, the causes must be determined. Measures: employee appraisals, analysis of processes, control of supplied semi-finished products or raw materials.	

Error rate	$$\frac{E * 100}{P}$$
Continuous for all levels of control	E: *Errors* P: *Products*
The error rate indicates product defects in intermediate stages (shell construction, paint inspection, etc.) and in the final inspection of the products. It is an indispensable tool for a functioning quality management system.	
Information from the acceptance logs	- Error Costs
A negative development of this indicator must be analyzed immediately. Customized production and high quality are the most important unique selling points of German SMEs. When dealing with the vulnerabilities, all persons involved must be engaged.	

Employee productivity	$$\frac{O \text{ or } P_R}{T}$$
Optional	O: *Output* P_R: *Process repeat* T: *Time*
This indicator is to be determined over a longer period of time. Ideally, target process times are defined together with the responsible employees and subsequently documented. This indicator helps to detect deviations.	
Data provides the time tracking, as well as an output quantity	- throughput time

Negative developments must be deliberately discussed with the affected employee and solutions must be found together.	

Error costs	Working time * wage costs + variable costs (+ subsequent costs)
Optional	
Errors can be evaluated on a monetary basis and the cost-effectiveness of countermeasures (for example, acquisition of more accurate tools, employee qualification) can be weighed.	
Data from the contribution margin calculation	- Error rate
If the error costs increase, an analysis analogous to the error rate must be carried out.	

Indicators to sales

Development of the order backlog	$\dfrac{B_{CP}}{B_{PP}}$
Monthly	B_{CP}: *Backlog of orders current period* B_{PP}: *Backlog of order in the prior period*
Indicates the current incoming business compared to the value of the previous period.	
Incoming business/sales planning	- Operating result
When the incoming business decreases, it is possible to selectively counteract the corresponding products by intensifying marketing activities. As the last action, price reduction can serve. The scope of this measure arises from the contribution margins of the individual products.	

Marketing success	$\dfrac{AA_N \text{ or } AA_C}{O_N \text{ or } O_{cm}}$
Regularly	AA_N: *Number of advertising activities* AA_C: *Costs of advertising activities* O_N: *Number of orders* O_{cm}: *Contribution margin of orders*

For this indicator, the ratio of submitted offers and customer visits to the realized orders can be a simple start. In addition, the costs of sales and advertising costs for an action can be determined and set in relation to the resulting contribution margin from sold products. This can at least roughly determine the success of promotions.	
Data from the contribution margin accounting	- Development of the order backlog
Measuring the success of advertising, trade fairs or other actions is very complex. Until it comes to a purchase decision with a customer, it is influenced by many different factors. Nevertheless, this indicator can be very useful to compare basic advertising formats. If a high and profitable return rate appears after a postal mailing, but not at a trade fair, this could influence the planning of promotion activities in the future.	

Structure of the order backlog	$$\frac{OB_P * 100}{OB_T}$$
Optional	OBP: *Order backlog of a product* OBT: *Total order backlog*
This measure shows the shares of each product type compared to the total order backlog. In conjunction with the contribution margins, a check can be made as to whether products with high contribution margins are sufficiently included in the order backlog.	
Incoming business and the contribution margins of the individual products.	- Development of the order backlog
If the quota for a product deteriorates, causes and measures can be identified together with the sales staff. This indicator should occasionally be the subject of sales and marketing discussions to achieve or maintain an ideal mix of product sales for the company.	

Market Share	$$\frac{C_A \text{ or } P_A}{C_{TA} \text{ or } P_{TA}}$$
Optional	CA: *Amount of customers* PA: *Amount of products* CTA: *Total amount of potential customers* PTA: *Total amount of potential products*
Important indicator to determine the position of the own company in the overall market of the industry. Very important for the analysis of possible expansion decisions or extensions of the product portfolio	

Customer file and estimates, or external information.	-
If this indicator is determined regularly and there is a negative development, the market and the competitors must be analyzed.	

6.5 Summary

In this chapter, all collected data has been brought together. In the first step, the identified information requirements could be mapped into indicators. These indicators were subsumed in different logical categories. In this step, the indicators were examined to determine what source-data is needed to detect them.

The results concerning the required source-data were needed to build the cost accounting system in the second step. This was preceded by a comparison of full-cost systems and marginal-cost systems. It has been shown that both systems meet the requirements of tax law in Germany. This criterion is crucial for the acceptance of the system by SME managers. In the last part of this chapter, the indicators were summarized in an indicator system and then listed separately in a more detailed and clear form.

CHAPTER 7

Conclusion

7.1 Introduction

The core objective of this PhD thesis was to provide a model for a cost accounting system and system of indicators for SME managers from Germany. The prerequisite for this was to examine the current situation in the areas of cost accounting and indicators and to identify the needs of German SME managers. The pragmatic approach was also very important, which should enable SME managers to implement the developed models of cost accounting and an indicator system in their own companies.

In this study, the current state of research was first determined in a very detailed literature review. In addition, however, important data for developing the model has already been collected. The first part of the Literature Review focused on established cost accounting systems and their applicability. Clear differences in these systems have already been achieved, which have provided important information to create parts of the survey.

The second part of the Literature Review focused on indicators. Here, important data could also be found that was very important in the preparation of the survey and the choice of questions. The survey had a good response rate and has also led to very interesting and in some cases surprising results. These deviations from previous studies have given the evaluations of the hypotheses. The hypothesis formation was a very good tool to ensure an unbiased analysis of the survey results.

This chapter compares the results and models of the cost accounting system and the indicator system with the Research Objectives. It then shows the academic significance of the study and the results and the contribution the results can make to

SME managers. This is followed by a critical examination of the limits encountered by this study and the areas for further research on this topic.

7.2 Research findings related to the research objectives

The research objectives were the starting point of this research. Below, the two research objectives are placed in a context with the results. The most important results are briefly summarized and the correlation to the Research Questions is shown.

> **RO 1:** To explore and investigate the potential impact of the use (or lack of use) of a sufficient cost accounting system and indicators on the efficiency of German SMEs by seeking and analyzing managers` perceptions.

The first research objective could partly be proven in the Literature Review. Previous studies have clearly demonstrated the positive impact of both up-to-date cost accounting (see section 2.5.1 and 2.5.2) and the performance of indicators for SMEs (see section 3.1.2 and 3.4). The idea and expectations of German SME managers could be adequately investigated in the study. The results indicate that SME managers are aware of the importance of cost accounting and indicators for their management tasks (see chapter 5). At the same time, however, it has become clear that a majority of managers do not use these desired systems in their companies (see Section 5.3.1).

> **RO 2:** To develop a potential model which provides a combination of a modern cost accounting system with appropriate indicators relevant to the requirements of German SMEs.

The requirement from the RO2 could be fulfilled. In the course of the research, all relevant information was obtained from different perspectives (Tax Aspects, Section 6.3.1, Results from Current Research: Chapters 2 and 3, needs analysis by the survey, Section 5.1.1 and 5.1.2 and interviews: Section 5.4.3) and with different methods

(quantitative and qualitative data). Based on these results, a model for the cost accounting system and the performance indicator system could be developed.

7.3 Research findings related to the Literature Review

Section 7.1 of this chapter described that in the Literature Review, important information about the model of cost accounting and the performance indicator system could already be collected. In the following section, these data from the Literature Review will be compared with the results of this research.

In section 2.2.5 the design criteria of cost accounting were outlined. The following important prerequisites for cost accounting have emerged: relevance, flexibility, freedom from bias and practicability. Relevance is given when cost accounting presents all the facts that are necessary and important for management. With the developed model of cost accounting for SME managers in this research, a system was found that meets the necessary tax requirements.

In addition, the system provides the necessary data to determine the indicators and is also a tool that can assist the manager in pricing the products. In the field of the flexibility of cost accounting, Lachnit and Müller (2012) see a system as a prerequisite, which has a modular structure and can, therefore, be adapted in quantity as well as quality, to the needs of the user. This point can be conditionally fulfilled by the cost accounting model. Flexibility exists for the managers in the choice of the division fixed cost and whether they wish to break down the fixed costs on the individual products. In this step of the fixed costs allocation, it is also up to the managers, with what accuracy and effort they want to conduct this allocation. Freedom from bias is largely given, as the system relies almost entirely on bookkeeping figures. An exception is given here in the fixed cost allocation key. This is inevitably subject to some influence

by the person defining the figures for the allocation key. The conditions for the practicability of the system were met in the best possible way. The close link to the data requirements of the indicators and the reference to a contribution margin accounting that has been practically applied for many years enables a practical implementation of this model.

In the field of key figures, some requirements arisen in section 3.1.2 that have to be checked. Ewert and Wagenhofer (2008) assume that Indicators have to be processed in a way that is easy to understand and that the interdependencies to other indicators are made clear. This requirement is met by the detailed presentation of the individual indicators in Section 6.3.2. Schneyder (2007) also demands that the indicators should be presented in a comprehensible context to the respective operating situation. In order to fulfil this, the indicator system was limited to a few indicators, which best represent the needs of the SME managers.

The most relevant topics identified in section 3.2.4: finance, sales, processes and materials as well as employees are reflected in the model of the indicator system (section 6.4.1). In section 3.3, Weber (2012) warns against undesirable developments due to the isolated consideration of individual indicators. This danger has been eliminated on the one hand by the model of the indicator system, which shows several indicators and their logical connection (Section 6.3.4), as well as a precise explanation of the individual figures in Section 6.4.2.

7.4 Academic Significance of the Research

The two core topics of this research, cost accounting and indicators, have been intensively researched and documented in economic sciences for many years. However, two shortcomings have been identified in the Literature Review: the majority

of studies usually take place in a purely theoretical context (see section 2.3.5); on the other hand, there is often a lack of a clear link to SMEs (see section 2.5.5).

With this research, these two areas should be considered in each step. The large economic contribution made by SMEs (see section 1.1) calls for research with a clear focus on the needs of SMEs. However, to be relevant to the target group, it must also be ensured that it can be implemented in daily practice. This research is trying to meet these two requirements. In addition, a holistic approach was in focus. Cost accounting and indicators should not be considered in isolation. In their application, these systems are inseparable: cost accounting as a source of data, indicators as instruments to transform this data into usable information. The most important theoretical contribution to knowledge in this research is the approach to investigate these fields, which are inseparable in the practical application, also in research as a whole. The research shows the current needs of SME managers in both areas and offers solutions to cover these needs.

7.5 Contribution for SME Managers in Germany

The studies analyzed in the Literature Review (section 3.5), already showed how much value SME managers place on practical solutions for their tasks. This also has been confirmed in the interviews with the SME managers (Section 5.5.3). The theory-laden approach of earlier studies was also shown in the Literature Review (Section 2.3.5).

This research aimed to create a model that could be implemented in a SME in Germany. In line to this, needs and available resources were identified and both cost accounting and indicators were targeted. For the user, the contribution can be very decisive. First and foremost, it is about giving users a system with which they can quickly achieve results and increase the quality of information significantly. The

benefits for the SME manager of applying this model have been shown in the course of this research. As soon as an SME manager deals with the model of this work, an elementary step has been taken:

"If you can't measure it, you can't manage it" (Kaplan and Norton, 1992). As soon as the SME managers deal with the system, they will see benefits and begin to address deficits. Indicators sensitize the manager to areas where improvements are possible or necessary. As soon as the first steps succeed, a new sensitization for the topic cost accounting and indicators will emerge:

> *"The use of indicators will stimulate the need for more information in SMEs and it will trigger a process that will culminate in the development of a management toolset that is aligned to the needs of the organization"* (Dethlefs, 1997, p. 186).

The model of this work cannot cover all the needs of a manager to support his work. It does, however, provide an introduction to the topic and leaves room for company-specific adaptation and expansion. Taking into account the great economic importance of SMEs (section 1.1), there is also an urgent need for professional development of SMEs. With the model of this work, this step can succeed.

7.6 Limitations of the study

Throughout the research, attempts were made to consider all relevant aspects and to act objectively and comprehensively in all contexts. Nevertheless, this research has limitations that are described below:

One of the most important factors in this study was the input from SME managers. The survey had a good response rate and has delivered satisfactory results. However, the survey did not collect all the data that would have been needed to more precisely select the indicators and offer a wider range of indicators to choose from. In the survey, a compromise was made. On the one hand, as many questions as possible should be

answered, on the other hand, SME managers should not be confronted with a survey that deters them because of the high volume.

A wider range of information could be collected with the personal interviews. Here, however, the small number of three conducted interviews must be listed. Although this topic is important for SME managers, it was extremely difficult to find appointments for interviews. In order to collect sufficient qualitative data, several interviews were planned. Without a personal contact (which existed with the three interviewed managers), not a single interview could be arranged. This also meant that the RQ 11 (Are German SME managers prepared to replace their current cost accounting system with more advanced and modern system) could not be answered. This question should be addressed in personal interviews. However, during the three conducted interviews, three different opinions have emerged. The manager, who was actually satisfied with his system, had no interest in it; the other two managers were not sure because it would depend on many factors in their opinion.

The bias of the researcher is another factor that should not be underestimated. Certain expectations can never be completely ignored and, in retrospect, can also be felt in the wording of the survey questions. For the analysis of the survey results, this problem should be actively addressed with the approach of hypothesis formation. The hypotheses are based primarily on assumptions that have emerged in the literature review but are also influenced by the expectations of the researcher. In the evaluation of the hypotheses, however, facts have emerged that could not be expected in this way. The hypotheses have made a decisive contribution to make clear these deviations of the expectation.

A weak point of the indicator system can be the waiving of soft facts. The increasing importance of soft facts has been described many times in the literature (Noé-Nordberg, 2017; Guserl and Pernsteiner, 2015; Loof, 2017), and has also been shown in section 3.3.2 on the change in corporate goals in recent decades. Issues such as employee satisfaction, sustainability or environmental protection are not found in the model of this research. These soft facts have been omitted to make it easier to get started with the performance indicator system. For this purpose, only indicators should be used, that could be determined without much effort and whose determination can follow a clearly defined strategy. This is difficult to implement in the area of soft facts.

7.7 Areas for further research

This topic has a lot of potentials. The rapid change and the ever-increasing competitive situation is not new but still a current challenge. In addition, the German economy is currently confronted with an acute shortage of skilled workers. This problem affects all companies regardless of their size. In the competition for employees, industrial companies have a decisive advantage. Due to the higher degree of mechanization and the higher added value per employee, higher wages can be paid in these companies (Hermann et al., 2017). For SMEs, it will become harder to find employees and they are increasingly confronted with the problem to produce products with fewer and fewer employees. A need for assistance with the key tasks of an SME manager does not end with this model but marks a step towards the different solutions for supporting SME managers.

There is a need for further research focusing on soft facts that have shown to be important. The need for further research is, of course, also in the practical implementation of the model. In this turn, all the individual steps of the implementation can be theoretically accompanied and the strengths and weaknesses of the system

can be uncovered and corrected. After accompanying some practical implementations, it can be considered whether the research results coincide with the reality in the daily routine of SMEs.

Bibliography

ADM (Arbeitskreis deutscher Markt- und Sozialforschungsinstitute e.V); 2007; Richtlinie für Online-Befragungen; p. 1

Aebi, Doris; 2014; Plädoyer für einen neuen Ansatz beim Research; in: Hofmann, Dieter; Bergert, Gabriele (Herausgeber); Hedhunter; pp. 15-26

Ahlemeyer, Niels; Burger, Anton; Wertorientierte Steuerungskennzahlen aus dem externen Rechnungswesen; in: Controlling & Management Review; December 2013; Volume 57; Issue 6; pp. 32-38

Albaum, Gerald; Duerr, Edwin; 2008; International Marketing and Export Management; pp. 306-307

Albayrak, Adam; Gadatsch, Andreas; 2012; IT-Governance-Modell für kleinere und mittlere Unternehmen; HMD Praxis der Wirtschaftsinformatik; June 2012; Volume 49; Issue 3; pp. 82-94

Alig, Simon; 2013; Wettbewerbsvorteile durch Innovationskooperationen: Eine ressourcen- und beziehungsorientierte Untersuchung in der deutschen Metall- und Elektroindustrie

Alvarez, Claudia; Urbano, David; Amoros, Jose; 2014; GEM research: achievements and challenges; Small Business Economics; March 2014; Volume 42; Issue 3; pp. 445-465

Amann, Klaus; Petzold, Jürgen; 2014; Management und Controlling

American Accounting Association; 1977; Statement on Accounting Theory and Theory Acceptance; p. 8

Andersen, Brigitte; Rossi, Federica; 2012; United Kingdom: Intelectual Asset Management Strategies for Diverse Innovations, in: OECD Studies on SMEs and Entrepreneurship. The SME Dimension; pp. 111-112

Arndt, Paul; 2013; Rentabilität

Arnolds, Hans; Heege, Franz; Tussing, Werner; Röh, Carsten; 2013; Materialwirtschaft und Einkauf

Bagusat, Ariane; 2006; Kundenbindungsstrategien für Business-to-Customer-Märkte; p. 148

Bartels, Frank; 2012; Eskimos kennen mehr als 100 Wörter für Schnee; p. 74

Barth, Klaus; Hartmann, Michaela; Schröder Hendrik; 2015; Betriebswirtschaftslehre des Handels

Bauer, Th. K.; Schmucker, A.; Vorell, M.; 2008; KMU und Arbeitsplatzdynamik-Eine Analyse auf Basis der Beschäftigten-Historik-Datei; ZFA Zeitschrift für Arbeitsmarktforschung, Heft 2/3, pp. 199-221

Baumann, Robert; Reber, Marcel; 2011; Rechnungswesen für technische Kaufleute und HWD

Baum-Nilsson, Anke; 2013; Social Media Insight: Befriedigung der kommunikativen Mitarbeiterbedürfnisse durch soziale Medien: Eine empirische Untersuchung anhand von DAX- und MDAX-Unternehmen

Baur, Nina; Blasius, Jörg; 2014; Handbuch Methoden der empirischen Sozialforschung

Bayer, Franz; Kühn, Harald; 2013; Prozessmanagement für Experten

Becher, Manuel; 2007; Entwicklung eines Kennzahlensystems zur Vermarktung touristischer Destinationen; pp. 65 - 66

Bea, Franz Xaver; Haas Jürgen; 2012; Strategisches Management

Becker, Hans Paul; 2011; Investition und Finanzierung: Grundlagen der betrieblichen Finanzwirtschaft; pp. 9-10

Becker, Wolfgang, Lutz, Stefan; Back, Christian; 2011; Gabler Kompaktlexikon Modernes Rechnungswesen

Becker, Wolfgang; Baltzer, Björn; Ulrich, Patrick; 2008; Aktuelle Entwicklungen in der Unternehmensführung mittelständischer Unternehmen; in: Bamberger Betriebswirtschaftliche Beiträge; Vol. 150; pp. 49-80

Becker, Wolfgang; Schwertner, Kerstin, Seubert, Christopher-Martin; 2005; Ergebnisse einer empirischen Studie. In: Controlling 17(1), pp. 33–39

Becker, Wolfgang; Ulrich, Patrick, Krüger, Steffen; Nowak, Christian; 2012; Entlohnungssysteme in mittelständischen Industrieunternehmen; in: Controlling & Management; February 2012; Volume 56; Issue 1; pp. 52-57

Becker, Wolfgang; Weber, Jürgen; 2013; Entscheidungsorientierte Kostenrechnungssysteme: Eine entwicklungsgeschichtliche Analyse

Belohuby; Richard; 2014; Kundenwertcontrolling und IFRS Rechnungslegung

Benedikter, Roland; Handwerk als globaler Wirtschaftstrend; in: Zeitschrift für Außen- und Sicherheitspolitik; October 2013; Volume 6; Issue 4; pp. 589-605

Berens, Wolfgang; Püthe, Tina; Siemes, Andreas; 2005; Ausgestaltung der Controllingsysteme im Mittelstand-Ergebnisse einer Untersuchung. In: ZfCM, H. 3; pp. 186-191

Berger, Florian; 2013; Diversity Management in Deutschland: Sicherung langfristiger Unternehmensziele im Mittelstand

Bernotat, Kirsten; Nickl Diane; 2006; Jahresbericht des deutschen Patent und Markenamtes; p. 12

Bertram, Björn; 2011; Innovationsprozesse wissensbasierter Technologien

Bestmann, Uwe; 2011; Betriebswirtschaftliche Formelsammlung: Kommentierte Kennzahlen; pp. 15-16

Bhimani, Alnoor; 2012; Introduction to Management Accounting

Bhimani, Alnoor; Horngren, Charles; Sundem, Gary; 2012; Introduction to Management Accounting

Bitsch, Günter; 2013; Theoretische Fundierung einer Coaching-Wissenschaft

Bittelmeyer, C.; Ehrhart, N.; Zimmermann, V.; 2007; Einflussfaktoren auf das Patentierungsverhalten von kleinen und mittleren Hightech-Unternehmen des Verarbeitenden Gewerbes. Mittelstands- und Strukturpolitik 39, p. 43-82

BMBF (Bundesministerium für Bildung und Forschung; 2012; Programm zur Informationsveranstaltung: „F&E-Förderung für KMU auf europäischer Ebene: Die Programme „Forschung für KMU" und „Eurostars", p. 1

Bohr, Kurt; 1988; Kostenrechnung

Bolz, Heinrich; 2013; Unternehmenserfolg durch marktorientierte Führung

Borchert, Margret, Hamburger, Joachim; Brockhaus, Nina; Strina, Guiseooe, Klinkhammer, Stefanie; Heinen, Ewald; 2011; Produktivitätsmanagement für Dienstleistungen aus der KMU-Perspektive, in: Bruhn, Manfred; Hadwich, Karsten (Herausgeber); Dienstleistungsproduktivität; pp. 89-120

Borger, K.; Gude, H.; 2008; Die konjunkturelle Lage kleiner und mittlerer Unternehmen, in: Mittelstands Monitor 2008-Jährlicher Bericht zu Konjunktur- und Strukturfragen kleiner und mittlerer Unternehmen; pp. 1 -36

Bösener, Kathrin; 2015; Kundenzufriedenheit, Kundenbegeisterung und Kundenpreisverhalten, Empirische Untersuchung; in: Fokus Dienstleistungsmarketing; 2015; pp. 147-254

Bourier, Günther; 2014; Beschreibende Statistik

Brandt, Siegmund; 2013; Datenanalyse für Naturwissenschaftler und Ingenieure

Brauchle, Thomas; 2015; Unternehmerische Entscheidung und Risikomanagement; in Rechnungswesen und Unternehmensüberwachung, Nov 2015; pp. 159-199

Braun, Norman; Saam, Nicole; 2014; Handbuch Modellbildung und Simulation in den Sozialwissenschaften

Brecht, Ulrich; 2012; Controlling für Führungskräfte: Was Entscheider im Unternehmen wissen müssen

Brenner, Rainer; 2013; Fresh-Interim-Management: oder wie sich der Mittelstand mit neuen Perspektiven entscheidende Vorteile sichert

Brexendorf, Tim Oliver; Tomczak, Thorsten; 2011, Markencontrolling; in: Controlling & Management; February 2011; Volume 55; Issue 1; pp. 28-32

Brock, Ditmar; Junge, Matthias; Krähnke, Uwe; 2012; Soziologische Theorien von Auguste Comte bis Talcott Parsons: Einführung, Band 3

Bromwich, Michael; Bhimani, Alnoor; 1989; Management Accounting: Evolution not Revolution, CIMA research studies; p. 105

Brown, Lawrence; Huang, Kelly; Pinello, Arianna; 2013; To beat or not to beat? The importance of analysts´ cash flow forecast. In Review of Quantitative Finance and Accounting; November 2013, Volume 41, Issue 4; pp. 723-752

Bruhn, Manfred; 2013; Qualitätsmanagement für Dienstleistungen

Brüse, Markus; 2011; Mezzanine-Kapital für den Mitelstand: eine empirische Analyse aus Unternehmenssicht in quantitativer und qualitativer Art

Buchholz, Meike; 2012; Theorie der Variantenvielfalt

Buchholz, Rainer; 2013; Grundzüge des Jahresabschlusses nach HGB und IFRS

Bühner, Markus; 2011; Einführung in die Test- und Fragebogenkonstruktion

Bungard, W; Antoni, C.; Lehnert, E.; 1993; Gruppenarbeitskonzepte mitlerer Industriebetriebe: Forschungsbericht, Mannheimer Schriften zur Arbeits- und Organisationspsychologie Nr. 4; pp. 74-80

Bungenstock, Christian; 1995; Entscheidungsorientierte Kostenrechnungssysteme: Eine entwicklungsgeschichtliche Analyse; p. 10

Bürkle, Hans; 2012; Mythos Strategie

Burns, Tony; 2011; Interpreting and appropriating texts in the history of political thought: Quentin Skinner and poststructuralism; in: Contemporary Political Theory; 2011; Vol. 10, pp. 313–331

Busse, Walther; Crasselt, Nils; Pellens, Bernhard; 2011; Lexikon des Rechnungswesens: Handbuch der Bilanzierung und Prüfung der Erlös-, Finanz-, Investitions- und Kostenrechnung; p. 546

Carspecken, Francis Phil; 2013; Critical Ethnography in Educational Research: A Theoretical and Practical Guide

Catlaw, Thomas; 2013; Beyond Methodological Taylorism? Pluralism and the Study of Public Administration; in: Journal of Public Administration Research and Theory, Volume 23, Issue 3; pp. 758-766

Cecia, Federica; Iubattib, Daniela; 2012; Personal relationships and innovation diffusion in SME networks: in: Research Policy, Volume 41, Issue 3; April 2012; pp. 499-662

Chambers, Ray; 1955; Blueprint for a theory of accounting; in: Accounting Research; Jan. 1955; pp21-22

Chapman, Christopher; Hopwood, Anthony; Shields, Michael; 2007; Handbook of Management Accounting Research, Band 2; p. 666

Charmaz, Kathy; 2014; Constructing Grounded Theory

CIMA; 2013; C01 Fundamentals of Management Accounting - Study Text

Coenenberg, A.; Fischer, T.; Schmitz, J.; 1997; Target Costing und Product Life-Cycle Costing als Instrumente des Kostenmanagements, in: Freidank, Carl-Christian: Kostenmanagement, p. 197

Coenenberg, Adolf; Fischer, Thomas, Günther, Thomas; 2012; Kostenrechnung und Kostenanalyse

Cohen, Louis; Manion, Lawrence; Morrison, Keith; 2013; Research Methods in Education

Cohen, W.M.; Levine R.C.; 1989; Handbook of Industrial Organization Vol 2

Collis, Jill; Hussey, Roger; 2013; Business Research: A Practical Guide

Creditreform; 2004; Insolvenzen, Neugründungen und Löschungen; p. 18

Deffner, Gertrud; 2011; Schnelleinstieg BWA: die betriebswirtschaftliche Auswertung lesen

Deimel, Klaus; 2008; Stand der strategischen Planung in kleinen und mittleren Unternehmen (KMU) in der BRD; in Zeitschrift für Planung & Unternehmenssteuerung; Nummer 19; pp. 281-298

Deimel, Klaus; Heupel, Thomas; Wiltinger, Kai; 2013; Controlling

Deimel, Klaus; Kraus, Sascha; 2008; Strategisches Management in kleinen und mittleren Unternehmen

Denzin, Norman; Lincoln, Yvonna; 2011; The SAGE Handbook of Qualitative Research

Deppenmeier, Jens; 2011; Lebenszyklusorientierte Planung und Erschließungskonzepte in Hochhäusern am Beispiel von Aufzugsanlagen; pp. 48-49

Dethlefs, Lars; 1997; Kennzahlencontrolling in Kleinen und Mittleren Unternehmen; p. 25

Deutsche Post; 2014; Online unter; http://www.deutschepost.de/de/a/adressleistungen.html; Stand 16.0s2014

Dexheimer, Andreas; 2011; Forschung in der sozialen Arbeit

Dietzel, Alexander; 2013; Vertriebscontrolling optimieren

Diller, Hermann; 2007; Preispolitik

Dillerup, Ralf; Stoi, Roman; 2013; Unternehmensführung; pp. 227-231

Dintner, Rolf; 1999; Controlling in kleinen und mittleren Unternehmen: Klassifikation, Stand und Entwicklung

Dintner, Rolf; Schorcht, Heike; 1999; Empirische Untersuchung zum Controlling in mittelständischen Unternehmen Thüringens. In: Dintner, Rolf (Herausgeber); Controlling in kleinen und mittleren Unternehmen: Klassifikation, Stand und Entwicklung; p. 67-309

Disatnik, David; Duchin, Ran; Schmidt, Breno; 2014; Cash Flow Hedging and Liquidity Choices; In: Review of Finance; Volume 18, Issue 2; pp. 715-748

Ditges, Johannes; Arendt, Uwe; 2002; Bilanzen

Dobhan, Alexander; 2012; Internal Supply Chain Management-Entwicklung und experimentelle Analyse hybrider Lösgrößenplanungsverfahren; pp. 32-33

Dorn, Gerhard; 1961; Institut der Industrieforschung: Die Entwicklung der industriellen Kostenrechnung in Deutschland; Band 12; p. 206

Drury, C.; Tayles, M.; 2000; Cost systems design and profitability analysis in UK companies; Chartered Institute of Management Accountants

Drury, Colin; 2008; Management and Cost Accounting; p. 50

Drury, Colin; 2011; Management Accounting for Business Decisions; pp. 15-16

Eid, Michael, Gollwitzer, Mario; Schmitt, Manfred; 2013; Statistik und Forschungsmethoden

Endenich, Christoph; 2012; Comparative Management Accounting

Engel, Uwe, Bartsch, Simone; Schnabel, Christiane; Vehre, Helen; 2012; Wissenschaftliche Umfragen: Methoden und Fehlerquellen

Engelmann, Jörg; Müller, Egon; Löffler, Thomas, Strauch, Jörg; 2012; Energieeffiziente Fabriken planen und betreiben

Erhard, Ludwig; 1956; Mittelstandspolitik, in: Rüstow: Der mittelständische Unternehmer in der Sozialen Marktwirtschaft. Wortlaut der Vorträge auf der vierten Arbeitstagung der Aktionsgemeinschaft Soziale Marktwirtschaft e.V. am 17.11.1955 in Bad Godesberg, Ludwigsburg, p. 54

Erhard, Ludwig; 1957; Wohlstand für alle; pp. 90-91

Erlbeck, Klaus; 2013; Kundenorientierte Unternehmensführung: Kundenzufriedenheit und –loyalität

Eucken, Walter; 1952; Grundsätze der Wirtschaftspolitik; Rowohlts Deutsche Enzyklopädie

European Commission; 2009; Commission Staff Working Document: The new SME definition; P. 3

Eurpoean Comission; 2012; European Union Support Programmes for SMEs; p. 2

Eversheim, Walter; Klocke, Fritz; 1998; Werkzeugbau mit Zukunft: Strategie und Technologie

Ewert, Ralf; Wagenhofer, Alfred; 2008; Interne Unternehmensrechnung, p. 526

Feldmeier, Gerhard; Lukas, Wolfgang; Simmet, Heike; 2015; Globalisierung KMU: Entwicklungstendenzen, Erfolgskonzepte und Handlungsempfehlungen

Fiedler, Rudolf; Gräf Jens; 2012; Einführung in das Controlling: Methoden, Instrumente und DV-Unterstützung.

Fischbach, Sven; 2013; Grundlagen der Kostenrechnung.

Fischer, Ellen; 2015; Balanced Scorecard: Einsatzmöglichkeiten bei KMU im Vergleich zum Großunternehmen

Fischer, Thomas; Möller, Klaus; 2015; Controlling: Grundlagen, Instrumente und Entwicklungsperspektiven

Flick, Uwe; 2014; An Introduction to Qualitative Research

Fowler, Floyd; 2013; Survey Research Methods

Franz, Klaus-Peter; Kajüter, Peter; 2002; Kostenmanaement-Wertsteigerung durch systematische Kostensteuerung; 2. Auflage; p. 580

Franz, Wolfgang; 2013; Arbeitsmarktökonomik

Freidank, Carl-Christian, 2012; Kostenrechnung, Einführung; pp. 363-365

Freidank, Carl-Christian; 2012; Kostenrechnung: Einführung in die begrifflichen, theoretischen, verrechnungstechnischen sowie planungs- und kontrollorientierten Grundlagen des innerbetrieblichen Rechnungswesens; p. 197

Fresow, Reinhard; 2014; Wirtschaftsfachwirte: Investition, Finanzierung

Fresow; Reinhard; 2013; Wirtschaftsfachwirte: Betriebliches Management

Friedl, Gunther; Hofmann, Christian; Pedell, Burkhard; 2014; Kostenrechnung

Friedl, Gunther; Hofmann, Christian; Pedell, Burkhard; 2017; Kostenrechnung: Eine entscheidungsorientierte Einführung

Gaedke, Yvonne; Berkhoff, Stephan; Robra-Bissantz, Susanne; 2011; Das Beschwerdeblog als Führungsinformationssystem; in: HMD Praxis der Wirtschaftsinformatik; December 2011; Volume 48; Issue 6; pp. 65-73

Garrel, von, Jörg; Tackenberg, Sven; 2013, Flexibilität von KMU durch situationsspezifische Auslegung der Fertigung, in: Bronewasser, Manfred; Zülch, Gert (Herausgeber); Arbeitszeit - Zeitarbeit; pp. 381-403

Garvin, Davis; 2003; Making The Case; in: Harvard Magazine, Heft 106, Issue 1; pp. 56-65

Gaydoul, Peter; 1980; Controlling in der deutschen Unternehmenspraxis

Geertz, Clifford; 1990; Die künstlichen Wilden: Anthropologen als Schriftsteller

Gehrig, Marco; 2013; Free Cashflow: Die Königskennzahl in der Praxis für KMU; in: Trex, der Treuhandexperte; Ausgabe 2/2013; pp. 94-95

Gelbmann, Ulrike; Rauter, Romana; Engert, Sabrina; Baumgartner, Ruppert; 2013; 2013; CSR-Innovationen in kleinen und mittleren Unternehmen; in: Altenburger; Reinhard (Herausgeber); CSR und Innovationsmanagement; Management-Reihe Corporate Social Responsibility; pp. 31-54

Georges, Walter; McGee, Robert; 1987; Analytical Contribution Accounting-The Interface of Cost Accounting and Pricing Policy, pp. 202-203

Geyer, Helmut; 2013; Praxiswissen BWL, p. 367

Gienke, Helmuth; Kämpf, Rainer; 2007; Handbuch Produktion: Innovatives Produktionsmanagement; p. 821

Gill, John; Johnson, Phil; 2010; Research Methods for Managers

Gilpin, Robert; 2011; Global Political Economy: Understanding the International Economic Order

Gladen, Werner; 2011; Performance Measurement: Funktionsbereichs-Kennzahlen

Glaser, Barney; Holton, Judith; 2005; Staying Open: The Use of Theoretical Codes in Grounded Theory; in: The Grounded Theory Review, Vol.5; No.1; pp. 1-20

Gleich, Ronald; 2011; performance Measurement; pp. 74-75

Gobrecht, Reinhard; 2014;Prinzipien in der Philosophie: Grundsätze in der Philosophie

Greener, Ian John; 2011; Negotiating the narrow road between institutionalism and non-foundationalism, and the difference it makes; in: International Journal of Organization Theory & Behaviour; Winter2011, Vol. 14 Issue 4, pp. 480-499

Greer, Howard; 1954; Alternatives to Direct Costing, in: National Association of Accountants on Direct Costing, Selected Papers, p. 147

Grieco, Peter; Pilachowski, Mel; 1995; Activity Based Costing: The Key to world-class performance; p. 158

Großklaus, Rainer; 2011; Praxisbuch Produktmanagement

Gukenbiehl, Hermann; 2013; Grundbegriffe der Soziologie

Günterberg, Brigitte; Kayser, Gunther; 2004: SMEs in Germany - Facts and Figures, IfM-Materialien Nr. 161, Bonn 2004

Günterberg, Brigitte; 2009; Unternehmensgrößenstatistik; p. 49

Günterberg, Brigitte; 2011; Institut für Mittelstandsforschung; IFM Materialien

Günther, Thomas; Grüning, Michael; 2002; Performance Measurement Systeme im praktischen Einsatz, in Controlling 14; 2002; 1, pp. 5-13

Günther, Thomas; Schomaker, Martin; 2012; 10 Thesen für mehr Effizienz in der Planung mittelständischer Unternehmen; in: Controlling & Management; November 2012; Volume 56; Issue 3 Supplement; pp. 18-30

Guser, Richard; Pernsteiner, Helmut; 2015; Control and Controlling System

Güth, Sandra; Decius, Julian; Horvat, Djerdj; Schaper, Niclas; Virgillito, Alfredo; 2018; Strategisches Kompetenzmanagement von Produktionsbeschäftigen-Innovations- und Wachstumsimpulse in nicht-forschungsintensiven kleinen und mittleren Unternehmen. In: Kompetenzentwicklung in analogen und digitalisierten Arbeitswelten. Kompetenzmanagement in Organisationen

Hagenloch; Thorsten; 2013; Einführung in die Betriebswirtschaftslehre: Theoretische Grundlagen und Managementlehre

Hahn, Christopher; 2014; Finanzierung und Besteuerung von Start-up-Unternehmen

Hamacher, Klaus; Borrmann, Robert, Schaschke, Michaela; 2013; Strategieentwicklung und –umsetzung im Deutschen Zentrum für Luft- und Raumfahrt; in ZfB-Special Issue; Volume 1/2013; pp. 55-82

Hamann, Gerrit; 2013; Strategisches Management für KMU: Unternehmenswachstum durch (r)evolutionäre Unternehmensführung

Hansen, Hans Robert; 1955; Die Unternehmung im Markt; p. 272

Happich, Gudrun; Classen, Markus; 2013; Coaching im Mittelstand; in: Organisationsberatung, Supervision, Coaching; September 2013; Volume 20; Issue 3; pp. 245-259

Hardt, R.; 1995; Logistik Controlling für industrielle Großbetriebe in: Kostenrechnungspraxis; pp. 199-206

Harris, Jonathan; 1936; What did we earn last month; in: Bulletin; N.A.C.A.; 15.01.1936

Haunschild, Ljuba; May-Strobl, Eva; 2009; Arbeitsplatzdynamik und nachhaltige Beschäftigungswirkung in kleinen und mittleren Unternehmen, Working Paper des IfM; p. 22

Hausladen, Iris; 2014, Materialwirtschaft und Produktion heute; in: HMD Praxis der Wirtschaftsinformatik; April 2010, Volume 47, Issue 2, pp. 6-16

Heesen, Bernd; 2011; Cash- und Liquiditätsmanagement

Heine, Bernd-Oliver; 2008; Konzeptionelle Nutzung von Controllinginformationen: Ein modelltheoretischer Ansatz

Heise, Wolfgang; 2010; Das kleine 1x1 von Zuverlässigkeit und LCC; p. 94

Helmke, Stefan; Uebel; Matthias; 2013; Managementorientiertes IT-Controlling und IT-Governance

Hendrich, A.; 2016; Open Source ERP. Systeme für KMU. Leistungsfähigkeit und Einsatz

Henke, Anja; 2015; Wachstum in gesättigten Märkten

Hennig, Marina; 2014; Aspekte der Stichprobenqualität; in: König, Christian; Stahl, Matthias, Wiegand, Erich (Herausgeber); Soziale Medien; Schriftenreihe der ASI - Arbeitsgemeinschaft Sozialwissenschaftlicher Institute 2014, pp. 111-126

Hermann, Wendelin; Jasch, Markus; Jung Manuel; Marte, Andreas; Schuster, Simon; 2017; Welche neuen Arbeitsbereiche entstehen in der Industrie 4.0. In: Industrie 4.0

Herzberger, Nils; 2015; Strategische Unternehmensausrichtung von KMU (kleine und mittlere Unternehmen) in der Europäischen Union

Heusinger von Waldegge, Sylke; 2009; Steigerung des Unternehmenswertes: Entwicklung und Einsatz eines Controlling-Instrumentes

Heyne, Dirk; Mönch, Lars; 2011; An agent-based planning approach within the framework of distributed hierarchical enterprise management; in: Journal of Management Control; December 2011; Volume 22; Issue 2; pp. 205-236

Heyse, Volker; Erpenbeck, John; Ortmann, Stefan; Coester, Stephan; 2018; Mittelstand 4.0 - eine digitale Herausforderung: Führung und Kompetenzentwicklung im Spannungsfeld des digitalen Wandels

Hoffmann, Jürgen; 2012; Risikomanagement für mittelständische Unternehmen; pp. 27-29

Höflinger, Peter; 1975; Informationsoptimierung in betrieblichen Entscheidungsprozessen. Ein Beitrag zur informations-ökonomischen Theoriebildung; p. 147

Hofstadler, Christian; 2014; Produktivität im Baubetrieb

Hofte-Fankhauser, Kathrin; Wälty, Hans; 2013; Marktforschung

Homburg, Christian; Weber, Jürgen; Aust, René; Karlshaus, Jan; 2008; Interne Kundenorientierung der Kostenrechnung: Ergebniss der Koblenzer Studie; pp. 15-17

Hoops, Christian; Schnapp, Kai-Uwe; Schaefer-Rolffs; Adrian; 2013; Zur Ziehung von Stichproben in schwer erreichbaren Zielgruppen mit gravitationsanalytischen Methoden; WISO Forschungslabor; Working Paper No. 04; April 2013

Horbel, Chris; Weismann, Friederike; 2013; Wert für den Kunde-Ein Überblick über begrifliche Konzeptionen. In: Roth, Stefan (Herausgeber); Aktuelle Beiträge zur Dienstleistungsforschung; pp. 171-194

Horváth, Péter ; Mayer, Reinhold; 1989; Prozesskostenrechnung

Horváth, Péter; 1999; Das Balanced Scorecard Managementsystem: das Ausgangsproblem, der Lösungsansatz und die Unternehmenserfahrungen; in: Die Unternehmung; Bern; Nr. 5 / 1999; pp. 303-319

Horváth, Péter und Partner; 2000; Balanced Scorecard umsetzen

Horváth, Péter ; 2006; Controlling

Horváth, Péter ; 2011; Controlling

Howel, R.; Soucy, S.; 1990; Operating Controls in new Manufacturing Environment; Management Accounting, October pp. 25-31

Huber, Andreas; 2011; Personalmanagement

Hubert, Boris; 2013; Kundenzufriedenheits-Controlling im Mittelstand; in: Controlling & Management Review; May 2013; Volume 57; Issue 5; pp. 56-63

Hummel, John; Huitt, William; 1994; What you measure is what you get; in: GaASCD Newsletter, The Reporter, p. 10-11

Hummel, Siegfried; Männel, Wolfgang; 1983; Kostenrechnung 2: Moderne Verfahren und Systeme. Ausgabe 4

Hutterer, Peter; 2013; Dynamic Capabilities und Innovationsstrategien: Interdependenzen in Theorie und Praxis

Ihlau, Susann; Duscha, Hendrik; Gödecke, Steffen; 2013; Besonderheiten bei der Bewertung von KMU

Innes, J; Mitchell, F.; Sinclair, D.; 2000; Activity-based costing in the UK´s largest companies: a comparison of 1994 and 1999 survey results. In: Management Accounting Research 11 (3); pp. 349-362

Ittner, Christopher; Larcker, David; 2003; Coming up. short on nonfinancial performance measurement. In: Harvard Business Review 81(11), pp. 88–95

Jacob, Rüdiger; Heinz Andreas; Décieux, Jean Philippe; 2013; Umfrage: Einführung in die Methoden der Umfrageforschung

Jacobs, Jens; Letmathe, Peter; Urigshardt, Thomas; Zielinski, Marc; 2009; Typologiebezogene Controllinganforderunge und –instrumente von kleinen und mittleren Unternehmen des produzierenden Gewerbes. In: Müller, David (Herusgeber): Conrolling für kleine und mittlere Unternehmen; pp. 49-50

Janakiew; Peter; 2013; Kompendium für die Dienstleistungfachwirt-Familie: Unternehmensführung, Rechnungswesen, Controlling

Jeschke, Barnim; 2017; Entscheidungsorientiertes Management: Einführung in eine konzeptionell fundierte, pragmatische Entscheidungsfindung

Jocob, Rüdiger; Heinz, Andreas; Décieux, Jean Philippe; 2013; Umfrage: Einführung in die Methoden der Umfrageforschung

Johnson, Thomas; Kaplan, Robert; 1991; Relevance Lost; pp. 204-205

Johnson, Thomas; 2013; A New Approach to Management Accounting History

Joos-Sachse, Thomas, 2002, Controlling, Kostenrechnung und Kostenmanagement; p. 34

Jorissen, Ann; Laveren, Eddy; Devinck, Sabine; Vanstraelen, Ann; 1997; Planning and Control: are these necessary tools for success? Empirical results of survey and case research on small and medium-sized enterprises compared with empirical research on large companies, Working Paper, University of Antwerpen, UFSAI, pp. 13-16

Jost, Claudia; 2013; Praxishandbuch Balanced Scorecard

Jung, Hans; 2007; Controlling; 2. Auflage

Jung, Hans; 2010; Personalwirtschaft

Kamiske, Gerd; 2013; Handbuch QM-Methoden: Die richtige Methode auswählen und erfolgreich umsetzen

Kannegiesser, Matthias; Günther, Hans-Otto; 2014; Sustainable development of global supply chains—part 1: sustainability optimization framework; in: Flexible Services and Manufacturing Journal; June 2014; Volume 26; Issue 1-2; pp. 24-47

Kaplan, Robert 1994 in: Drury, Colin; 1997; Management and Cost Accounting; pp. 21-22

Kaplan, Robert; Bruns, William; 1987; Accounting and Management: A Field Study Perspective

Kaplan, Robert; Cooper, Robin; 1998; Cost & Effect: Using Integrated Cost Systems to Drive Profitability and Performance.

Kaplan, Robert; Norton, David; 1992; The Balanced Scorecard: Measures that Drive Performance In: Harvard Business Review 70, Nr. 1, Reprint #92105

Kaplan, Robert; Norton, David; 1996; The Balanced Scorecard: Translating Strategy Into Action; p. 77.

Kaplan, Robert; Norton, David; 1996; Using the Balanced Scorecard as a Strategic Managemen System, Harvard Business Review; 74; Pp. 76 - 85.

Kaplan, Robert; Norton, David; Horváth, Peter; 2001; Die strategiefokussierte Organisation. Führen mit der BalancedScorecard, p. 189.

Kaplan, Robert; Norton, David; Horváth, Péter; Gaiser, Bernd; 2004; StrategyMaps: Der Weg von immateriellen Werten zum materiellen Erfolg

Kaschny, Martin; Nolden, Matthias; 2014; Controlling and Governance: Innovationsmanagement in Mittelstand

Kemmis, Stephen; McTaggart, Robin; Nixon, Rhonda; 2014; The Action Research Planner: Doing Critical Participatory Action Research

Kern, Eva-Maria; Hertung, Thomas; 2013; Zielorientiertes Risikomanagement; in: Kersten, Wolfgang; Wittmann, Jochen (Herausgeber); Kompetenz, Interdisziplinarität und Komplexität in der Betriebswirtschaftslehre; pp: 113-132

Kesten, Ralf; Lühn, Michael; Schmidt, Steffen; 2013; Wertorientiertes Vertriebscontrolling im Konzern; in: Controlling & Management Review; February 2013; Volume 57; Issue 2; pp. 26-35

Keuper, Frank; Brösel, Gerrit; Albrecht, Tobias;2009; Controllung in KMU: Identifikation spezifischer Handlungsbedarfe auf Basis aktueller Studien, in: Müller, David Controlling für kleine und mittlere Unternehmen; pp. 56-70

Kiederer, Christoph; 2011; Entwicklung von Qualitätsmanagementstrategien in einem KMU

Kilger, Wolfgang; Pampel, Jochen; Vikas, Kurt; 2012; Die Entwicklung der Kostenrechnung zur Genzplankosten- und Deckungsbeitragsrechnung. In: Flexible Plankostenrechnung und Deckungsbeitragsrechnung; pp. 49-113

Kilger, Wolfgang; Pampel, Jochen; Vikas, Kurt; 2012; Flexible Plankostenrechnung und Deckungsbeitragsrechnung

Kirsch, Werner; Picot, Arnold; 2013; Die Betriebswirtschaftslehre im Spannungsfeld zwischen Generalisierung und Spezialisierung

Kistner, Klaus-Peter; Bauer, Hans; Albach, Horst; 2013; Unternehmensdynamik

Klamminger, Sandra; Stelling, Johannes; Hollidt, Andreas; 2011; Implementierung einer KMU spezifischen Kostenrechnung am Beispiel Georg Egger & Co GmbH; p. 23

Kleemann, Frank; Krähnke, Uwe; Matuschek, Ingo; 2013; Interpretative Sozialforschung

Kleimeier, Peter; 2017; Verkaufserfolg für KMU; Mit pragmatischen und effizienten Lösungen zu besseren Vertriebsergebnissen

Klein, Andreas; Schnell, Harald; 2012; Controlling in der Produktion: Instrumente, Strategien und Best-Practicies

Kleining, Gerhard; 1986; Das qualitative Experiment; In: Kölner Zeitschrift für Soziologie und Sozialpsychologie; Band 38; 1986; pp. 724–750

Klemisch, Herbert; Rauhut; Ingo; 2009; Wissenslandkarte: Berufsbildung für nachhaltiges Witschaften im Handwerk; p. 122

Klinger, Wolfgang; Pampel, Jochen; Vikas, Kurt; 2012; Flexible Plankostenrechnung und Deckungsbeitragsrechnung

Knieps, Simon; 2014; Warum halten Unternehmen Kasse? Eine Analyse der Einflussfaktoren auf die Liquidität

Kölling, Arnd; 2014; Wirtschaftsförderung, Produktivität und betriebliche Arbeitsnachfrage; in: Journal for Labour Market Research; March 2014; Volume 47; Issue 1-2; pp. 143-164

König, Matthias; Clausen, Hartmut; Schank, Christoph; Controlling in der Sozialwirtschaft-ein Vergleich zum Controlling in gewerblichen Unternehmen; in: Controlling & Management; April 2012; Volume 56; Issue 2; pp. 126-132

Kosmider, Andreas; 1994; Controlling im Mittelstand: Eine Untersuchung der Gestaltung und Anwendung des Controlling in mittelständischen Industrieunternehmen. In: Schriftreihe der WHU Koblenz; Nr5.; pp. 30- 42

Krabbe, Heiner; 2014 Werkstattbericht: Die Kunst des Fragens; in Zeitschrift für Konfliktmanagement; Band 17, Heft 6; pp. 185–188

Kraemer, Helena; Yesavage, Jerome; Taylor, Joy; Kupfer, David; 2000; How Can We Learn About Developmental Processes From Cross-Sectional Studies, or Can We?; in American Journal Of Psychiatry; Volume 157 Issue 2; February 2000; pp. 163-171

Kranzusch, Peter; Pahnke, André; Kay, Rosemarie; Holz, Michael; 2016; nternationalisierung von kleinen und mittleren Unternehmen im Dienstleistungssektor im Lichte der (amtlichen) Statistikin: Daten und Fakten, Institut für Mittelstandsforschung (IfM) Nr. 17

Kremer, Fabian; 2013; Kostenrechnung als Controlling-Instrument: Die kostentheoretische Fundierung der Grenzplankostenrechnung; pp. 5-7

Kriegesmann, Bernd; Kerka, Friedrich; 2014; Unternehmerisches Innovationsmanagement; in: Mai, Manfred (Herausgeber); Handbuch Innovationen; pp. 73-87

Krol, Florian; 2009; Wertorientierte Unternehmensführung im Mittelstand-Erste Ergebnisse einer empirischen Studie; pp. 3-16

Kronthaler, Franz; 2014; Statistik angewandt: Datenanalyse ist (k)eine Kunst

Krüger, Günther; 2011; Mit Kennzahlen Unternehmen steuern. Praxisleitfaden für Unternehmen und Berater

Krumwiede, Kip; Swain, Monte; Thornock, Todd; Eggett, Dennis; 2013; The effects of task outcome feedback and broad domain evaluation experience on the use of unique scorecard measures; in: Advances in Accounting; Volume 29; Issue 2; December 2013; pp. 205-217

Krystek, Ulrich; Moldenhauer, Ralf; Evertz, Derik; 2009; Controlling in aktuellen Kriesenerscheinungen: Löung oder Problem. In: Controlling & Management, Juni 2009, Volume 53; Ausgabe 3; pp. 164-168

Kühnapfel, Jörg; 2013; Aufgaben des Vertriebscontrollers; in: Controlling & Management Review; February 2013; Volume 57; Issue 2; pp. 36-46

Kuß, Alfred; 2012; Marktforschung: Grundlagen der Datenerhebung und Datenanalyse

Kütz, Martin; 2014; IT-Prozesse mit Kennzahlen steuern; in: Controlling & Management Review; March 2014; Volume 58; Issue 7; pp. 86-93

Labitzke, Niklas; Volling, homas; Spengler, Thomas; 2011; Wertorientierte Simulation zur Unterstützung der logistischen Prozessgestaltung bei der Stahlherstellung; in: Zeitschrift für Betriebswirtschaft; August 2011; Volume 81; Issue 7-8; pp. 771-803

Lachnit, Laurenz; Müller, Stefan; 2012; Unternehmenscontrolling: Managementunterstützung bei Erfolgs-, Finanz-, Risiko- und Erfolgspotentialen

Lachnit, Laurenz; Müller, Stefan; 2012; Unternehmenscontrolling: Managementunterstützung bei Erfolgs-, Finanz-, Risiko- und Erfolgspotentialsteuerung

Ladurner, Christian; Mäder, Olaf; 2012; Erfolgsfaktoren der Umsetzung des wertorientierten Controllings-Ergebnisse einer empirischen Studie; in: Controlling & Management; June 2012; Volume 56; Issue 3; pp. 197-203

Langer, Cornelia; Eschenburg, Klaus; Eschbach, Rainer; 2013; Rating und Finanzierung im Mittelstand: Leitfaden für erfolgreiche Bankgespräche

Langer, Thomas; Seufert, Bernd; 2012; Controlling im Handel

Lanz, Rolf; 1992; Controlling in kleinen und mittleren Unternehmen. 3. Auflage

Lauterhahn, Frank; 2015; Dem Kunden auf der Spur. Systematische Einführung von Customer Experience Management

Legenhausen, Claas; 2013; Controllinginstrumente für den Mittelstand

Leick, Birgit; Leßmann, Grit; Nußbaum, Jens; 2014; KMU als Global Player; in: Standort; March 2014; Volume 38; Issue 1; pp. 8-13

Leidig, G.; 2001; Kostenrechnung und Controlling im Mittelstand, in: krp. (Kostenrechnungspraxis) Sonderheft 3/2001; pp. 94-96

Lengenhausen, Claas; 2013; Controllinginstrumente für den Mittelstand; pp. 147-154

Lewin, Kurt; 1946; Action Research and Minority Problems; in: Journal of Social Issues

Leyh, Christian; Neumann, Mark; 2012; Open-Source-ERP-Systeme für das Controlling — eine vergleichende Systemevaluation; in: HMD Praxis der Wirtschaftsinformatik; February 2012; Volume 49; Issue 1; pp. 49-57

Lingle, John; Schiemann, William; 1996; From Balanced Scorecard to Strategic Gauges: Is Measurement worth it?, in American Management Association, March 1996; pp. 56-61

Link, Harald; Hemel, Ulrich; 2017; Zukunftssicherung für Familienunternehmen

Lippold, Dirk; 2013; Die Unternehmensberatung

Loebe, Herbert; Severing, Eckart; 2013; Qualifizierungsberatung in KMU: Förderung systematischer Personalentwicklung

Lohmann, Karl; Körnert, Jan; 2013; Kosten- und Leistungsrechnung: Arbeits- und Studienbuch

Loof, Uwe; 2017; Strategy Map. in: Modernes Personalmanagement, pp. 301-309

Lübke, Ekkehard; 2007; Lebenszyklusorientiertes Produktstrukturmanagement; Eine theoretische und empirische Untersuchung

Luenstroth, H.W.; 1952; National Association of Accountants: Bulletin

Lukas, Christian; Rapp, Matthias; 2013; Unternehmenssteuerung mit Rentabilitätskennzahlen; in: Controlling & Management Review; December 2013; Volume 75; Issue 6; pp. 68-74

Luther, Robert; Jones, Colwyn; Saxl; Astrid; 2009; Experiencing Change in German Controlling: Management accounting in a globalizing world

Macharzina, Klaus; Wolf, Joachim; 2012; Unternehmensführung: Das internationale Managementwissen. Konzepte-Methoden-Praxis

Männel, Wolfgang; 2013; Neue Systeme, EDV-Konzepte und Controlling-Instrumente

Maleri, Rudolf; 1997; Grundlagen der Dienstleistungsproduktion; p. 224

Manzoni, Alex; Islam, Sardar; 2009; Performance Measurement in Corporate Governance; pp. 8 -10

Marr, Bernard; 2005; Business performance measurement: An overview of the current state of use in the USA. In: Measuring Business Excellence 9(3), pp. 56–62

Martínez-Sola, Cristina; García-Teruel, Pedro; Martínez-Solano, Pedro; 2014; Trade credit and SME profitability; in: Small Business Economics; March 2014; Volume 42; Issue 3; pp. 561-577

Marx, Karl; 1975; Das Kapital

Matz, Adolph; 2013; Plankosten, Deckungsbeiträge und Budgets: Managementhilfen für die Betriebsanalyse

Mayr, Stefan; Ausweger, Martin; 2013; CSR-Strategien mittels CSR-Scorecard erfolgreich umsetzen; in: Controlling & Management Review; April 2013; Volume 57; Issue 4; pp. 36-44

Mayring,Philipp; 2003; Qualitative Inhaltsanalyse: Grundlagen und Techniken

Mayring, Philipp; 2010; Design; in: Mey, Günter; Mruck, Katja (Herausgeber); Handbuch Qualitative Forschung in der Psychologie, pp. 225-237

Mayring, Philipp; Fenzl, Thomas; 2014; Qualitative Inhaltsanalyse; in: Baur, Nina; Blasius, Jörg; Handbuch Methoden der empirischen Sozialforschung, Sept. 2014, pp. 543-556

Mayring, Phillip; 2002; Einführung in die qualitative Sozialforschung: eine Anleitung zum qualitativen Denken

Mayring, Phillip; 2007; Qualitative Inhaltsanalyse. Grundlagen und Techniken, Weinheim

McKernan, James; 2013; Curriculum Action Research: A Handbook of Methods and Resources for the Reflective Practitioner

McNiff, Jean; 2013; Action Research: Principles and Practice

Menze, Steffen; 2013; Projekt-Controlling mit Earned Value and Earned Schedule; in: Controlling & Management Review; March 2013; Volume 57; Issue 3; pp. 68-76

Merkle, Hans; 1994; Unternehmensziele und ihre Verwirklichung; in: Albach; Horst (Herausgeber) Werte und Unternehmensziele im Wandel der Zeit; pp. 27-42

Mey, Günter; Mruck, Katja; 2007; Grounded Theory Methodologie-Bemerkungen zu einem prominenten Forschungsstil; In: Günter, Mey; Katja, Mruck (Herausgeber) Grounded Theory Reader, Zentrum für Historische Sozialforschung; pp. 11-42

Mey, Günter; Mruck, Katja; 2010; Handbuch Qualitative Forschung in Der Psychologie

Mey, Günter; Mruck, Katja; 2014; Qualitative Forschung: Analysen und Diskussionen-10 Jahre Berliner Methodentreffen

Meyer, Claus; 2011; Betriebswirtschaftliche Kennzahlen und Kennzahlen-Systeme; pp. 24-28

Meyer, Jörn-Axel; 2010; Strategien von kleinen und mittleren Unternehmen: Jahrbuch der KMU-Forschung und –Praxis; pp248-249

Meyer, Jörn-Axel; 2011; Nachhaltigkeit in kleinen und mittleren Unternehmen; p. 149

Miles, Matthew; Huberman, Michael; 2013; Qualitative Data Analysis Qualitative Data Analysis: A Methods Sourcebook

Mittag, Hans-Joachim; 2012; Statistik: Eine interaktive Einführung

Mochmann, Ekkehard; 2014; Quantitative Daten für die Sekundäranalyse; in: Handbuch Methoden der empirischen Sozialforschung September, 2014; pp. 233-244

Monrov, Carlos Rodriguez; Nasiri, Azadeh; Peláes, Miguel; 2014; Activity Based Costing, Time-Driven Activity-Based Costing and Lean Accounting: Differences Among Three Accounting Systems Approach to Manufacturing. In: Annals of Industrial Engineering; pp. 11-17

Mowen, Maryanne; Hansen, Don; Heitger, Dan; 2011, Cornerstones of Managerial Accounting, p. 18

Myers, Michael; 2009; Qualitative Research in Business & Management

Naderer, Gabriele, Balzer, Eva; 2011; Qualitative Marktforschung in Theorie und Praxis: Grundlagen, Methoden und Anwendungen

Nagl, Anna; 2014; Der Businessplan

National Association of Accountants; 1961; Applications Of Direct Costing; p. 4

Nebl, Theodor; 2011; Produktionswirtschaft; p. 51

Neikirk, Waldo; 1951; National Association of Accountants: Bulletin, pp. 12-17

Nessler, Christian; 2013; Social-ResponsiveBalancedScorecard:Wie Unternehmen gesellschaftliche Verantwortung in Kennzahlen umsetzen

Neumann, Dieter; 2014; Kommunikationscontrolling: Ein wirkungsvolles Steuerungssystem

Niedermayr, Rita; 1994; Entwicklungsstand des Controlling: System, Kontext und Effizienz

Noe-Nordberg, Konrad; 2017; Drum prüfe wer sich bindet in: Unternehmenskultur in der Praxis; pp. 399-416

Nüssel, Manfred; 2010; Jahresmittelstandsbericht 2010, Beschäftigungspolitik, p. 28

Obermaier, Robert; 2005; Grenzplankostenrechnung im Mittelstand; In: Lingnau, Volker; Einsatz von Controllinginstrumenten im Mittelstand; p. 67

O'Grady, Maeve; 2013; The Sage handbook of action research: participative inquiry and practice; in: Action Learning: Research and Practice; Volume 10; Issue 2; pp. 195-199

Ogura, Yoshiaki; Uchida, Hirofumi; 2014; Bank Consolidation and Soft Information Acquisition in Small Business Lending; in: Journal of Financial Services Research; April 2014; Volume 45; Issue 2; pp. 173-200

Oldenburger, Iris; 2013; Die Bilanzierung von Pensionsgeschäften nach HGB, US-GAAP. und IAS: Die wirtschaftliche Betrachtungsweise als Konvergenzkriterium Organisation for Econimic Co-operation and Developement; 2010; Die OECD in Zahlen und Fakten 2010: Wirtschaft, Umwelt, Gesellschaft; p. 32

Orlikowski, Wnada Janina; Baroudi, Jack; 1991; Studying Information Technology in Organizations: Research Approaches and Assumptions; in: Information Systems Research; pp. 1-28

Ossadnik, Wolfgang; Barklage, David; van Lengerich, Ellen; 2004; Controlling im Mitelstand. In: Controlling; pp. 621-630

Ossola-Haring, Claudia; Schlageter, Andreas; Schöning, Stephan; 2016; 11 Irrtümer über Kennzahlen

Ott, Robert; Förster, Björn-Eric; 2012; Beteiligungscontrolling und Rechnungswesen in wachsenden mittelständischen Familienunternehmen; in: Controlling & Management; February 2012; Volume 56; Issue 1; pp. 67-77

Ottersbach, Jörg; 2013; Der Businessplan: Praxisbeispiele für Unternehmensgründer und Unternehmer

Padberg, Thomas; 2012; Wirtschaftsfachwirt-das prüfungsrelevante Wissen, Teil 1; pp. 132-134

Pangarkar, Ajay; Kirkwood, Teresa; 2012; The trainer´s Balanced Scorecard; A Complete Resource for Linking Learning to Organizational Strategy; pp. 38-42

Pannicke, Danny; Zarnekow, Rüdiger; 2013; Was sich aus Second Life lernen lässt; in: HMD Praxis der Wirtschaftsinformatik; August 2013; Volume 50; Issue 4; pp. 82-91

Pape, Jens; 2012; Betriebliches Nachhaltigkeitsmanagement: p. 266

Paul, Joachim; 2014; Analyse / Kontrolle-die Arbeit mit Kennzahlen; pp. 105-167

Paul, Joachim; 2014; Beteiligungscontrolling und Konzerncontrolling

Peritsch, Manfred; Lercher, Hans; 2014; Innovationsstrategien

Piontek, Jochem; 2004; Controlling; pp. 409-410

Plaud, Hans-Georg; 1953; Die Grenz-Plankostenrechnung, in: Zeitschrift für betriebswirtschaft (23); pp. 347-363

Pleschak, Franz; Sabisch, Helmut; Wupperfeld, Udo; 2013; Innovationsorientierte kleine Unternehmen: Wie Sie mit neuen Produkten neue Märkte erschließen

Plinke, Wulff; 2006; Industrielle Kostenrechnung: Eine Einführung

Pohl, Jens; 2015; Performance Management: Dogma oder Einzelfallbetrachtung?; in: Erfolgsfaktor Performance Management; Herausgeber; Künzel, Hansjörg; Sept 2015; pp. 1-16

Posch, Arthur; Speckbacher, Gerhard; 2012; Führung in Familienunternehmen: besonderheiten der Entscheidungsfindung und verhaltenssteuerungf und deren

Auswirkung auf den Unternehmenserfolg; in: ZfB (Zeitschrift für betriebswirtschaft); Volume 82; Issue 3; pp. 5-23

Poynter, Gavin; 2013; Restructuring in the Service Industries: Management Reform and Workplace Relations in the UK Service Sector; pp. 95-97

Prackwieser, Christoph; Eckert, Kai-Helmut; 2013; Prozesskostenmanagement für Experten; p. 188

Prätsch, Joachim; Schikorra, Uwe; Ludwig, Eberhard; 2012; Finanzmanagement: Lehr- und Praxisbuch für Investition, Finanzierung und Finanzcontrolling; pp. 136-138

Preißler, Peter; 2008; Betriebswirtschaftliche Kennzahlen; p. 48

Press service Deutscher Bundestg; 1996; Drucksache 12-8 (404) Bonn

Pritsch, G.; 2000; Realoptionen als Controlling Instrument; p. 364

Przyborski, Aglaja; 2013; Qualitative Sozialforschung

Raab-Steiner, Elisabeth; Benesch, Michael; 2012; Der Fragebogen. Von der Forschungsidee zur SPSS-Auswertung

Rachfall, Thomas; 2013; Strategische Kennzahlen in dynamischen Märkten. In: Controlling &Management Review; Dezember 2013, Volume 57, Issue 6; pp. 60-67

Rachfall, Thomas; Rachfall, Konstantin; 2013; Strategische Kennzahlen in dynamischen Märkten; Controlling & Management Review; December 2013; Volume 57; Issue 6; pp. 60-67

Rappaport, Alfred; Bogle, John; 2011; Saving Capitalism From Short-Termism: How to Build Long-Term Value and Take Back our Financial Future; pp. 27-29

Raue, Heiko; 2013; Wiederverwendbare betriebliche Anwendungssysteme: Grundlagen und Methoden ihrer objektorientierten Entwicklung

Rautenstrauch, Thomas; 2006; Balanced Scorecard in mittelständischen Unternehmen-Empirische Ergebnisse und Implikation. In: Lingnau, Volker (Herausgeber): Einsatz von Controllinginstrumenten im Mittelstand; Controlling Band 3; pp. 3-15

Reichenbach, Hans; 2011; Ziele und Wege der heutigen Naturphilosophie: Fünf Aufsätze zur Wissenschaftstheorie

Reichmann, Thomas; 2014; Controlling mit Kennzahlen: Die systemgestützte Controlling-Konzeption mit Analyse- und Reportinginstrumenten

Reichmann; Thomas; 2001; Controlling mit Kennzahlen und Managementberichten. Grundlage einer systemgestützten Controlling-Konzeption; p. 23

Reid, Alan; Scott; William; 2013; Researching Education and the Environment: Retrospect and Prospect

Reinecke, Sven; Siegwart, Hans; Sander, Stefan; 2009; Kennzahlen für die Unternehmensführung; p. 5

Reinecke, Sven; Siegwart, Hans; Sander, Stefan; 2009; Kennzahlen für die Unternehmensführung; pp. 225-226

Riebel, Paul; 1979; Einzelkosten- und Deckungsbeitragsrechnung

Riebel, Paul; 2013; Einzelkosten- und Deckungsbeitragsrechnung: Grundfragen einer markt- und entscheidungsorientierten Unternehmerrechnung

Rigby, Darrell; 2001; Management tools and techniques: A survey. In: California Management Review, 43(2), pp. 139–160

Rindfleisch, Aric; Malter, Alan; Ganesan, Shankar; Moorman, Christine; 2008; Cross-Sectional Versus Longitudinal Survey Research: Concepts, Findings, and Guidelines; in: Journal of Marketing Research, Vol 45; June; pp. 261-279

Rohwer, Götz; 2014; Deskriptive und funktionale Modelle in der statistischen Sozialforschung; in: Handbuch Modellbildung und Simulation in den Sozialwissenschaften; pp. 309-329

Rollberg, Roland; Hering, Thomas; Burchert, Heiko; 2010; Produktionswirtschaft

Röpke, Wilhelm; 1948; ORDO, Jahrbuch für die Ordnung von Wirtschaft und Gesellschaft: Klein- und Mitelbetriebe in der Volkswirtschaft. Pp. 155-174

Röttgen, Stephan; 2013; Relative Einzelkosten und Deckungsbeitragsrechnung nach Paul Riebel; p. 7

Rüth, Dieter; 2012; Kostenrechnung, Band 1

Runkler, Thomas; 2010; Data Mining: Methoden und Algorithmen intelligenter Datenanalyse

Sandt, Joachim; 2004; Management mit Kennzahlen und Kennzahlensystemen. Bestandsaufnahme, Determinanten und Erfolgsauswirkungen; p. 120

Scapens, Robert W.; 1990; Researching management accounting practice: The role of case study methods; in: British Accounting Review; Issue 22; pp. 259-281

Schäffer, Utz; 2013; Management accounting research in Germany: from splendid isolation to being part of the international community; in: Journal of Management Control; February 2013; Volume 23; Issue 4; pp. 291-309

Scheffler, Eberhard; 2013; Lexikon der Rechnungslegung: Buchführung, Finanzierung, Jahres- und Konzernabschluss nach HGB und IFRS

Scheibeler, Alexander; 2002; Balanced Scorecard für KMU; pp. 6-7

Schiersch, Alexander; Kritikos, Alexander; 2014; Kleine und mittlere Unternehmen: Stütze der gewerblichen Wirtschaft in Europa in: DIW-Wochenbericht Nr. 81, Ausgabe 13, pp: 277-287

Schmaltz, Kurt; 1927; Bilanz- und Betriebsanalyse in Amerika in Hinsicht auf ihre Verwendbarkeit für die deutsche Wirtschaft; pp. 228-231

Schmelzer; Hermann; Ganzheitliches Geschäftsprozessmanagement erfolgreich umsetzen; Controlling & Management; July 2011; Volume 55; Issue 2 Supplement; pp. 69-79

Schmid-Gundram, Ralf; 2014; Controlling-Praxis im Mittelstand
Schmid-Gundram; 2014; Umsetzungsbeispiel: Aufbau eines Controllingsystems in zehn Schritten. In: Controlling Praxis im Mittelstand; pp. 181-199

Schmidlin, Nicolas; 2013; Unternehmensbewertung & Kennzahlenanalyse: Praxisnahe Einführung mit Zahlreichen Fallbeispielen börsennotierter Unternehmen

Schmidt, Andreas; 2014; Kostenrechnung: Grundlagen der Vollkosten-, Deckungsbeitrags- und Plankostenrechnung sowie des Kostenmanagements

Schmidt, Leo; 2006; Technologie als Prozess. Eine empirische Untersuchung organisatorischer Technologiegestaltung am Beispiel von Unternehmenssoftware, Dissertation an der freien Universität Berlin, Fachbereich Wirtschaftswissenschaft

Schmidt, Reinhardt; Schor, Gabriel; 1987; Modell und Erklärung in den Wirtschaftswissenschaften. Aus: Schmidt, Reinhardt; Schor, Gabriel; (Hrsg.) Modelle in der Betriebswirtschaftslehre. Neue Betriebswirtschaftliche Forschung; pp. 9-36

Schmidt, S.; 1996; Entwicklung eines Kostenrechnungsmodells für die Qualitätssicherung

Schmidt, Thomas; 2016; Praxisleitfaden Management Reporting: Aufbau und Gestaltung als unternehmerisches Entscheidungstool

Schmidt-Hertha; Kuwan, Helmut; Gidion, Gerd; 2011; Web 2.0: neue Qualifikationsanforderungen in Unternehmen

Schmiemann, Manfred; 2008; Eurostat: Industrie, Handel und Dienstleistugen, Statistik; p. 1

Schmitt, Martina; Klinke, Sebastian; Rohn, Holger; 2011; Was zeichnet ressourceneffiziente innovative KMU aus?

Schmitt, Martina; Klinke, Sebastian; Rohn, Holger; 2011; Was zeichnet ressourcenefiziente, innovative KMU aus; in: Artec-Forschungszentrum Nachhaltigkeit Wuppertaler Institut (Herausgeber); RessourcenKultur; Paper 4; Juni 2011; p. 63

Schmitt-Schreiner, Frank; 2001; Grenzen der Deckungsbeitragsrechnung als Marketing-Informationsinstrument

Schmoller, Gustav von; 1870, 2005 reprint; Zur Geschichte der deutschen Kleingewerbe im 19. Jahrhundert; pp. 196-211

Schmutte, Andre; 2014; Exzellente Managemententscheidungen

Schneck, Ottmar; 2008; Rating; p. 206

Schneck, Ottmar; 2012; Lexikon der Betriebswirtschaft

Schneider, Dieter in Stütz, Sebastian; 2011; Kleine und mittlere Industrieunternehmen in der ökonomischen Theorie; p. 90

Schneyder, Wolfram, von; 2007; Kennzahlen für die Personalentwicklung: Refernzmodellbasiertes System zur Quantifizierung erzeugter Wirkungen; pp. 35-36

Schommer, Rainer; 1999; Perspektiven der Kostenrechnung im Dienstleistungsunternehmen Krankenhaus; p. 35

Schön, Dietmar; 2010; Mittelstandsstudie: Controlling familien- und managementgeführter KMU im Vergleich; Gemeinsame Untersuchung von FH Dortmund und Diamant Software; Pressemitteilung 2010

Schön, Dietmar; 2012; Planung und Reporting im Mittelstand

Schöneck, Nadine; Voß, Werner; 2013; Welches Forschungsdesign plane ich; in: Das Forschungsprojekt; pp. 27-42

Schreiber, Florian; Wruk, Dominika; Huppertz, Stefan; Oberg; Achim; Woywode, Michael; 2012; Die Verbreitung moderner Managementkonzepte im Mittelstand; in: Zeitschrift für Betriebswirtschaft; May 2012; Volume 82; Issue 3 Supplement; pp. 25-69

Schultz, Volker; 2012; Basiswissen Rechnungswesen: Buchführung, Bilanzierung, Kostenrechnung, Controlling

Schultz, Volker; 2013; Basiswissen Betriebswirtschaft: Management, Finanzen, Produktion, Marketing

Schumann, Siegfried; 2012; Repräsentative Umfrage: Praxisorientierte Einführung in empirische Methoden und statistische Analyseverfahren

Schumpeter, Joseph Alois; 1942 reprint 1993; Kapitalismus, Sozialismus und Demokratie; p. 218

Schuster, Thomas; Liesen, Arndt; 2013;Statistik für Wirtschaftswissenschaftler

Schweitzer, Marcell; Küpper, Hans-Ulrich; 2011; Systeme der Kosten- und Erlösrechnung

Schweitzer, Marcell; Küpper, Hans-Ulrich; 2015; Systeme der Kosten- und Erlösrechnung

Seebacher, Werner; 2015; Management Accounting: Bilanz, Gewinn- und Verlustrechnung

Seehausen, Sven; 2014; Kapitalstrukturentscheidungen in kleinen und mittleren Unternehmen

Sekaran, Uma; Bougie, Roger; 2016; Research Methods For Business: A Skill Building Approach

Sewering, Karl; 2013; Kostenrechnung in der Industrie

Shim, Jae; Siegel, Joel; 2009; Modern Cost Management and Analysis; p. 2

Siegert, Andreas; Buscher, Herbert; Ohliger, Rainer; 2013; Transaktionskosten und Fachkräftewerbung: Ein Erklärungsansatz auf Grundlage der Institutionenökonomik; in: IWH-Diskussionspapiere; Ausgabe 11; 2013

Siller, Helmut; Grausam, August; 2013; Selbstcontrolling für Selbständige und kleine Unternehmen

Siller, Helmut; Grausam, August; 2013; Selbstcontrolling für Selbständige und kleine Unternehmen

Silvermann, David; 2013; Doing Qualitative Research: A Practical Handbook

Skinner, Ross; 1987; Accounting standards in evolution; pp. 50-55

Smith, Mitchell; 2012; States of Liberalization: Redefining the Public Sector in Integrated Europe

Staubus, George; 2013; The Decision Usefulness Theory of Accounting: A limited History

Steger, Johann; 2010; Kosten- und Leistungsrechnung: Einführung in das betriebliche Rechnungswesen, pp. 106-107

Steger, Johann; 2014; Kennzahlen und Kennzahlensysteme

Steiner, Eberhard; Paul, Jenny; Kah, Arnd; 2014; Exzellente Managemententscheidungen

Steiner, Eberhard; Paul, Jenny; Kah, Arnd; 2014; Finanzmanagement: Die Entscheidung über Finanzierung und Investition; in: Niermann; Schmutte (Herausgeber); Exzellente Managemententscheidungen; pp. 173-212

Stern, Thomas; Townsend, Andrew; Rauch, Franz; Schuster, Angela; 2013; Action Research, Innovation and Change Across Disciplines: International Perspectives Across Disciplines

Steyer, Rolf; Eid, Michael; 2001; Messen und Testen - Mit Übungen und Lösungen

Stotz, Waldemar; Wedel-Klein, Anne; 2013; Employer Branding: Mit Strategie zum bevorzugten Arbeitgeber

Stütz, Sebastian; 2011; Kleine und mittlere Industrieunternehmen in der ökonomischen Theorie

Taschner, Andreas; 2012; Umsetzungsoptionen eines KMU-spezifischen Kennzahlen-Manaements; ZfkE-Zeitschrift für KMU und Entrepreneurship; Vol 60, No 2, pp. 111-135

Taylor, Marilyn; Sondergaard, Mikael; 2014; Doing Case Study Research for Business and Management Students

Thommen, Jean-Paul; 2014; Gabler Wirtschaftslexikon

Thul, Matthias; Middelhoff, Tobias; 2011; Grundlagen der Kosten- und Leistungsrechnung; pp. 41-42

Töpfer, Armin; 2012; Erfolgreich Forschen: Ein Leitfaden für Bachelor-, Master-Studierende und Doktoranden

Tran, Thi Thuy Ngoc; 2010; Chancen und Risiken von Innovationskooperationen

Trapp, Rouven; Konvergenz des internen und externen Rechnungswesens; in: Zeitschrift für Betriebswirtschaft;September 2012; Volume 82; Issue 9; pp. 969-1008

Tröndle, Rüdiger; 2013; Strategische Zielsysteme und Entwicklung von prozessorientierten Balanced Scorecards; in: Zeitner, Regina; Peyinghaus, Marion (Herausgeber); Prozessmanagement Real Estate; pp. 101-115

Troßmann, Ernst; 2013; Investition als Führungsentscheidung: Projektrechnungen für Controller

Ulrich, Patrick, Botzkowski Tim; Becker Wolfgang; 2016; Entscheidungen in Marketing und Vertrieb, in: Management und Controlling im Mittelstand; pp. 95-122

Urquhart, Cathy; 2013; Grounded Theory for Qualitative Research: A Practical Guide

Vaus, David de; 2013; Surveys in Social Research

VDA (Verband der Automobilindustrie); 2010, Politikbrief: News service for decision-makers in politics and economics. The famous German Mittelstand; p. 7

VEND consulting GmbH; 2008; Marktforschung in KMU

Vezzetti, Enrico; Violante, Maria; Marcolin, Federica; A benchmarking framework for product lifecycle management (PLM) maturity models; in: The International Journal of Advanced Manufacturing Technology; March 2014; Volume 71; Issue 5-8; pp. 899-918

Volcic, Klaus; Schermann, Michael; Siller, Helmut; 2013; Strategische Managementpraxis in Fallstudien:Umsetzung einer erfolgreichen Strategie in vier Schritten

Vollmuth, Hilmar; Zwettler, Robert; 2013; Kennzahlen

Vorländer, Karl; 2012; Geschichte der Philosophie

Vossler, Karl; 2012; Positivismus Und Idealismus in Der Sprachwissenschaft; Eine Sprach-Philosophische Untersuchung

Wagner, Karl Werner; Zacharnik, Matthias; 2005; Qualitätsmanagement für KMU: Qualität. Sensibilisieren - realisieren-leben

Walter, Wolfgang; Wünsche, Isabella; 2013; Einführung in die moderne Kostenrechnung

Walter, Wolfgang; Wünsche, Isabella; 2013; Grundlagen der Kosten- und Leistungsrechnung

Waniczek; Mirko; 2012; SustainabilityBalancedScorecard: Nachhaltigkeit in der Praxis erfolgreich managen; p. 21

Weber Jürgen; Schäfer, Utz; 2014; Einführung in das Controlling; 14. Auflage

Weber, Helmut; 2013; Rentabilität, Produktivität und Liquidität: Größen zur Beurteilung und Steuerung von Unternehmen

Weber, J.;Reitmeyer, T.; Frank, S.; 2000; Erfolgreich entscheiden der Managementleitfaden für den Mittelstand; p. 239

Weber, Jürgen; 2012; Logistikkostenrechnung: Kosten-, Leistungs- und Erlösinformationen

Weber, Peter; 2013; Controlling Management

Weber, S.; Anderson, W. Hamm, A.-M.; Knispel, T. Liese, M.; Salfeld, T.; 2013; Liquidity-adjusted risk measures, in: Mathematics and Financial Economics; January 2013, Volume 7, Issue 1, pp. 69-91

Weber, Thomas; Wewer, Moritz; 2013; Cashflow-Orientierung Braucht Verhaltensänderung der Mitarbeiter; in: Controlling & Management Review; May 2013; Volume 57; Issue 5; pp. 26-29

Weber, Wolfgang; Mayrhofer, Wolfgang; Nienhüser, Werner; Rodehuth, Maria; Rüther, Bernhardine; 1994; Betriebliche Bildungsentscheidungen. Entscheidungsverläufe und Entscheidungsergebnisse

Wegmann, Jürgen; 2013; M&A-Prozesse bei KMU in 30 Punkten. In: Unternehmensverkauf, 2013; pp. 161-172

Wehrlin, Ulrich; 2012; Steuerung der Unternehmensleistung, Unternehmensziele entwickeln, messen und steuern mit Kennzahlensystemen - Balanced Scorecard BSC - Performance Measurement / Performance Pyramid

Weiss, Martin; Zirkler, Bernd; Guttenberger, Brigitte; 2008; Performance Measurement Systeme und ihre Anwendung in der Praxis: Ergebnisse einer empirischen Studie. In: Controlling Nr.3; p. 147

Welge, Martin; Witt, Peter; 2013; Corporate Governance in kleinen und mittleren Unternehmen; in: ZfB Special Issue; Volume 2/2013; pp. 185-205

Welter, Frederike; 2013; Management von KMU und Gründungsunternehmen; in: Festschrift für Erbert Kahle zum 60. Geburtstag; pp. 27-48

Welter, Friederike; Malshe, Ashwin; 2013; Der Deutsche Mittelstand-Triebwerk des Erfolges-Der deutsche Mittelstand im Fokus

Wenger, Wolf; Geiger, Martin Josef; Kleine, Andreas; 2011; Business Excellence in Produktion und Logistik: Festschrift für Prof. Dr. Walter Habe nicht; pp. 192-196

Werner, Hartmut; 2013; Modernes Management von Qualitätskennzahlen; in: Controlling & Management Review; December 2013; Volume 57; Issue 6; pp. 40-49

White, Steven; 2011; Business Population Estimates for the UK and Regions 2011; p. 1

Wiegand, Erich; 2013; Marktforschung in Deutschland. In: Jahresbericht 2012; Arbeitskreis deutscher Markt- und Sozialforschungsinstitute e.V.; p. 18

Wieselhuber, Norbert; 2003; Insolvenzen in Deutschland-Insolvenzursachen und Erfolgsfaktoren einer Sanierung aus der Insolvenz; pp. 13-17

Wildebach, Hendrik; 2008; Kundenindividuelle Massenproduktion zur Bewältigung überkapazitätsbedingter Unternehmenskriesen; pp. 63-65

Willis, Jerry; Jost, Muktha; 2007; Foundations of qualitative research; Interpretive and critical approaches

Winter, Rainer; 2014; Ein Plädoyer für kritische Perspektiven in der qualitativen Forschung; in: Mey, Günter; Mruck, Katja; Qualitative Forschung; pp. 117-132

Winter, Stefan; 2014; Management von Lieferanteninnovationen

Witt, Harald; 2001; Forschungsstrategien bei quantitativer und qualitativer Sozialforschung [36 Absätze]; Forum Qualitative Sozialforschung / Forum Qualitative Social Research,2(1), Art. 8, http://nbn-resolving.de/urn:nbn:de:0114-fqs010189. (Stand 10.04.2015)

Wöhe, Günter; Bilstein, Jürgen; Ernst, Dietmar; Häcker, Joachim; 2013; Grundzüge der Unternehmensfinanzierung

Wöhe, Günter; Döring, Ulrich; Brösel, Gerrit; 2016; Einführung in die Allgemeine Betriebswirtschaftslehre

Wolfswinkel, Joost; Furtmueller, Elfi; Wilderom; Celeste; 2013; Using grounded theory as a method for rigorously reviewing literature in: European Journal of Information Systems; Vol. 22, pp. 45–55

Wöltje, Jörg; 2013; Bilanzen lesen, verstehen und gestalten; p. 112

Wurmnest, Wolfgang; 2012; Marktmacht und Verdrängungsmissbrauch: Eine Rechtsvergleichende Neubestimmung des Verhältnisses Von Recht und Ökonomik in der Missbrauchsaufsicht über Marktbeherrschende Unternehmen

Yadav, Neetu; Sushil; Mahim; Sagar; 2013; Performance measurement and management frameworks: Research trends of the last two decades; in: Business Process Management Journal; Vol. 19; Issue: 6; pp.947-971

Yin, Robert; 2011; Applications of Case Study Research

Zander, Benjamin; Zender, Ursula; 2015; Methoden im Rahmen der qualitativen Teilstudie; in Jugend, Migration, Sport; 2015; pp. 167-187

Zehnder, Hanspeter; 2013; Betriebliche Bildung

Zentralverband der Elektrotechnischen Indutrie (ZVEI); 1990; ZVEI-Kennzahlensystem. Ein Instrument der Unternehmenssteuerung. Herausgegeben vom BetriebswitschaftlichenAusschuß des zentralverbandes der Elektrotechnik- und Elektronikindustrie; pp. 176-179
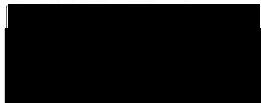
Zwißler, Frank; Okhan, Eftal; Westkämper, Engelbert; 2013; Lean and productivity Management for SMEs; in: Procedia CIRP; Volume 7; 2013; pp. 604-609

Appendix

Appendix (I) Accompaning letter to the Survey (original in german)

Universität Niederrhein

Sehr geehrte Damen und Herren,

im Rahmen meiner Doktorarbeit an der Dundee Business School in Kooperation mit der Hochschule Niederrhein, analysiere ich Kennzahlen und Kostenrechnungssysteme. Mein Augenmerk liegt speziell auf kleinen und mittleren produzierenden Unternehmen.

Um einen objektiven Überblick über die Anforderungen von KMU an Kennzahlen und Kostenrechnung zu bekommen, bitte ich Sie, an der beiliegenden wissenschaftlichen Umfrage teilzunehmen. Die Umfrage dauert ca. 5 Minuten. Um Ihren Aufwand so gering wie möglich zu halten habe ich einen adressierten Rückumschlag beigelegt der nicht frankiert werden muss.

Alle Angaben sind anonym und werden streng vertraulich erhoben. Selbstverständlich erhalten Sie als Dankeschön für Ihre Hilfe kompletten Zugriff auf die Ergebnisse der Umfrage sowie deren Analyse. Senden sie mir dazu einfach eine E-Mail an: christian.huber.umfrage@gmail.com

Herzlichen Dank für Ihre Unterstützung.

Appendix (II) Survey (original in german)

Wie viele Mitarbeiter beschäftigen Sie?

○ 1 - 25	○ 26 - 50	○ 51 - 100	○ 101 - 200	○ Mehr als 200

In welchen Losgrößen produzieren Sie?

○ Einzelstücke	○ Kleine Lose bis 10	○ Serienfertigung	○ Massenfertigung

Wie erfolgt die Produktion?

○ Fertigung nach Auftrag	○ Teilefertigung auf Lager, Endmontage nach Auftrag	○ Fertigung auf Lager

Gehört Ihr Unternehmen zu einem Konzern?

○ Ja	○ Nein

In welchem Gebiet werden Ihre Produkte vertrieben?

○ Deutschlandweit	○ Europaweit	○ Weltweit

Wie vertreiben Sie Ihre Produkte?

○ Eigenvertrieb	○ Direkte Vertriebspartner	○ Fachhandel	○ Einzelhandel

Wie viele unterschiedliche Produkte werden in Ihrem Unternehmen hergestellt?

○ 1 - 10	○ 11 - 30	○ 31 - 100	○ Mehr als 100

Wie schätzen Sie den Innovationsdruck in Ihrer Branche ein?

○ Sehr hoch	○ Hoch	○ Normal	○ Niedrig	○ Sehr niedrig

Wie hoch ist der Anteil an Produkten, die individuell auf den Kundenwunsch zugeschnitten sind?

○ Sehr hoch	○ Hoch	○ Normal	○ Niedrig	○ Sehr niedrig

Fragen zur Kostenrechnung in Ihrem Unternehmen

Welche Bedeutung hat die Kostenrechnung für Ihre tägliche Arbeit?

○ Sehr wichtig	○ Wichtig	○ Durchschnittlich	○ Eher unwichtig	○ Unwichtig

Welche Kosten verwenden Sie für Ihre Kostenrechnung?

○ Kosten der Vorperiode	○ Durchschnittskosten mehrerer vergangener Perioden	○ Geplanten Kosten anhand von Zukunftstrends

Welche der folgenden Kostenrechnungssysteme setzten Sie regelmäßig oder fallweise ein?

Vollkostenrechnung (variable Kosten direkt auf das Produkt und die Fixkosten über Schlüsselung auf das Produkt)

○ Immer	○ Regelmäßig	○ Selten / Projektbezogen	○ Nie

Deckungsbeitragsrechnung (variable Kosten direkt auf das Produkt und die Fixkosten als Block)

○ Immer	○ Regelmäßig	○ Selten / Projektbezogen	○ Nie

Prozesskostenrechnung (die Kosten einzelner Prozesse stehen im Vordergrund)

○ Immer	○ Regelmäßig	○ Selten / Projektbezogen	○ Nie

Zielkostenrechnung (der Verkaufspreis des Produktes ist relevant. Davon werden alle Produktionsschritte abhängig gemacht)

○ Immer	○ Regelmäßig	○ Selten / Projektbezogen	○ Nie

Produktlebenszyklusrechnung (Produktkosten stehen im Mittelpunkt, von der Idee bis zur Einstellung der Produktion)

○ Immer	○ Regelmäßig	○ Selten / Projektbezogen	○ Nie

Wie schätzen Sie ihre aktuelle Kostenrechnung in Bezug auf folgende Punkte ein?

Liefert alle Informationen zur Planung des Unternehmens.

○ Ja	○ Teilweise	○ Nein

Liefert alle Informationen zur Steuerung des Unternehmens.

○ Ja	○ Teilweise	○ Nein

Liefert alle Informationen zur Kontrolle des Unternehmens.

○ Ja	○ Teilweise	○ Nein

Wie schätzen Sie das Know How im Bereich der Kostenrechnung in Ihrem Unternehmen ein?

○ Sehr hoch	○ Hoch	○ Normal	○ Niedrig	○ Sehr niedrig

Passen Sie Ihre Kostenrechnung regelmäßig an Veränderungen in Ihrem Unternehmen an?

○ Ja	○ Teilweise	○ Nein

Bitte wenden

Wie viel Zeit können Sie sich wöchentlich für die Auswertung und Bearbeitung Ihrer Kostenrechnung nehmen?

○ Bis zu 1 Stunde   ○ Bis zu 3 Stunden   ○ Bis zu 5 Stunden   ○ Mehr als 5 Stunden

Fragen zu Kennzahlen und Kennzahlensystemen

Wie viele Kennzahlen werde in Ihrem Unternehmen regelmäßig ermittelt?

○ 1 - 3   ○ 4 - 9   ○ 10 - 20   ○ Mehr als 20

Welche Bedeutung haben Kennzahlen in Ihrem Unternehmen?

○ Sehr wichtig   ○ Wichtig   ○ Durchschnittlich   ○ Eher unwichtig   ○ Unwichtig

Welches der folgenden Kennzahlensysteme verwenden Sie?

○ Balanced Scorecard   ○ RL-Kennzahlensystem   ○ Du Pond Kennzahlensystem   ○ ZVEI Kennzahlensystem   ○ Keines der angegebenen

Welche Informationen sind für Ihre täglichen Management-Aufgaben wichtig?
Bitte kreuzen Sie zusätzlch die rechte Spalte an, wenn Sie diese Information bereits ermitteln.

Finanzen	Sehr wichtig	Wichtig	Wissenswert	Eher unwichtig	Unwichtig	Bereits ermittelt
Aktuelles Betriebsergebnis	○	○	○	○	○	○
Umsatzrendite	○	○	○	○	○	○
Aktuelle Zahlungsfähigkeit	○	○	○	○	○	○
Analyse der Fixkosten	○	○	○	○	○	○
Kostenplanung	○	○	○	○	○	○
Kostensenkung (Kostenkontrolle)	○	○	○	○	○	○
Produktkalkulation	○	○	○	○	○	○

Prozesse	Sehr wichtig	Wichtig	Wissenswert	Eher unwichtig	Unwichtig	Bereits ermittelt
Verbesserung von Prozessen	○	○	○	○	○	○
Kosten einzelner Prozesse	○	○	○	○	○	○
Fehlerquote und Fehlerkosten	○	○	○	○	○	○
Reklamationsquote und -kosten	○	○	○	○	○	○
Make or Buy Entscheidungen	○	○	○	○	○	○
Lagerkosten	○	○	○	○	○	○
Verkaufspreisbestimmung	○	○	○	○	○	○

Rentabilität	Sehr wichtig	Wichtig	Wissenswert	Eher unwichtig	Unwichtig	Bereits ermittelt
Rentabilität einzelner Produkte	○	○	○	○	○	○
Gewinnspanne	○	○	○	○	○	○
Break Even Punkt neuer Produkte	○	○	○	○	○	○
Marktanteil, Marktdeckung	○	○	○	○	○	○
Einsparpotential im Einkauf	○	○	○	○	○	○

Mitarbiter	Sehr wichtig	Wichtig	Wissenswert	Eher unwichtig	Unwichtig	Bereits ermittelt
Verhalten der Mitarbeiter	○	○	○	○	○	○
Kosten der Mitarbeiter	○	○	○	○	○	○
Arbeiterproduktivität	○	○	○	○	○	○

Bitte beschreiben Sie nachfolgend noch weitere, für Sie wichtige Kennzahlen und Daten:

_____

_____

Welchen Umsatz erwirtschaftet Ihr Unternehmen jährlich?

○ Bis 5 mio   ○ 5-10 mio   ○ 10-25 mio   ○ 25-50 mio   ○ Über 50 mio

Vielen Dank für Ihre Teilnahme.

Appendix (III) Accompaning letter to the Survey (translated version)

Dear ……….,

as part of my PhD at Abertay University (Dundee Business School) in cooperation with the University of Applied Science Niederrhein I am analyzing Indicators for a cost accounting system with a special focus on German small and medium-sized manufacturing companies.

In order to collect the necessary information related to the needs of SMEs, I would like to invite you to participate in this research project by completing the enclosed survey. The survey should only take about 5 minutes. I have enclosed a self-addressed and stamped envelope.

All data is anonymous and strictly confidential. Of course you have the option to get the results of the survey as well as the PhD thesis. If you would like to have access to the results please send an e-mail to: christian.huber.umfrage@gmail.com

Thank you for your support and participation in this PhD research project..
Christian Huber

Important Disclaimer: The survey is subject to the strict criteria of the ethics committee of the University of Abertay Dundee. The data will be evaluated solely for the purpose of the thesis and is not used commercially in any way.

Appendix (IV) Survey questions (translated version)

Analysis of key indicators and cost acconting tools for the management support of small and medium-sized manufacturing companies.

	General questions to your company and industry				
1	How many employees does your company employ?	1-25	26-50	51-100	101-200	More than 200
2	In which batch sizes do you run your production?	Single items	Small batches up to 10 items	Serial production	Mass production
3	What type of production do you offer?	Production based on orders	Production of parts in stock, final assembly based on orders	Production in stock		
4	Is your company part of a corporation?	Yes	No			
5	In which region do you distribute and sell your products?	In Germany	In Europe	Worldwide		
6	How do you distribute and sell your products?	Own distribution	Direct distribution partners	Specialist retailers	Retail	
7	How broad is your product range?	1-10	11-30	31-100	More than 100	
8	How would you describe the pressure to innovate in your industry?	Very high	High	Normal	Low	Very Low
9	How high is the share of your products that are individually tailored to customers' requirements?	Very high	High	Normal	Low	Very Low
	Questions on cost accounting in your company				

10	How important is cost accounting to your daily work?	Very important	Important	Average	Rather unimportant	Not important at all
11	Which costs do you use in your cost accounting?	Costs of the previous period	Average costs of a number of previous periods	Predicted costs, predictions based on future trends		
	Which of the following systems of cost accounting do you regularly or occasionally use?					
12	Full cost accounting (variable costs directly on the product, fixed costs broken down by product)	Always	Regularly	Rarely ore based on projects	Never	
13	Contribution Margin Accounting (variable costs directly on the product, fixed costs as a block)	Always	Regularly	Rarely ore based on projects	Never	
14	Activity based costing (The most important costs are those of individual processes)	Always	Regularly	Rarely ore based on projects	Never	
15	Target costing (The product's selling price is relevant. All steps of production are dependent from this)	Always	Regularly	Rarely ore based on projects	Never	
16	Product life cycle costing (The product's cost - from the idea to the discontinuation of production – are the most important)	Always	Regularly	Rarely ore based on projects	Never	
	How would you judge your cost accounting in regards to the following points:?					
17	Provides all the information involved in planning activities	Yes	Partially	No		

18	Provides all the information involved in activities of management	Yes	Partially	No		
19	Provides all the information involved in monitoring activities	Yes	Partially	No		
20	How would you judge the know how on cost accounting in your company?	Very high	High	Normal	Low	Very Low
21	Do you regularly adapt your cost accounting to changes in your company?	Yes	Partially	No		
22	How much time a week can you dedicate to the evaluation and processing of cost accounting?	Up to 1 hour	Up to 3 hours	Up to 5 hours	More than 5 hours	
	Questions on Key Performance Indicators (KPIs)					
23	How many KPIs are regularly collected and calculated in your company?	1-3	4-9	10-20	More than 20	
24	How important are KPIs in your company?	Very important	Important	Average	Rather unimportant	Unimportant
25	Which of the following KPI systems do you use?	Balanced Scorecard	RL-System of KPIs	Du Pont System of KPIs	ZVEI System of KPIs	None of these
	Which information is important to your daily management activities? Please select the right column if you already determine these values in your company	Very important	Important	Worth knowing	Rarely needed	unimportant
	Finances					

26	Income from current operations					
27	Return on sales					
28	Current liquidity					
29	Analysis of fixed costs					
30	Cost planning					
31	Cost reduction (Cost control)					
32	Product calculation					
	Processes					
33	Improvement of processes					
34	Costs of individual processes					
35	Error rate and cost of errors					
36	Complaints rate and cost of complaints					
37	Make or Buy decisions					
38	Storage costs					
39	Sales price determination					
	Rate Of Return					
40	Profitability of individual products (Gross margin)					
41	Profit margin					
42	Break Even point of new products					
43	Market share, Market coverage					
44	Savings potential in purchasing					
	Employees					

45	Employee behaviour					
46	Costs of employees					
47	Employee productivity					
48	If you consider any additional indicator as important, please write it in the space below:					
49	What is your yearly turnover	Up to 5 Million	5-10 Million	10-25 Million	25-50 Million	More than 50 Million

Thank you very much for your time and effort completing this survey.