CONTROLLING & BUSINESS ACCOUNTING

Sebastian Wolf

Management Accountants' Business Orientation and Involvement in Incentive Compensation

Empirical Results from a Cross-Sectional Survey

PETER LANG

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Changing roles of management accountants have been intensively discussed in business practice and academic research. The objective of this empirical study is to gain a deeper understanding of management accountants' business orientation and extended tasks. Based on data collected from the top 1,500 companies in Germany, results reveal that especially subjective norms have a strong impact on the practice of management accountants acting business-oriented. Furthermore, the results reinforce the frequently postulated positive effect of management accountants' business orientation. The analyses also show positive associations between the involvement of management accountants in incentive compensation, the effort effects of incentive schemes, and firm performance.

Sebastian Wolf studied Business Administration at the University of Giessen (Germany) and Karlstad University (Sweden). He worked as a management consultant before conducting the underlying research of this book.

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Foreword

In recent years, management accountants – in German-speaking countries also referred to as "controllers" – and their functional roles have been a major research issue. In brief, management accountants are not supposed to act as "company watchdogs" or "cost recorders" anymore, but rather as a "business partner" to management. In this context, management accountants gain increasing importance for managerial decision making. Even though this change has been subject to a broad discussion in literature, some research gaps still remain. In his dissertation, Sebastian Wolf successfully addresses several of these research gaps.

In a first step, Wolf analyzes possible reasons why management accountants should act as a business partner in general. Based on the seminal model of *Ajzen/Fishbein* (1980), Wolf finds that the changing role of management accountants rather stems from external managerial pressure than from internal attitudes. He also finds that acting as a business partner has a significant, albeit small, positive impact on firm performance. In a second step, Wolf complements these results with an in-depth study of the involvement of management accountants in incentive compensation. He finds that this is beneficial especially for firms in which management accountants see themselves as business partners.

The results of Wolf's outstanding analyses are based on empirical data gathered by questionnaire with the top 1,500 German companies in terms of revenue in 2009. This database is distinctive as not only management accountants were surveyed, but also general managers. The dyadic study design combining constructs measured with management accountants with those measured with general managers reduces common method bias as well as key informant bias, thus increasing the validity of Wolf's results.

The dissertation of Sebastian Wolf is therefore a valuable source of knowledge not only for researchers but also for practitioners in the field of management accounting as two major bottom lines can be drawn from this book. First, firms benefit from management accountants acting as business partners. Second, to induce this change, it is not sufficient to address only the management accountants. General managers also have to be included, as ultimately, it is their demand for decision-

making support that brings about the desired change in management accountants' practice.

Gießen, December 2010 Prof. Dr. Barbara E. Weißenberger

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This dissertation presents the results of the scientific research I conducted at the Chair for Controlling and Business Accounting at the Justus-Liebig-University Giessen. I would like to take this opportunity to express my gratitude to all those who have supported and encouraged me in the course of preparing this work.

First of all, I would like to show my deepest gratitude to my supervisor, Prof. Dr. Barbara E. Weißenberger, for giving me the chance to work at her chair in an excellent and open academic environment. I highly appreciate her engaged and competent guidance throughout the process of my dissertation as well as her encouraging and inspiring personality. I have learned much from her during my time as a student and as a doctoral candidate and I am convinced that this will remain highly valuable for years to come.

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Moreover, I am also indebted to those professionals and academics who offered me their time to discuss and pre-test the questionnaires. My work greatly benefited from their input. The study would not have been possible without the cooperation and support of a great number of management accountants and general managers of the largest German companies. I gratefully acknowledge their efforts to fill out the questionnaires of the research project.

Many thanks go also to Dr. Hendrik Angelkort, Dr. Holger Steinmetz, and Marius Wehner for their advice as well as for very insightful, inspiring, and valuable discussions on methodological and other related aspects of my work. It was a pleasure working with you. In addition, I would like to thank Christian Kleine, who energetically supported me during the phase of data gathering.

I have greatly enjoyed the process of writing this dissertation. The team of Prof. Weißenberger's chair made this possible. In this regard, I wish to thank my colleagues

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Düsseldorf, December 2010 Sebastian Wolf

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List of abbreviations

ANN ..... Artificial neural networks

ANOVA ..... Analysis of variance

AT ..... Attitude

AVE ..... Average variance extracted

CA ..... *Cronbach*'s alpha

CBSEM ..... Covariance-based structural equation modeling

CEO ..... Chief Executive Officer

CFO ..... Chief Financial Officer

CO ..... Contribution of management accountants

CR ..... Composite reliability

e.g. ..... Exempli gratia

ED ..... External dynamism

Ed(s). ..... Editor(s)

EMP ..... Size (Employees)

et al. ..... Et alii

etc. ..... Et cetera

f^2 ..... Effect size

GM ..... General manager

H ..... Hypothesis

HR ..... Human resource

ICE_E ..... Effort effects

ICE_S ..... Selection effects

ID ..... Internal dynamism

i.e. ..... Id est

IMA ..... Involvement of management accountants (in incentive compensation)

IT ..... Information technology

JV ..... Joint venture

MA ..... Management accountant

MANOVA ..... Multivariate analysis of variance

MCS ..... Management control system

N ..... Sample size

n.s. ..... Not significant

p ..... Probability

p. ..... Page(s)

P_DP ..... Decision-making processes

P_IE ..... Internal efficiency

P_MP ..... Market performance

PLS ..... (Variance-based) partial least squares (path modeling)

PR ..... Practice

Q^2 ..... Predictive relevance measure

R^2 ..... Multiple squared correlations

Ref. ..... Refer to

REV ..... Size (Revenue)

SEM ..... Structural equation modeling

SN ..... Subjective norms

Std. dev. ..... Standard deviation

UK ..... United Kingdom

US ..... United States (of America)

List of symbols

b ..... Parameter estimates

B ..... Path coefficient matrix

E ..... Sum of squares of prediction errors

J ..... Number of bootstrap samples

k ..... Total number of items of a measurement model

O ..... Sum of squares of errors based on the mean of prediction

x ..... Observed indicators of ξ

y ..... Observed indicators of η

β ..... (True) population parameters

Γ ..... Path coefficient matrix

ε ..... Measurement error/residuals (measurement models)

ζ ..... Vector of residuals (structural model)

η ..... Vector of endogenous construct

Θ ..... Unit step function

λ ..... Loading of a construct

Λ ..... Loadings matrix

ξ ..... Vector of exogenous construct

σ_j^2 ..... Variance of item j

σ_t^2 ..... Total variance of a measurement model t

A Introduction

1 Motivation and overview of prior research

The seminal work of *Johnson/Kaplan* (1987) on a possible relevance loss of management accounting triggered a debate in academia and business practice on the need for changing roles of management accountants[1] and for new management accounting techniques. In the course of discussions on how to regain relevance, a considerable body of literature has evolved in recent years. Most of this literature advocates that management accountants should seize opportunities – for instance, those offered by advanced IT systems – and shift capacities from their 'traditional' tasks such as score keeping or 'number crunching' and place emphasis on business related activities.[2] Reflecting this change, it is claimed that management accountants need to become a more "pro active internal business consultant"[3], a "business support"[4], a "hybrid accountant"[5], a "business-oriented management accountant"[6], or simply a "business partner"[7].

Albeit being frequently discussed in business practice as well as in academic research, knowledge and theory in this context are, up to now, "rather underdeveloped, anecdotal and fragmented"[8]. Several calls for research underpin the need for further investigations that pursue prior findings.[9] So far, empirical research initiatives have

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1 The term "management accountant" basically refers to individuals offering dedicated management accounting services and operating organizations' management accounting systems, ref. *Anthony/Govindarajan* (2004), p. 7; *Merchant/Van der Stede* (2007), p. 631f.; *Zimmerman* (2006), p. 13-15. Overviews of management accounting, its historic origins, basic principles, or task descriptions of management accountants are offered, for instance, by *Sorensen* (2009) or *Weber/Schäffer* (2008), p. 1-36. Management accountants are, especially in German-speaking countries, sometimes also denoted as "controllers", ref. *Becker/Messner* (2005), p. 418f.; *Sheridan* (1995), p. 287; *Wagenhofer* (2006), p. 2. However, I only apply the term "management accountant" throughout this dissertation for consistency reasons.

2 Ref. *Burns/Vaivio* (2001).

3 Ref. *Coad* (1999), p. 109.

4 Ref. *Burns/Vaivio* (2001), p. 390.

5 Ref. *Burns/Baldvinsdottir* (2005), p. 738.

6 Ref. *Granlund/Lukka* (1998), p. 199.

7 Ref. *Byrne/Pierce* (2007), p. 469; *Davis/McLaughlin* (2009a), p. 35; *Siegel/Sorensen/Richtermeyer* (2003a), p. 39; *Siegel/Sorensen/Richtermeyer* (2003b), p. 37.

8 *Järvenpää* (2007), p. 102. Similarly, *Bento/White* (2006), p. 305; *Byrne/Pierce* (2007), p. 473; *Granlund/Lukka* (1998), p. 201.

9 E.g., *Anthony* (1987), p. 18; *Atkinson et al.* (1997), p. 100; *Sorensen* (2009), p. 1288-1290.

addressed heterogeneous aspects on business orientation and changing tasks of management accountants.[10] There are studies that comprehensively grasp the status quo and the scope of management accountants' activities and roles; comparing the results of the studies, it becomes evident that management accountants' tasks are getting more diverse over time.[11] Other studies analyze advanced IT systems and show that those systems may act as enabler for change in the management accounting profession.[12] Similar studies address the drivers and the impact of an implementation of a 'new' or innovative management accounting system; the results basically reveal that business-oriented management accountants tend to implement innovative accounting systems and, furthermore, that innovative systems can positively influence the image of management accountants.[13] Other studies address aspects on changes over a specific time horizon of management accounting culture; the studies point, on the one hand, to the importance of informal interventions by top managers to foster management accounting change and, on the other, to changes of the external environment as a possible trigger to change management accounting culture.[14] There are also studies that focus on the knowledge, attitudes, and characteristics of management accountants; they show, for instance, that business knowledge is important for acting in a business-oriented way.[15] Other studies analyze possible role conflicts of management accountants' different roles; exemplarily, they show inherent tension in management accountants' roles as business partners and providers of information.[16] There are also studies that assess management accountants' activities and roles from different perspectives; the results reveal that there are partly differences of perceptions between management accountants and general managers on the quality of services.[17] The influence of (na-

10 In addition to the brief outline of prior empirical work in this introduction, the appendix of this study offers a complementary overview of selected prior empirical research. The tabular overview especially addresses research related to the tasks and roles of management accountants and/or innovative management accounting systems.

11 Ref. *Mouritsen* (1996); *Newman/Smart/Vertinsky* (1989); *Siegel/Sorensen* (1999). The seminal work of *Simon et al.* (1954) can also be allocated to this group of studies.

12 Ref. *Caglio* (2003); *Granlund/Malmi* (2002).

13 Ref. *Emsley* (2005); *Friedman/Lyne* (1997); *Naranjo-Gil/Maas/Hartmann* (2009).

14 Ref. *Burns/Baldvinsdottir* (2005); *Järvenpää* (2007).

15 Ref. *Byrne/Pierce* (2007); *Coad* (1999); *Hunton/Wier/Stone* (2000); *Stone/Hunton/Wier* (2000).

16 Ref. *Hopper* (1980); *Indjejikian/Matějka* (2006); *Maas/Matějka* (2009).

17 Ref. *Johnston/Brignall/Fitzgerald* (2002); *Pierce/O'Dea* (2003).

tional) culture on management accountants' roles and activities[18] or the impact of organizational characteristics or an organization's industry[19] on roles of management accountants is also a subject of selected studies. Finally, some research addresses the involvement of management accountants in tasks beyond their core responsibilities; those studies focus on an involvement of management accountants in managerial decision making[20], strategic management processes[21], or in operational processes[22].

Notwithstanding the broad strand of existing (empirical) literature in this field, relatively little is known about the consequences of management accountants' new activities and roles.[23] For instance, there is no satisfying answer to the question regarding whether business orientation of management accountants even has a positive impact on the intended objectives. Furthermore, although studies address the process of how management accounting culture has changed, it remains unclear whether the current practice of management accountants acting in a business-oriented way depends on changes in their own attitudes or on 'pressure' from their organizational environment.[24] Some scholarly attempts have been made to address the involvement of management accountants in activities other than their 'traditional' responsibilities.[25] However, knowledge is still scarce on the possible results of an involvement of management accountants in other important fields such as like marketing[26], procurement, or human resource (HR) management.

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18 Ref. *Ahrens/Chapman* (2000); *Granlund/Lukka* (1998).

19 Ref. *Brandau/Hoffjan* (2010); *Granlund/Taipaleenmäki* (2005); *Yazdifar/Tsamenyi* (2005).

20 Ref. *Davis/McLaughlin* (2009a); *Sathe* (1982); *Zoni/Merchant* (2007).

21 Ref. *Ferreira/Moulang* (2009).

22 Ref. *Byrne/Pierce* (2007); *Johnston/Brignall/Fitzgerald* (2002).

23 Ref. *Byrne/Pierce* (2007), p. 474; *Scapens/Bromwich* (2001), p. 253. Exceptions are, for instance, *Hunton/Wier/Stone* (2000) or *Zoni/Merchant* (2007).

24 This question is also similarly discussed as "role-making versus role-taking" in academic literature, ref. *Katz/Kahn* (1978), p. 195-197 and 219; *Turner* (1962), p. 21f.

25 Ref. *Byrne/Pierce* (2007); *Davis/McLaughlin* (2009a); *Ferreira/Moulang* (2009); *Johnston/Brignall/Fitzgerald* (2002); *Sathe* (1982); *Zoni/Merchant* (2007).

26 E.g., the exploratory study of *Roslender/Hart* (2003) highlights the importance of further research on the relationships between marketing and management accounting, ref. *Roslender/Hart* (2003), p. 275.

2 Research objective

Reflecting the research gap, I intend to pursue the introduced stream of management accounting literature with my thesis. Thereby, I aim at filling the highlighted gap and contributing to both the specific academic body of knowledge as well as to management accounting practice. Against this background, the overall research objective of this thesis is to gain a deeper understanding of management accountants' business orientation and of management accountants' extended tasks. Two research questions are particularly raised:

Research question 1: Why do management accountants act as business partners and what is the impact of this practice on management accountants' contribution?

Guided by the identified gaps in prior literature, the first research question addresses reasons why management accountants act in a business-oriented way and analyzes the corresponding results of such behavior with a special focus on management accountants' contribution. Similar research questions have been raised in various academic disciplines. A possible approach to answering those questions is offered by the theory of reasoned action.[27] This theory can be employed to predict and explain the behavior of individuals. Basically, it is argued that behavior is determined by an individual's intentions, which are, in turn, influenced by the individual's attitude toward the specific behavior and by the perceived subjective norms to perform the behavior. Originating from social psychology, the theory of reasoned action has been widely applied in different academic settings and has shown sufficient reliability to predict behavior.[28] Thus, I derive a research model that incorporates the thoughts of this theory to better explain and understand the reasons of management accountants' activities. The derived research model also allows me to test if a business orientation of management accountants leads to the frequently postulated positive effects.

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27 Ref. *Ajzen/Fishbein* (1980); *Fishbein/Ajzen* (1975) and the explanations in Section 1.2 of Part C.

28 Ref. *Sheppard/Hartwick/Warshjaw* (1988).

Whereas the first research question addresses the business orientation of management accountants in general, the second research question focuses on a particular aspect regarding enlarged activities of management accountants:

Research question 2: Does the involvement of management accountants in incentive compensation positively influence the effects of incentive compensation systems and, subsequently, firm performance?

The second research question elaborates on the effects resulting from management accountants' expanded tasks and roles. It pursues similar prior work by investigating the involvement of management accountants in HR practices with a special emphasis on the design and operation of incentive compensation systems. Incentive compensation systems are an important device that can reduce control problems in organizations and ensure that organizational objectives are achieved. Management accountants are already partly involved in designing and operating these systems since they provide relevant information, i.e., performance measures. Nevertheless, it is key for organizations that suitable performance measures are designed, that the incentive compensation system itself is properly configured, and foremost, that the incentive compensation systems are aligned with other controls of the organization. This is of high importance since inappropriate performance measures or inadequately designed incentive compensation systems can trigger dysfunctional managerial behavior. In this context, management accountants may contribute to reducing the risk of dysfunctional effects. Beyond their core tasks as information providers, management accountants might also be involved in other responsibilities such as designing incentive functions or specifying remuneration packages, e.g., regarding the percentage of performance-dependent pay. With such an involvement, management accountants may more strongly contribute to the achievement of incentive compensation systems' objectives and to firm performance. To answer the second research question, I derive another research model that incorporates the involvement of management accountants in incentive compensation and which analyzes resulting effects on incentive systems as well as on performance.

In order to answer the research questions and to realize scientific progress, I apply an empirical research strategy.[29] Empirical research basically aims at systematically deriving insights by analyzing prior knowledge, deriving hypotheses, and testing them against experiences obtained from observations or experiments.[30] For the present thesis, I rely on data gathered by a questionnaire-based survey as a source of observations.[31] Similar to other business disciplines, surveys are an important instrument for data collection in management accounting research and, in particular, in research addressing behavioral aspects[32] of management accounting.[33]

As already alluded, the present research also follows several calls for scholarly activities. *Stone/Hunton/Wier* (2000) claim that management accountants, albeit being important for organizations, are an "understudied professional group."[34] It is also noticeable that, in comparison with other research strategies such as analytic research approaches, the application of empirical research strategies is less common in management accounting research originating from German academic institutions or conducted in German-speaking countries; in particular, empirical research using a survey for data gathering is still scarce.[35] In addition, a number of researchers argue that management accounting research should shift to research on management problems and toward a

29 Alternatives are formal-analytical or conceptual-analytical research strategies, ref. *Messner et al.* (2008), p. 141; *Wagenhofer* (2006), p. 9f., as well as the seminal work of *Grochla* (1976), p. 634-637.

30 Ref. *Grochla* (1976), p. 634; *Popper* (1959), p. 3.

31 Research approaches of prior empirical studies vary and comprise case-based or interview-based research (e.g., *Friedman/Lyne* (1997); *Granlund/Lukka* (1998); *Burns/Baldvinsdottir* (2005); *Byrne/Pierce* (2007)), survey research (e.g., *Coad* (1999); *Ferreira/Moulang* (2009); *Mouritsen* (1996); *Yazdifar/Tsamenyi* (2005); *Zoni/Merchant* (2007)), or hybrid forms such as large-scale telephone interview surveys (e.g., *Siegel/Sorensen* (1999)). Whereas most of the studies gathered their data at a certain point of time, there are also selected longitudinal (case) studies (ref. *Burns/Baldvinsdottir* (2005); *Järvenpää* (2007)).

32 Behavioral accounting research focuses on the "behavior of accountants or the behavior of non-accountants as they are influenced by accounting functions", *Hofstedt/Kinard* (1970), p. 43. An introductory as well as comprehensive review of behavioral accounting research offer *Birnberg/Shields* (1989).

33 Ref. *Kwok/Sharp* (1998), p. 137; *Young* (1996), p. 55.

34 *Stone/Hunton/Wier* (2000), p. 697.

35 Ref. *Messner et al.* (2008), p. 141f.; *Wagenhofer* (2006), p. 9f. *Messner et al.* (2008), however, find a recent trend toward an increasing use of empirical research strategies. Furthermore, publications of German management accounting research in leading international accounting journals are rather limited, ref. *Wagenhofer* (2006), p. 9; an exception is, for instance, the recent work of *Homburg/Stebel* (2009).

stronger focus on management accounting practice.[36] Academics and journal editors frequently formulate a demand for more theoretically grounded research. Whereas no comprehensive theory is available to answer both research questions, the application of the well-established theory of reasoned action to answer the first research question is especially in line with this postulated request.[37] Focusing on the tasks of management accountants related to incentive compensation is also consistent with a broad number of calls for research since prior empirical management accounting studies mainly emphasize decision making rather than control aspects.[38] In this regard, analyzing aspects related to incentive compensation from a management accounting perspective offers various important avenues for research.[39]

3 Outline of the thesis

The thesis is divided into five parts. Figure A-1 offers an overview of the course of the analyses. This introductory part is devoted to highlighting the motivation behind conducting the present research. Following the motivation, a brief review of prior literature reveals existing research gaps. In conclusion, the objective of the thesis is formulated and the research questions are raised. Finally, the course of the analyses is presented.

Part B offers explanations for the applied research method. It starts with a description of the data collection procedures. A key characteristic is the dyadic research design, which captures responses from both management accountants and general managers. Data is collected from the top 1,500 companies in Germany. Details of the cross-sectional sample are accordingly presented. The second chapter of this part introduces and describes the methodological foundations and the techniques employed

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36 Ref. *Otley* (2001); *Merchant/Van der Stede/Zheng* (2003), p. 251.

37 Ref. *Scapens/Bromwich* (2001), p. 252. To answer the second research question, I adopt thoughts from different theoretical and practical approaches to derive hypotheses and the research model. This approach is consistent with the suggestions of *Ittner/Larcker* (2002) who assume that "substantive insights about management accounting" (p. 792) can be derived by combining economics-based research, behavioral aspects and insights from business practice.

38 Ref. *Otley* (2003), p. 324; *Zimmerman* (2001), p. 424.

39 Ref. *Berry et al.* (2009), p. 5; *Hall* (2008), p. 157; *Indjejikian* (1999), p. 152 and 154; *Moers* (2007), p. 409f.

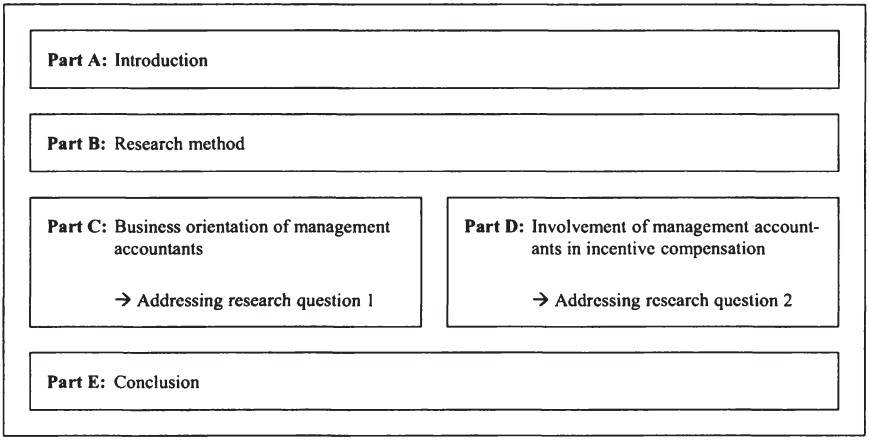

Figure A-1: Outline of the thesis

for data analyses. As structural equation modeling (SEM) is applied to analyze the data, the basics of this approach are introduced and discussed. In particular, the explanations describe the partial least squares (PLS) technique, including the assessment of measurement and structural models, since this specific technique is used to test the study's hypotheses.

Once the research method has been described, Part C of the thesis aims at providing an answer to the first research question about the business orientation of management accountants. Based on a review of related literature and grounded in the rationale of the theory of reasoned action, a research model is derived, corresponding hypotheses formulated, and the constructs employed in the study are described. The results of the analyses are presented in the second chapter of this part. I reveal the results of the main research model to answer the research question and of an alternative model. Furthermore, procedures for assessing the robustness of the results are introduced and the corresponding results are disclosed.

Part D of the thesis addresses the second research question regarding the result of an involvement of management accountants in incentive compensation. The review of related literature focuses on the extended tasks and roles of management accountants in general as well as on the specific tasks and roles related to incentive compensation. The first chapter also embraces the formulation of the hypotheses, the derived research model, and the description of the constructs employed. Similar to the procedures in

Part C, the second chapter of this part is devoted to the results of the analyses. It contains the findings of the main research model, of alternative models as well as of procedures conducted for robustness checks.

The findings of this study are summarized in Part E. First, the results are reflected and the contributions are thoroughly assessed. Furthermore, implications for managerial practice are deduced and the findings of the study are discussed against the background of inherent limitations that might potentially diminish the value of the results. Finally, the thesis ends with the identification of potential avenues for future research initiatives.

B Research method

Part B of the thesis addresses the research method. The methodological foundations are laid in two steps: The first chapter of this part is devoted to data collection procedures and the sample of the study. The second chapter introduces and describes SEM techniques that will be applied for data analysis.

1 Collection of survey data and sample

1.1 Data collection and survey administration

This subsection starts with an overview of the data collection procedures. In the following, potential key informant and common method biases and corresponding activities to reduce the risk of such biases are described. Moreover, I present details on the pilot-test procedures as well as on the specific activities for data collection.

Overview of the data collection procedures

The procedures to collect data started with the definition of the target population.[40] The target population of the research consists of management accountants and general managers of German medium- and large-sized corporations. Since the research questions of the study basically focus on management accountants and the impact of their activities, management accountants and general managers, i.e., users of services offered by management accountants, were selected as adequate target respondents.[41] Medium- and large-sized corporations were chosen because control issues and management accountants or management accounting departments are typically present in such corporations.[42] Except for financial institutions the target population covers all industries to allow generalizability of the results. Financial institutions have been excluded due to their specific business models and regulatory requirements. Furthermore, the target population of firms was restricted to a single country in order to limit possible biases due to institutional or cultural differences.[43]

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40 Ref. *Van der Stede/Young/Chen* (2005), p. 666.

41 Ref. *Kwok/Sharp* (1998), p. 144; *Pinsonneault/Kraemer* (1993), p. 84.

42 Ref. *Emsley* (2005), p. 165; *Hoque/James* (2000), p. 3; *Rosenzweig* (1981).

43 Ref. *Chow/Kato/Merchant* (1996); *Jansen/Merchant/Van der Stede* (2009).

The selected survey population was derived from a database of a German commercial list provider[44]. In a first step, I selected the top 1,500 companies in terms of revenue. As a second step, another 281 companies had to be discarded for various reasons[45] resulting in a final survey population of 1,219 companies for the study.

Key informant and common method biases

Data gathering procedures in survey research typically apply single-informant designs, i.e., one respondent per company answers relevant questions and assesses constructs.[46] The quality of obtained data accordingly depends on the adequate selection of respondents. Especially two potential problems are associated with such single-informant designs: Key informant and common method biases.

- Information provided by survey respondents, i.e., the key informants, is in most cases not limited to personal opinions since their ratings typically also embrace departmental- or company-related aspects. Potential key informant biases might arise if the respondents do not possess adequate knowledge due to their functional or hierarchical position in the company.[47]
- Selection of respondents and the research design might create a common method bias. Such an effect potentially results from research designs in which independent and dependent constructs are assessed by the same person. Possible explanations for this potential bias are consistency motifs, implicit theories, social desirability, or affectivity of respondents.[48]

To cope with those two potential biases, I carefully selected the respondents and implemented a multi-informant – more precisely, a 'dyadic' – research design. Taking required competencies with regard to functional and hierarchical position into account, the heads of management accounting departments seemed to be the most appropriate respondents for questions and assessments related to the tasks and roles of management accountants. Aspects regarding the results of management accountants' actions were surveyed with general managers as they are the users of management ac-

44 Hoppenstedt Firmeninformationen GmbH.

45 E.g., lack of dedicated management accounting department, double counts due to legal form constructions, or ceased operations.

46 Ref. *Pinsonneault/Kraemer* (1993), p. 88f.; *Van der Stede/Young/Chen* (2005), p. 666.

47 Ref. *Bagozzi/Yi/Phillips* (1991), p. 423-425; *Kumar/Stern/Anderson* (1993), p. 1634.

48 Ref. *Podsakoff et al.* (2003), p. 881-883; *Podsakoff/Organ* (1986).

countants' services.[49] The result of this choice of respondents is the dyadic research design, which covers assessments of two respondents.[50] In addition, this resulting multi-informant design should also alleviate a possible common method bias since it allows to survey independent and dependent constructs with different respondents. Subsequently to data gathering, I complementally conducted *Harman*'s (1967) single-factor-test to search for possible signals of common method bias. This test checks whether an exploratory factor analysis of all relevant survey items results in one or more factors. The results of the exploratory factor analyses for the two research models, which will be introduced in Part C and Part D of the present study, do not reveal a single or common factor indicating no risk of common method bias. For additional validation purposes, I discussed and confirmed the selection of respondents during the pre-test procedures described in the following. Summarizing the activities in this context, the research approach should alleviate possible key informant or common method biases.

Pilot-test procedures

Before starting data collection, the survey instruments were pilot-tested by five executives from business practice and six academic researchers to ensure reliable and valid measurements in the study. Pilot- or pre-tests are especially important in mail surveys since respondents have no or at least a reduced opportunity to contact the researcher in case of questions or problems in understanding the survey items.[51] As a result of the pre-test procedures, some of the survey items were slightly adjusted. Details of the survey items are presented in Chapter 1.3 of Part C and in Chapter 1.4 of Part D of the study.

As this research project was conducted in Germany, I applied the German language for the questionnaires and all correspondence. If references or existing item definitions were in English, I searched for German translations or carefully translated the materials. I additionally discussed the questionnaire with a bilingual researcher to ensure reliable and valid translations.

49 Ref. *Chenhall* (2003), p. 134
50 Ref. *Kenny/Kashy/Cook* (2006), p. 1-3
51 Ref. *Van der Stede/Young/Chen* (2005), p. 670.

Data collection procedures

Data collection took place in the period of March to May 2009 as a large-scale mail survey. In particular, data collection procedures followed a three-step implementation strategy: First, I contacted each firm by phone to check data accuracy, to ask for the latest contact details, and to introduce the study. Second, I sent a cover letter, a questionnaire as well as a second survey package to the heads of the management accounting departments.[52] I asked them (i) to fill out the functionally customized questionnaires for management accountants and (ii) to forward the second survey package to a general manager, i.e., a member of the upper or upper-middle management such as the CEO, managing director, or division manager. Third, I sent out two reminder e-mails, two respectively four weeks after the initial mailing to boost the response rate. To enhance the chance of participation, I personalized all correspondence and offered a research report covering the main findings of the study to all participants.

1.2 Sample description

The subsection on the sample of the study encompasses descriptions on responses and response rates, different data sets employed in the study, details of the sample, and activities to analyze a potential non-response bias.

Responses and return rates

A total of 280 persons participated in the study. Eight questionnaires had to be discarded due to a large number of missing data. From the remaining 272 responses, 160 were from management accountants and 112 from general managers. Due to the dyadic research design I need matching pairs of questionnaires. Thus, the final dyadic sample consists of the answers of 112 firms representing a return rate of 9.19%. This response rate is lower than anticipated and below average in typical empirical management accounting studies.[53] Answers from non-participating firms to follow-up phone calls or reminder e-mails revealed, for instance, that executives had other priorities during the ongoing economic downturn in spring 2009, that they had introduced a policy of not participating in survey research due to the increasing number of requests, or that the

[52] In a few cases participants requested the instruments to be sent by fax or mail.

[53] Ref. *Van der Stede/Young/Chen* (2005), p. 671f.

complexity of the research project was too high due to the need for dyadic data. Whereas the low response rate raises a potential limitation of the study, the sample is large enough to process planned advanced statistical procedures for analyzing the data.[54]

Dyadic and MA data set

Two samples were basically obtained from data collection. The main sample contains the dyadic sets of questionnaires and is denoted as "Dyadic data set" in the following. I use this data to analyze the main research models that are derived to answer the research questions. A second set of data denoted as "MA data set" includes both the answers by management accountants of the dyadic data set and the answers by management accountants of those companies that did not provide a response by a general manager. I employ this data for selected descriptive statistics and for some robustness checks of the research models.

Sample details

Tables B-1 and B-2 provide information regarding the organizations' size in terms of revenue and number of employees. Data are gathered especially from medium- and large-sized companies. Taking into account that control problems and departments of management accountants are primarily in place in medium- and large-sized companies, descriptive statistics indicate that the firms were large enough to ensure that the sample is adequate for analyzing the research questions. Furthermore, results of *Mann-Whitney*-U-tests to assess whether the two (independent) samples come from the same distribution indicate no significant differences in the central tendency of the two data sets (revenue: $p = 0.659$; employees: $p = 0.744$).

[54] Ref. *Auzair/Langfield-Smith* (2005), p. 409f. and 418.

Revenue (Million EUR)	Dyadic data set		MA data set	
	Frequency	Percentage	Frequency	Percentage
0 – 500	32	28.83%	41	25.95%
501 – 1,000	38	34.23%	54	34.18%
1,001 – 5,000	27	24.32%	41	25.95%
5,001 – 10,000	4	3.60%	8	5.06%
10,001 – 20,000	3	2.70%	3	1.90%
> 20,000	7	6.31%	11	6.96%
Mean	3,684		4,274	
Standard deviation	8,390		10,491	
Lower quartile	500		500	
Median	800		854	
Upper quartile	2,273		2,400	
N *	111		158	

Notes:
* Not all companies did provide details on revenue
MA – Management accountant

Table B-1: Surveyed firms by revenue

Employees	Dyadic data set		MA data set	
	Frequency	Percentage	Frequency	Percentage
0 – 500	6	5.36%	10	6.29%
501 – 1,000	14	12.50%	21	13.21%
1,001 – 5,000	54	48.21%	77	48.43%
5,001 – 10,000	13	11.61%	16	10.06%
10,001 – 20,000	13	11.61%	17	10.69%
> 20,000	12	10.71%	18	11.32%
Mean	12,881		14,496	
Standard deviation	45,549		46,048	
Lower quartile	1,430		1,350	
Median	3,300		3,100	
Upper quartile	7,575		7,500	
N *	112		159	

Notes:
* Not all companies did provide details on the number of employees
MA – Management accountant

Table B-2: Surveyed firms by number of employees

The sample shows a reasonable spread across industries. Table B-3 offers more details on industry composition of the cross-sectional sample indicating the predominant industries wholesale/retail, chemicals/health care, utilities, automotive, and industrial goods. Financial institutions are not listed since I excluded this sector from the research project. A complementally conducted chi-square-test to analyze the two data sets indicates no significant variances between the industry distributions (chi-square = 3.631; p = 0.9987).

Industry	Dyadic data set		MA data set	
	Frequency	Percentage	Frequency	Percentage
Wholesale/retail	15	13.39%	24	15.00%
Chemicals/health care	13	11.61%	20	12.50%
Utilities	12	10.71%	18	11.25%
Automotive	11	9.82%	13	8.13%
Industrial goods	10	8.93%	12	7.50%
Consumer goods	8	7.14%	12	7.50%
Manufacturing	7	6.25%	12	7.50%
Information technology	6	5.36%	7	4.38%
Construction	5	4.46%	7	4.38%
Transport/logistics	4	3.57%	8	5.00%
Media/communication	4	3.57%	7	4.38%
Real estate	4	3.57%	4	2.50%
Services	3	2.68%	4	2.50%
Telecommunication	2	1.79%	3	1.88%
Tourism	2	1.79%	2	1.25%
Others	6	5.36%	7	4.38%
N	112		160	

Notes:
MA – Management accountant

Table B-3: Surveyed firms by industry

In terms of organizational structure the sample is primarily composed of holdings and subsidiaries/joint ventures (ref. Table B-4). Intermediate holdings and non-affiliated companies are of less importance in the sample. A chi-square-test reveals no significant variances between the two data sets (chi-square = 2.183; p = 0.535).

Organizational structure	Dyadic data set		MA data set	
	Frequency	Percentage	Frequency	Percentage
Holding	44	39.29%	68	42.50%
Intermediate holding	23	20.54%	26	16.25%
Subsidiary/joint venture	43	38.39%	61	38.13%
Non-affiliated company	2	1.79%	5	3.13%
N	112		160	

Notes:
MA – Management accountant

Table B-4: Surveyed firms by organizational structure

Non-response bias

One of the inherent limitations of survey research is non-response bias. This potential bias might especially arise in studies with low response rates.[55] To test for any bias, I split the data set into three groups according to the number of days that has passed from initial mailing until receipt of the returned instrument and searched for possible divergent answers between the first and the last third. The underlying rationale is that the answers of respondents who participate later are expected to be more similar to those by non-respondents.[56] To assess the answers, I employed *Mann-Whitney*-U-tests for every item of the questionnaire. I only found small significant differences ($p < 0.05$) between early and late respondents for four items (AT_1; CO_3; ICE_E_1; P_DP_1). However, I am confident that this relatively low number of items does not cause serious problems for the interpretation of the results. Furthermore, all items belong to different constructs and are not related to only one of the research models.

2 Data analysis using structural equation modeling

2.1 Methodological foundations

This subsection of the present study addresses the fundamentals of SEM. First of all, the nature and some basics of SEM are introduced. This will be followed by a description of reflective and formative measurement models employed in SEM analyses

55 Ref. *Van der Stede/Young/Chen* (2005), p. 673.
56 Ref. *Armstrong/Overton* (1977), p. 397.

and an exemplary structural equation model. Furthermore, two different SEM techniques will be introduced and compared. The subsection ends with a description of the rationale underlying the selection of the SEM technique for this study.

Nature and overview of SEM

The research questions of this study address aspects and theoretical ideas which cannot be directly measured (e.g., attitude of management accountants) and are linked in a series of dependence relationships (e.g., effect of an involvement of management accountants in incentive compensation on incentive compensation systems and on performance). SEM is a statistical approach that allows analyses and interpretations of such research questions. Combining the 'first-generation' statistical techniques multivariate regression and path analysis, SEM is a so-called 'second-generation' multivariate statistical technique.[57]

In particular, SEM allows simultaneous examination of latent constructs and theories.[58] Latent constructs (or just constructs) reflect theoretical concepts; measurement models, also denoted as outer models, relate constructs to observable indicators, for instance survey items.[59] The structural model, also denoted as inner model, specifies relations among the constructs. The relationships among the constructs represent the theoretical reasoning and have to form a recursive model, i.e., the relationships are formulated unidirectional and do not include loops.[60] Overall, SEM has the advantage over 'first generation' statistical techniques that (i) it allows creating models with multiple relationships among several constructs, (ii) it offers to apply observable and unobservable constructs, and (iii) it incorporates measurement errors.[61]

SEM has become a dominant multivariate technique for data analysis in social sciences.[62] Nevertheless, the number of studies using SEM in management accounting

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57 Ref. *Hair et al.* (2006), p. 711; *Chin* (1998a), p. 296.

58 Ref. *Anderson/Gerbing* (1988); *Henseler/Ringle/Sinkovics* (2009), p. 284; *Jarvis/Mackenzie/Podsakoff* (2003), p. 199.

59 The process of developing operational definitions of indicators linked to the respective constructs is denoted as operationalization, ref. *Bisbe/Batista-Foguet/Chenhall* (2007), p. 790. The result of the operationalization process, a set of indicators or survey items, is also called a scale, ref. *Kwok/Sharp* (1998), p. 138.

60 Ref. *Tenenhaus et al.* (2005), p. 166.

61 Ref. *Chin/Newsted* (1999), p. 307f.

62 Ref. *Hershberger* (2003).

research is relatively small compared to other fields of business research such as marketing or organizational science.[63] For instance, *Smith/Langfield-Smith* (2004) find in their review (research period: 1980 to 2001) across ten leading (management) accounting journals that only 20 published management accounting papers used SEM. Besides the advantages of the approach itself, this aspect also accentuates the motivation for recent calls for more research in management accounting using SEM.[64]

Reflective and formative measurement models

With regard to the nature and direction of the relationship between a construct and its indicators, two types of measurement models can be distinguished: Reflective and formative measurement models.[65]

- The underlying assumption of reflective measurement models is that indicators, i.e., single items or questions in a questionnaire, are caused by changes of the construct. Reflective measurement models aim to be internally consistent since all indicators are understood as equally valid indicators for the construct. Furthermore, single indicators of the construct are interpreted as interchangeable and the indicators of the construct should be highly correlated. Removing a single indicator of a construct should not alter the construct's meaning or internal consistency. Possible residuals or measurement errors are taken into account at indicator level.
- Formative measurement models capture relationships from indicators toward the construct. In contrast to reflective measurement models, it is assumed for formative measurement models that each single indicator has an impact on the construct since the group of indicators jointly forms the construct in terms of conceptual and empirical meaning. Correlation of the indicators is not required since two indicators may be important aspects for the construct but might even be negatively correlated. Since all indicators constitute the construct, dropping an indicator is not appropriate and may lead to severe misspecification prob-

63 Ref. *Smith/Langfield-Smith* (2004), p. 61.

64 Ref. *Chenhall* (2003), p. 155; *Shields/Shields* (1998), p. 67; *Smith/Langfield-Smith* (2004), p. 49.

65 Ref., in the following, *Bisbe/Batista-Foguet/Chenhall* (2007), p. 799-803; *Bollen/Lennox* (1991), p. 305f.; *Edwards/Bagozzi* (2000); *Jarvis/Mackenzie/Podsakoff* (2003), p. 200-202.

lems. Formative measurement models take residuals or measurement errors into account on construct level.

Structural equation models may contain both reflective and formative measurement models.[66] To avoid biased interpretations due to misspecifications of measurement models, the selection of the respective measurement type should always be determined by theoretical reasoning.[67] In this respect, literature provides several criteria that aim at helping to decide whether a measurement model should be specified as reflective or formative. Table B-5[68] offers decision rules for determining whether a construct is reflective or formative. Basically, the criteria embrace the direction of the causality between the construct and its indicators, the interchangeability of the indicators, covariation among indicators, and the nomological net of the construct indicators.[69]

The constructs of the present study, which will be described in detail in Section 1.3 of Part C and in Section 1.4 of Part D, capture various aspects like attitudes of management accountants, effects of controls, or expressions of performance. For all constructs, it can be noted that the causality is rather from the construct to the indicators, that indicators of the constructs should be interchangeable, and that the indicators should covary. Thus, reflective measurement models are applied for all constructs of the study. This approach is also consistent with *Jarvis/Mackenzie/Podsakoff* (2003), p. 200f., who point out that especially for constructs related to attitude or intentions, reflective measurement models are appropriate.

66 Ref. *Fornell/Bookstein* (1982), p. 441f.
67 Ref. *Diamantopoulos/Winklhofer* (2001), p. 274.
68 Adapted from *Jarvis/Mackenzie/Podsakoff* (2003), p. 203.
69 Ref. *Jarvis/Mackenzie/Podsakoff* (2003), p. 202f.

	Reflective model	Formative model
Direction of causality between construct and its indicators		
Is the causality between construct and its indicators from construct to its items or vice versa?	Direction of causality is from construct to items	Direction of causality is from items to construct
Are the indicators defining characteristics or manifestations of the construct?	Indicators are manifestations of the construct	Indicators are defining characteristics of the constructs
Would changes in the indicators cause changes in the construct?	No	Yes
Would changes in the construct cause changes in the indicators?	Yes	No
Interchangeability of indicators		
Should the indicators have the same or similar content?	Indicators should have the same or similar content	Indicators need not have the same or similar content
Would dropping one of the indicators alter the conceptual domain of the construct?	Dropping an indicator should not alter the conceptual domain	Dropping an indicator may alter the conceptual domain
Covariation among indicators		
Should a change in one of the indicators be associated with changes in the other indicators?	Yes	Not necessarily
Nomological net		
Are the indicators expected to have the same antecedents and consequences?	Yes	Not required

Table B-5: Decision rules for determining whether a construct is reflective or formative

Exemplary structural equation model

Figure B-1[70] depicts a typical visualization of a structural equation model. The model embraces four constructs. Each construct is measured with two indicators. For purely exemplarily reasons, the measurement models on the left side are of formative nature whereas the measurement models on the right are reflective. Constructs are typically

[70] Adapted from *Fornell/Cha* (1994), p. 57; *Henseler/Ringle/Sinkovics* (2009), p. 285.

represented by squares with rounded corners (or ovals or circles) and indicators are illustrated as squares. Although depicted in Figure B-1 for reasons of completeness, single indicators and error terms or residuals are usually not included in visualizations of research models using SEM.

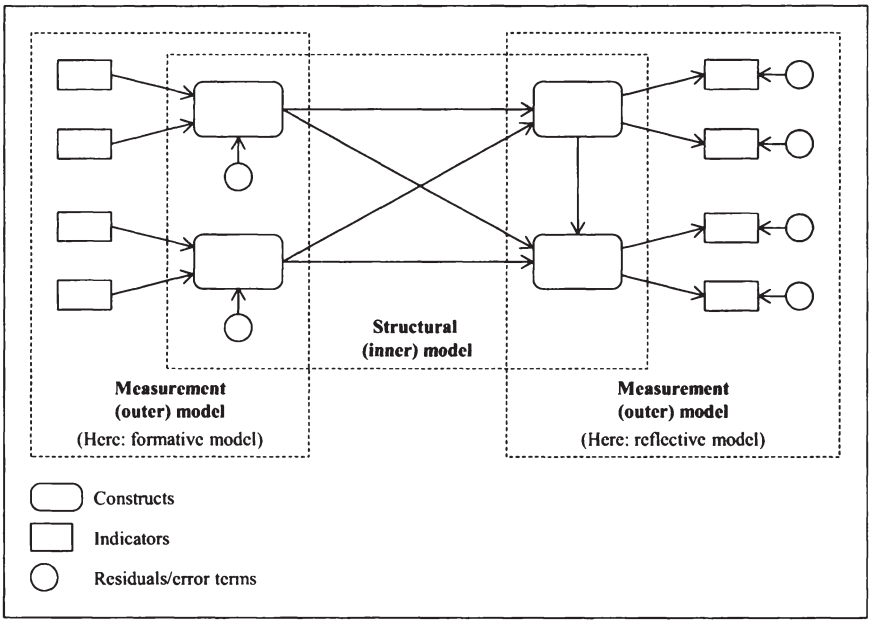


Figure B-1: Example of a structural equation model

Comparison of SEM techniques

SEM analyses are either possible applying covariance-based SEM (CBSEM) or variance-based PLS path modeling techniques:[71]

- The development of CBSEM is intimately linked with the seminal work of *Jöreskog*[72]. The technique is predominantly applied to test and confirm theories. In particular, CBSEM typically uses the maximum likelihood function to

[71] Ref., in the following, *Fornell/Cha* (1994), p. 52f.; *Chin* (1998a), p. 297f.; *Chin/Newsted* (1999), p. 308-314; *Tenenhaus et al.* (2005), p. 159f.

[72] E.g., *Jöreskog* (1973).

minimize the difference between the empirical covariance matrix and the theoretical model. The underlying assumption of this procedure is that empirical data follow a multivariate normal distribution and that observations are independent of one other. The literature suggests minimum sample sizes of approximately 200 as appropriate to ensure unbiased parameters and estimates.[73]

- The PLS technique, originally developed by *Wold*[74], pursues a different goal than CBSEM. The technique especially serves for research with rather predictive purposes, research with a more exploratory objective, or research activities with rather scarce theoretical foundations. Data analyzed with the PLS technique do not have to fulfill the normal distribution criterion since the PLS calculation procedures do not make distributional assumptions. Requirements regarding sample size are less strict for PLS than for CBSEM. Heuristics mention sample sizes of 30 as appropriate; more precisely, *Chin* (1998a), p. 311, proposes that sample sizes should exceed either (i) ten times the number of indicators of the construct with the largest number of formative indicators or (ii) ten times of the largest number of independent constructs impacting a dependent construct.

To sum up, both techniques allow the analysis of structural equation models. The main differences result from research objectives, assumptions on data distribution, and sample size requirement. Table B-6[75] summarizes the differences between the two techniques.

73 Ref. *MacCullum/Browne/Sugawara* (1996).

74 E.g., *Wold* (1980).

75 Adapted from *Chin/Newsted* (1999), p. 314.

Criterion	CBSEM	PLS
Statistical approach	Covariance-based	Variance-based
Research objective	Parameter-oriented; rather confirmatory research objectives	Prediction-oriented; rather exploratory research objectives
Data assumptions	Multivariate normal distribution (parametric data)	Predictor specification (non-parametric data)
Sample size requirements	Minimal recommendations range from 200 to 800 cases	Minimal recommendations range from 30 to 100 cases

Notes:
CBSEM – Covariance-based structural equation modeling; PLS – (Variance-based) partial least squares (path modeling)

Table B-6: Comparison of SEM techniques

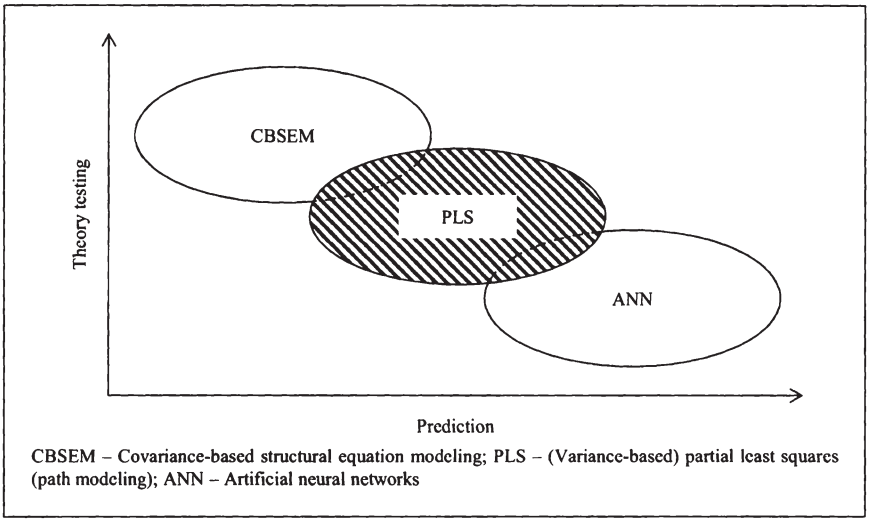
Selection of statistical technique

With respect to the present research, the PLS technique seems to be the preferred approach for the required analyses. The research questions aim at business orientation of management accountants and at involvement of management accountants in incentive compensation. As indicated in the introduction to the study, there is no substantial or comprehensive theory and empirical evidence available in this specific context. In this regard and reflecting *Jöreskog/Wold* (1982), p. 270, who point out that CBSEM is theory-oriented and more appropriate for confirmatory research objectives and PLS is suited for research if prior theoretical and empirical knowledge is rather scarce, PLS is the adequate technique for the present research.[76] Figure B-2[77] also adds support to this decision since it compares PLS with other techniques and shows that PLS is suited for research in which theory is not very strong and for research with an exploratory and predictive character.[78] Nevertheless, PLS allows testing hypotheses which have been derived from theoretical reasoning.

[76] This does not compulsory mean that CBSEM does only allow testing strictly confirmatory models. *Jöreskog* (1993), p. 295, notes that CBSEM might also be used for a research strategy in which several models are generated and the model which fits the data well and which offers meaningful interpretations will be selected.

[77] Adapted from *Henseler/Ringle/Sinkovics* (2009), p. 296.

[78] Figure B-2 also displays artificial neural networks as possible technique for data analysis. Due to the reason that this technique is especially applied in exploratory research designs, it is not appropriate for the present research and is left out of the discussion on possible alternatives for data analysis.



CBSEM – Covariance-based structural equation modeling; PLS – (Variance-based) partial least squares (path modeling); ANN – Artificial neural networks

Figure B-2: Purposes of statistical (SEM) techniques

Contrary to CBSEM, PLS does not require data that fulfill the criteria of a multivariate normal distribution. A *Kolmogorov-Smirnov*-test conducted for all items of the study indicated that data do not meet the requirement of a normal distribution ($p < 0.01$).[79] This result represents another argument for employing PLS in the present research.[80]

The sample size requirements also confirm the decision to apply PLS as the technique for data analysis. The sample size of the dyadic data set, which will be employed for the analyses of the main research models, is 112. This number is below the recommended minimum requirement of 200 for CBSEM but typically within the required range for PLS (assuming a research model with a medium level of complexity).

Although CBSEM is sometimes denoted as the predominant or more powerful technique,[81] both PLS and CBSEM should be assessed as being complementary rather

79 Ref. *Hair et al.* (2006), p. 81f.

80 This argument on the impact of possible violations of the normal distribution of data has to be reflected with caution since the application of maximum likelihood functions for CBSEM typically also leads to robust results in the case of a sufficient sample size, ref. *Reinartz/Haenlein/Henseler* (2009).

81 Ref. *Chin* (1998a), p. 297; *Balderjahn* (2008).

than competitive and the choice of applied technique should depend on the respective research design.[82] There is also a growing number of studies using the PLS technique in recent management and management accounting literature indicating appropriateness in principle for typical research questions in this field.[83]

Various software solutions are available for SEM in general and the PLS technique in particular. For the present research, the software package SmartPLS[84] was employed. To conduct additional analyses, the software package SPSS Statistics 17.0 was used.

2.2 Analysis of research models using the partial least squares technique

The following subsection is devoted to details of the analysis of research models employing the PLS technique. Initially, a formal specification of a PLS model and the PLS algorithm will be introduced. The description of the assessment of PLS models is split into two parts since analysis and interpretation of PLS models typically follow a two-stage approach encompassing the assessment of measurement models and the assessment of the structural model.[85] At the end of this subsection, procedures for subgroup analyses for complemental model validation activities are described. Due to the reason that no formative constructs are employed in the present study, the explanations below will focus on reflective measurement models only.

Formal specification of PLS models

The notation of the formal specification of PLS models follows conventional descriptions.[86] Descriptions typically assume that latent and manifest parameters, i.e., constructs and indicators, are standardized.[87]

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82 Ref. *Henseler/Ringle/Sinkovics* (2009), p. 296.

83 E.g., *Bouwens/van Lent* (2006); *Chapman/Kihn* (2009); *Dowling* (2009); *Groth/Henning-Thurau/Walsh* (2009); *Hall* (2008); *Hartmann/Naranjo-Gil/Perego* (2010); *Homburg/Stebel* (2009); *Naranjo-Gil/Hartmann* (2007).

84 Ref. *Ringle/Wende/Will* (2005).

85 Ref. *Hulland* (1999), p. 198.

86 Ref. *Chin* (1998a), p. 312-314; *Fornell/Cha* (1994), p. 57-60; *Henseler/Ringle/Sinkovics* (2009), p. 284-286; *Tenenhaus et al.* (2005), p. 161-166.

87 Ref. *Henseler/Ringle/Sinkovics* (2009), 284f.

The structural model describes the relations among the constructs as derived by theoretical argumentations. Following the formalization of *Fornell/Cha* (1994), p. 58f., the relationship among exogenous and endogenous constructs can be described as follows:

$$\eta = B^*\eta + \Gamma^*\xi + \zeta$$

In this equation, η is the vector of the endogenous construct and ξ is the vector of the exogenous construct. In general, if a construct never emerges as a dependent construct, it is labeled exogenous; otherwise it is labeled endogenous. Furthermore, ζ represents the vector of residuals (i.e., unexplained variances) and B as well as Γ are path coefficient matrices.

Measurement models represent the relations among construct and indicators. Reflective measurement models can be formalized as follows:

$$y = \Lambda_y\eta + \varepsilon_y$$

$$x = \Lambda_x\xi + \varepsilon_x$$

As defined before, η and ξ are the endogenous and exogenous constructs in this equation; y and x are the observed indicators of η and ξ. The matrices of loadings that relate the constructs to their indicators are labeled as Λ_y and Λ_x, respectively. Residuals, also interpreted as measurement error, are specified by ε_y and ε_x.

PLS algorithm

The following paragraphs introduce the basic PLS algorithm.[88] Basically, the algorithm computes the constructs as linear combinations of their indicators and other unknown relations in a successive way[89] and can be distinguished into a three-stage process.

[88] Ref. *Cassel/Hackl/Westlund* (1999), p. 438f.; *Chin* (1998a), p. 301f.; *Fornell/Cha* (1994), p. 64-66; *Henseler/Ringle/Sinkovics* (2009), p. 287f. Detailed and formalized descriptions of the PLS algorithm are especially offered by *Tenenhaus et al.* (2005), p. 166-172, and in the seminal work of *Lohmöller* (1989).

[89] I.e., one of the core ideas of the PLS algorithm is that some parameters are assumed as known and are fixed whereas other parameters are estimated, ref. *Fornell/Cha* (1994), p. 62.

The first stage of the algorithm, which is also described as the "heart of the PLS algorithm"[90], aims at iteratively estimating the construct scores. Whereas the initial estimation of the constructs is rather arbitrary (initial outer approximation), the procedures iteratively switch between inside and outside approximation in order to continuously improve the estimations:

- The initial outer approximation calculates the scores of the constructs as linear combinations of their corresponding indicators. Due to the fact that weights are firstly calculated during the following approximations, the initial scores rely on arbitrary weights.
- Inner weights related to the structural model are estimated by the inside approximation. With the exception of the first iteration[91], the inner weights are calculated based on the outer (measurement) model weights. The inner weights reflect how strongly two constructs within the theoretical model are connected.
- The outside approximation estimates the weights of the measurement models relying on the inner (structural) model weights. For reflective measurement models, weights may be interpreted as (simple) regression coefficients which describe the influence of the construct on its indicators.

The iterations continue until the changes of the estimates between two iterations are below a predefined threshold. In other words, the iterative procedure stops as soon as convergence is achieved.[92]

The second and the third stages of the algorithm finally contain non-iterative applications of (multiple) linear regressions in order to receive loadings and path coefficients (stage 2) as well as mean scores and location parameters (stage 3) based on the estimates generated in the first stage of the algorithm. Figure B-3[93] offers a brief overview of the PLS algorithm.

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90 *Chin/Newsted* (1999), p. 316.

91 The first iteration relies on the results of the initial outer approximation.

92 According to *Chin/Newsted* (1999), p. 316, the procedure stops as soon as the percentage change is less than 0.001.

93 Adapted from *Götz/Liehr-Gobbers* (2004), p. 723.

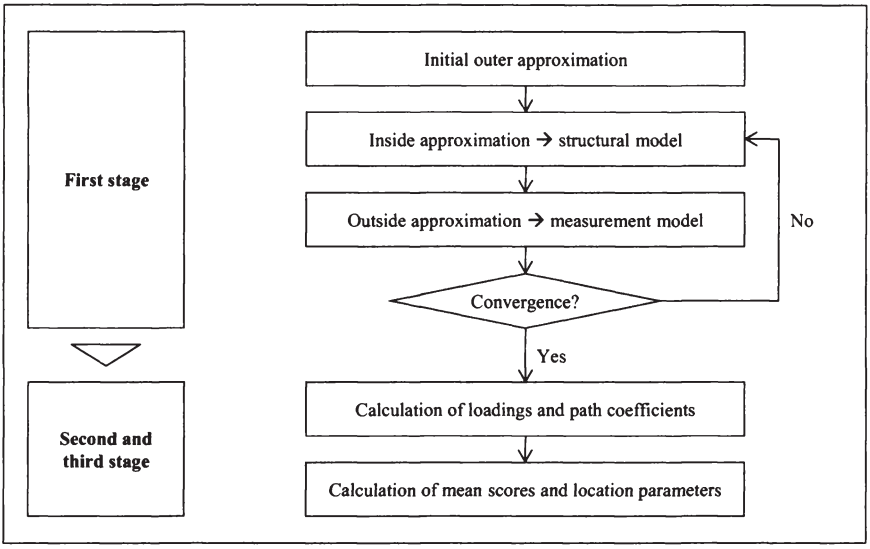

Figure B-3: PLS algorithm

After presenting the basic structure of the PLS algorithm, the two-stage approach of assessing measurement and structural models is discussed in the following: First, assessment of measurement models; second, assessment of structural models.[94]

Assessment of measurement models

Sufficient validity and reliability of measurement models are a prerequisite for analyzing structural models.[95] Measurement models are assessed as being valid if they measure what they intend to measure, and as being reliable if they are basically free from random errors.[96]

94 Ref. *Hulland* (1999), p. 198.

95 Ref. *Barclay/Higgins/Thompson* (1995), p. 295; *Henseler/Ringle/Sinkovics* (2009), p. 298.

96 Ref. *Churchill* (1979), p. 65.

For reflective measurement models, typically four groups of dedicated assessment criteria are distinguished: Content validity, item reliability, convergent validity, and discriminant validity.[97]

Content validity describes the degree to what extent indicators of a construct adequately capture the construct's conceptual content.[98] In addition to adequate construct development and pre-test procedures, the literature suggests applying exploratory factor analyses (principal component analysis) to achieve and assess content validity.[99] The exploratory factor analysis checks whether a measurement model is based on a single factor or if the indicators of the construct represent multiple factors. The number of extracted factors is determined according to the eigenvalue-criterion. Following this criterion all factors with an eigenvalue higher than one are extracted. Measurement models exhibit sufficient results, especially in terms of uni-dimensionality, if the eigenvalue of the first factor is higher than one and the eigenvalue of the second factor is smaller than one.[100] Furthermore, the variance explained shall at least exceed the 50%-level.[101]

Item or indicator reliability is analyzed based on the respective factor loadings of the constructs. Factor loadings should exceed 0.7; i.e., more than approximately 50% of an indicator's variance should be explained by its underlying construct. Furthermore, indicators with factor loadings below 0.4 should be removed from the measurement models.[102] It is not uncommon that some indicators, especially of newly developed scales, might have factor loadings below the defined rule of thumb of 0.7. Such indicators should be carefully reviewed and do not have to be eliminated mandatorily; this applies, for instance, in cases where other loadings of the construct are well above the threshold.[103]

Convergent validity (also referred to as composite reliability or internal consistency) evaluates the comprehensive constructs and is even more important than the

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97 Ref. *Barclay/Higgins/Thompson* (1995), p. 295-298; *Churchill* (1979), p. 68f.; *Hulland* (1999), p. 198-201.

98 Ref. *Bohrnstedt* (1970), p. 91.

99 Ref. *Bohrnstedt* (1970), p. 92f.; *Kwok/Sharp* (1998), p. 138f. and 159; *Tenenhaus et al.* (2005), p. 163.

100 Ref. *Tenenhaus et al.* (2005), p. 163.

101 Ref. *Homburg/Giering* (1996), p. 12.

102 Ref. *Hulland* (1999), p. 198; *Bagozzi/Baumgartner* (1994), p. 402.

103 Ref. *Barclay/Higgins/Thompson* (1995), p. 295f.

analysis of individual indicators.[104] Basically, convergent validity is indicated when each item strongly correlates with its own construct. All or some of the three measures described below are typically employed for the assessment of convergent validity:

- *Cronbach*'s alpha (CA), which is based on the seminal work of *Cronbach* (1951), is a 'traditional' measure for internal consistency and is widely used in empirical research.[105] CA is calculated by the formula:

$$CA = \frac{k}{k-1} * \left(1 - \frac{\sum_{j=1}^{k} \sigma_j^2}{\sigma_t^2}\right)$$

  In this formula, k represents the total number of items of the measurement model, σ_j^2 the variance of item j, and σ_t^2 the total variance of the measurement model.[106] The interpretation of CA should take the number of the construct's indicators into account since the CA value increases with the number of indicators. However, CA values above 0.7 are typically assessed as being sufficient.[107]

- The composite reliability (CR) measure, originally developed by *Werts/Linn/Jöreskog* (1974), is an alternative to CA and defined as follows:

$$CR = \frac{(\sum \lambda_i)^2}{[(\sum \lambda_i)^2 + \sum Var(\varepsilon_i)]} \text{ with } Var(\varepsilon_i) = 1 - \lambda_i^2$$

  In this equation, λ_i is the loading of a construct i and ε_i the measurement error of the construct.[108] The CR measure copes with drawbacks of CA, such as the assumption that all indicators are reliable in the same way, and is sometimes evaluated as more appropriate. The literature suggests a minimum value of 0.6 for CR.[109]

- Average variance extracted (AVE) was introduced by *Fornell/Larcker* (1981), p. 45f., and is a more conservative measure in comparison to CR. AVE can be formally described by:[110]

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104 Ref. *Bagozzi/Baumgartner* (1994), p. 402.
105 Ref. *Peter* (1979), p. 8.
106 Ref. *Cronbach* (1951), p. 299; *Peter* (1979), p. 8.
107 Ref. *Nunnally/Bernstein* (1994), p. 264f.
108 Ref. *Fornell/Larcker* (1981), p. 45; *Henseler/Ringle/Sinkovics* (2009), p. 300.
109 Ref. *Bagozzi/Yi* (1988), p. 82.
110 Ref. *Fornell/Larcker* (1981), p. 46; *Henseler/Ringle/Sinkovics* (2009), p. 300.

$$AVE = \frac{\sum \lambda_i^2}{\sum \lambda_i^2 + \sum Var(\varepsilon_i)} \text{ with } Var(\varepsilon_i) = 1 - \lambda_i^2$$

The measure describes the average variance shared between the construct and its underlying indicators. AVE values larger than 0.5 indicate that the analyzed construct is able to explain more than half of its indicators' variance on average. Consequently, the cutoff value of AVE statistics is formulated as 0.5.[111]

Discriminant validity is a complement to convergent validity in methodological terms.[112] It exhibits that the operationalization of two constructs diverges from each other. Discriminant validity also implies that indicators underlying one construct correlate preferably at a low level with the indicators of other constructs. Assessment of discriminant validity basically relies on the *Fornell/Larcker*-criterion and the evaluation of cross-loadings:

- The *Fornell/Larcker*-criterion checks whether the square roots of AVE statistics of each construct exceed the correlations between the two constructs.[113] I.e., it can be concluded that discriminant validity on construct level is adequate if this test is fulfilled for all pairs of constructs.
- The evaluation of cross-loadings assesses discriminant validity on indicator level. Appropriate discriminant validity is assumed if all indicators load higher on the construct they intend to measure than on other constructs of the research model.[114]

Table B-7 summarizes the criteria for assessment of reflective measurement models including respective requirements and critical values as employed in the present study.

111 Ref. *Bagozzi/Yi* (1988), p. 82.
112 Ref. *Hulland* (1999), p. 199.
113 Ref. *Fornell/Larcker* (1981), p. 46; *Hulland* (1999), p. 200.
114 Ref. *Chin* (1998a), p. 321.

Criterion	Requirements and critical values
Content validity	Exploratory factor analysis: ▪ Eigenvalue > 1 ▪ Variance explained > 50%
Item reliability	Factor loadings > 0.7
Convergent validity	Cronbach's alpha (CA) > 0.7 Composite reliability (CR) > 0.6 Average variance extracted (AVE) > 0.5
Discriminant validity	Correlations between constructs < $\sqrt{AVE}$ statistics Evaluation of cross-loadings

Table B-7: Assessment criteria for reflective measurement models

Assessment of structural models

The second stage of the two-stage approach for the assessment of research models addresses structural models. Relevant criteria for the evaluation are multiple squared correlations (R^2), standardized β-statistics interpreted as path coefficients, effect sizes (f^2), and predictive relevance measures (Q^2).[115]

One of the key purposes of the PLS technique is to analyze the explained variance of (dependent) constructs.[116] For assessing this aspect, multiple squared correlations, i.e., the R^2 value of a dependent construct, are utilized. There is basically no 'good' or 'bad' R^2 value since the research question and design influence this amount.[117] This especially applies for research models in which only a few constructs explain another construct.[118] Despite this thought, *Chin* (1998a), p. 323, proposes to label values of 67% as 'substantial', values of 33% as 'moderate', and values of 19% as 'weak'.

Standardized β-statistics interpreted as path coefficients are employed for hypotheses testing and substantially contribute to validation of theoretical reasoning. Path coefficients should be assessed in terms of sign, magnitude, and significance. Basically, the postulated sign of the path coefficient should match the sign of the resulting

115 Ref. *Barclay/Higgins/Thompson* (1995), p. 298f.; *Henseler/Ringle/Sinkovics* (2009), p. 303-307.

116 Ref. *Hulland* (1999), p. 202.

117 Ref. *Jain* (1994), p. 168.

118 Ref. *Henseler/Ringle/Sinkovics* (2009), p. 303.

path coefficient of the PLS analysis to allow the support of a hypothesis.[119] Path coefficients should be at least 0.1 but higher values are recommended to enhance the meaning of the results.[120] The significance of the path coefficients is determined by respective t-values that are derived from non-parametric resampling procedures; regular approaches are bootstrap and jack-knife procedures.[121] Bootstrapping is characterized by a procedure embracing resampling with replacement from the original sample[122] and is typically the preferred procedure for PLS analyses. Reasons for this prevalence are, for instance, the lower variances of standard errors compared to jack-knife procedures.[123] Bootstrapping using 500 samples with replacement was employed for the present research. Each of the samples consisted of the same number of cases as the number of the original data set, i.e., N = 112 for research models applying the dyadic data set. For hypotheses testing (one-tailed test), t-values larger than 1.648 indicate significant path coefficients assuming a 5%-significance level.[124] In particular, the following criteria are used in the present research:

- t-value $\leq$ 1.648: not significant (n.s.)
- t-value > 1.648: significant (*; $p < 0.05$)
- t-value > 2.334: significant (**; $p < 0.01$)
- t-value > 3.107: significant (***; $p < 0.001$)

Effect sizes (f^2) are calculated to determine the influence of a particular independent construct on a dependent construct. In detail, the calculation of effect sizes incorporates the impact on the dependent construct's R^2 value due to the omission of one of the independent constructs and can be formalized as follows:

$$f^2 = \frac{R^2_{included} - R^2_{excluded}}{1 - R^2_{included}}$$

119 Ref. *Henseler/Ringle/Sinkovics* (2009), p. 304.

120 Ref. *Chin* (1998b), p. xiii; *Lohmöller* (1989), p. 60.

121 Ref. *Chin* (1998a), p. 318-320; *Tenenhaus et al.* (2005), p. 176.

122 The bootstrapping samples are obtained, as described, by randomly drawing cases with replacement from the original sample. PLS estimates the structural model for each sample and derives a bootstrapping distribution based on the derived path coefficients. The t-values for hypotheses testing can be derived from corresponding mean values and standard errors, ref. *Henseler/Ringle/Sinkovics* (2009), p. 305f.

123 Ref. *Chin* (1998a), p. 320; *Efron/Gong* (1983), p. 38.

124 A 5%-significance level implies an average risk of five in a hundred of not corroborating an accurate hypothesis. More specifically, it describes the probability that the null hypothesis is true, ref. *Haller/Krauss* (2002), p. 2.

In this formula, $R^2_{included}$ and $R^2_{excluded}$ reflect the R^2 values of the dependent construct when a selected independent construct is used ($R^2_{included}$) or omitted ($R^2_{excluded}$) in the structural model. Thus, the calculation of effect sizes is only applicable if there is more than one independent construct connected with the dependent construct. Resulting effect sizes of 0.02, 0.15, and 0.35 are regarded as 'small', 'medium', and 'large' effects.[125]

The predictive relevance of each construct can be evaluated by the *Stone-Geisser*-test-criterion redundancy Q^2.[126] This criterion provides information as to what extent the data set can be reconstructed by the structural model and the parameters. In order to derive this measure, a blindfolding procedure is applied. This procedure excludes a fraction of the data set during the calculation of the estimates and reconstructs the omitted part by the estimated parameters. The blindfolding procedure is repeated until all data points have been omitted and reconstructed once. The *Stone-Geisser*-test-criterion redundancy Q^2 can be calculated as:

$$Q^2 = 1 - \frac{E}{O}$$

In this equation, E is the sum of squares of prediction errors, which are calculated as the difference between the true and the estimated values of the omitted data, and O represents the sum of squares of errors derived from a prediction based on the mean of the remaining data points. Redundancy Q^2 values larger than zero confirm predictive relevance.[127]

Table B-8 summarizes the criteria introduced to assess structural models. However, especially R^2 as well as path coefficients are predominantly employed for the assessment of research models with the PLS technique.[128]

125 Ref. *Chin* (1998a), p. 316f.
126 Ref. *Geisser* (1974); *Stone* (1974).
127 Ref. *Chin* (1998a), p. 317f.; *Fornell/Cha* (1994), p. 71-73.
128 Ref. *Barclay/Higgins/Thompson* (1995), p. 288.

Criterion	Requirements and critical values
Multiple squared correlation	R^2 = ▪ ~67%: 'substantial' ▪ ~33%: 'moderate' ▪ ~19%: 'weak'
Path coefficient and significance	Path coefficient > 0.1 Significance level (one-tailed test): ▪ *** $p < 0.001$ (t-value > 3.107) ▪ ** $p < 0.01$ (t-value > 2.334) ▪ * $p < 0.05$ (t-value > 1.648)
Effect size	f^2 = ▪ ~0.35: 'large' ▪ ~0.15: 'medium' ▪ ~0.02: 'small'
Predictive relevance	$Q^2 > 0$

Table B-8: Assessment criteria for structural models

Sub-group analyses

Robustness checks of SEM results are possible via sub-group analyses (also denoted as between-group or multi-group analyses). Such procedures can be applied to check whether the results hold or differ for dedicated sub-groups (e.g., derived by selected characteristics of participating firms or respondents) of the sample.[129] Possible differences of results due to group affiliation can also be interpreted as moderating effect.[130]

The analysis to detect the presence or the absence of sub-group differences starts with the collection of separated data sets or the split of an existing data set according to a specified criterion.[131] After processing the PLS algorithm and the bootstrapping procedures, measurement models have to be checked for adequacy and structural models can be evaluated.[132] Differences between sub-groups may be indicated for measurement or for structural models or for both. However, adequate measurement

129 Ref. *Henseler/Ringle/Sinkovics* (2009), p. 307f.
130 Ref. *Hsieh/Rai/Keil* (2008), p. 109; *Qureshi/Compeau* (2009), p. 198.
131 Ref. *Enns/Huff/Higgins* (2003), p. 166.
132 Ref. *Keil et al.* (2000), p. 309-315; *Plouffe/Vandenbosch/Hulland* (2001), p. 72-76.

models with low variances across sub-groups are recommended for sub-group analyses of structural models.[133]

The interpretation of sub-group analyses for structural models encompasses two steps: (i) Assessment and comparison of path coefficients and R^2 values, followed by (ii) tests whether selected path coefficients significantly differ between the sub-groups.[134] A parametric and a non-parametric approach can be distinguished as a technique for testing possible significant differences of path coefficients.[135] Whereas prior research frequently applied parametric approaches and used a t-test for respective analyses[136], I follow the procedures of conducting PLS-based sub-group comparisons suggested by *Henseler/Ringle/Sinkovics* (2009), p. 309.[137] This procedure does not assume a normal distribution of underlying data and is classified as a non-parametric statistical approach. Since data of the present study does not exhibit a normal distribution, the introduction of distributional assumptions for sub-group analyses would be inconsequent.[138]

The approach of *Henseler/Ringle/Sinkovics* (2009) relies on the observed distribution derived from the outcome of the bootstrapping procedures. The following equation allows hypotheses to be tested to verify the probability of differences in parameters between two sub-groups:

$$p\left(b^{(1)} > b^{(2)} \middle| \beta^{(1)} \leq \beta^{(2)}\right) = 1 - \sum_{\forall j,i} \frac{\Theta(2\bar{b}^{(1)} - b_j^{(1)} - 2\bar{b}^{(2)} + b_i^{(2)})}{J^2}$$

In this equation, b denotes the parameter estimates, i.e., the path coefficients, β the true population parameters, Θ the unit step function, and J the number of bootstrap samples. Superscripts in parentheses mark the respective sub-group; overlines indicate mean values.

In line with prior explanations related to hypotheses testing, significant sub-group differences can be assumed if the p-value is below 0.05. Furthermore, the sum

133 Ref. *Qureshi/Compeau* (2009), p. 199.
134 Ref. *Plouffe/Vandenbosch/Hulland* (2001), p. 75f.
135 Ref. *Henseler/Ringle/Sinkovics* (2009), p. 308f.
136 E.g., *Hartmann/Slapničar* (2009), p. 733; *Keil et al.* (2000), p. 312-315.
137 Selected sub-group analyses applying the approach using a t-test to cross-check the results of the study show no material differences.
138 Ref. *Henseler/Ringle/Sinkovics* (2009), p. 283.

on the right side of the equation can be interpreted as the probability that the path coefficient of the second group is larger than that of the first group.

C Business orientation of management accountants

Part C of the thesis addresses the first research question about business orientation of management accountants. The analysis intends to provide evidence for reasons why management accountants act in a business-oriented way as well as for possible results of management accountants' business orientation. In this regard, the first chapter aims at reviewing related literature to develop the theoretical basis, formulating the hypotheses, and describing the constructs employed in the derived research model. The second chapter of this part presents corresponding results and findings. It contains descriptions on this part's main research model, on an alternative model, and on selected procedures for assessing the robustness of the results.

1 Related literature, hypotheses, and constructs

1.1 Literature on business orientation of management accountants

Management accountants have always been placed in a service role within organizations. The seminal classification introduced by *Simon et al.* (1954) assigned them the responsibility to provide information for score keeping, attention directing, and problem solving. Probably by the 1980s, the emphasis lay in score keeping and maintaining the financial database systems, often negatively labeled as 'number crunching'.[139] In the last few decades, management accounting as well as the roles of management accountants have undergone dynamic changes. The priorities with regard to score keeping decreased and far more time and resources were devoted to business-oriented tasks and responsibilities.[140]

The trend toward business orientation and business partnering comes along with several external and internal developments. The key drivers mentioned in literature and business practice embrace the changing market conditions exemplarily triggered by globalization, increased business complexity, new management philosophies, organizational re-design and restructuring initiatives like the bundling of tasks in shared service centers, or even myths about potential positive effects disseminated by several

[139] Ref. *Newman/Smart/Vertinsky* (1989), p. 136.

[140] Ref. *Burns/Baldvinsdottir* (2005), p. 726; *Colton* (2001); *Friedman/Lyne* (1997); *Järvenpää* (2007); *Kaplan* (1995); *Regel* (2003); *Sathe* (1982); *Siegel/Sorensen* (1999); *Yazdifar/Tsamenyi* (2005).

interest groups.[141] Furthermore, especially the developments in IT systems create opportunities and enable management accountants to shift capacities toward business-oriented activities since transaction processing and calculations are increasingly automated.[142]

A substantial strand of literature addressed aspects on the business orientation of management accountants. The studies can be broadly distinguished into three streams: First, there are several normative style studies.[143] Second, there are empirical studies conducted in collaboration with or by professional (management) accounting organizations that have been published in corresponding professional journals or as research reports.[144] Third, there are numerous empirical papers published in academic journals on which I concentrate in the following literature review.[145]

Normative studies

Exemplarily for the first stream is the normative work of *Kaplan* (1995). The author claims that management accountants have to participate more in the formulation and implementation of strategy. He points out that information systems must be amended and designed by management accountants in order to satisfy the information needs of management. The systems should ensure that critical cost and performance information on activities, processes, products, services, and customers are provided.[146] Although the group of normative studies contributes by offering arguments for discussions in the field of the present research, they only offer their conceptual ideas or anecdotal evidence and do not test or verify their suggestions that business orientation of management accountants is beneficial.

Similar literature can also be found in German with a focus on management accounting practices in German-speaking countries. In particular, the International Group of Controlling, which is an organization of professional institutions and dominated by its members from German-speaking countries, formulates a mission state-

141 Ref. *Burns/Baldvinsdottir* (2005), p. 726.
142 Ref. *Caglio* (2003); *Granlund/Malmi* (2002).
143 E.g., *Colton* (2001); *Kaplan* (1995); *Regel* (2003).
144 E.g., *Davis/McLaughlin* (2009a); *IBM* (2010); *Siegel/Sorensen* (1999); *Siegel/Sorensen/Richtermeyer* (2003a).
145 E.g., *Burns/Baldvinsdottir* (2005); *Byrne/Pierce* (2007); *Coad* (1999); *Granlund/Lukka* (1998); *Järvenpää* (2007); *Mouritsen* (1996).
146 Ref. *Kaplan* (1995), p. 6.

ment as the general objective of management accountants' activities. *Weber/Schäffer* (2008), p. 19, reprint the German statement in English and formulate that management accountants "design and accompany the management process of defining goals, planning and controlling and thus have a joint responsibility with management to reach their objectives." This general mission statement, which is derived from business practices and also applied in a number of organizations[147], reflects changes in the finance function and, in particular, the growing demand for a business-oriented behavior of management accountants.[148]

Empirical studies (professional organizations)

Examples for the second stream of literature are the studies of *Siegel/Sorensen* (1999) and *Davis/McLaughlin* (2009a). The study by *Siegel/Sorensen* (1999) reports findings of a large-scale telephone interview survey with 300 management accountants who are members of the Institute of Management Accountants or of the American Institute of Certified Public Accountants. The researchers address the tasks of management accountants and focus on possible developments in a five-year period at the end of the 1990s. Their results show various changes in the profession. In particular, management accountants spend more time on analyzing data and participating in decision-making processes, shift more capacities toward non-traditional accounting tasks like strategic planning, internal consulting, or process improvement, and increasingly hold leadership roles in cross-functional teams. Thus, they are able to provide more value to the company and have an improved image. Furthermore, the authors report the emergence of the business partner role of management accountants triggered by the demands of internal customers.

Pursuing those findings, the recent study of *Davis/McLaughlin* (2009a) including senior financial executives of 112 Fortune 1,000 companies investigates the possible trade-off between a business-oriented role of the finance function and the need to remain independent. According to their results, the professionals assume that the finance function can basically satisfy both requirements. For their analysis, the authors employ the involvement of the finance function in decision making as an indicator for business partnering. Their results show a high degree of business partnering in broad

147 E.g., *Lutz* (2007), p. 104. Similarly, for instance, *Ernst/Mißler/Vater* (2008), p. 148-151; *Schwarz* (2008), p. 122; *Steinke* (2008), p. 142.

148 Ref. *Michel* (2006); *Schmidt* (2008).

areas, especially on senior level. Regardless the fact that some sub-functions of the finance function, such as management accounting, have better opportunities for business partnering than others, such as risk management, the results exhibit wide variations regarding the extent of business partnering. Although they discover high levels of business orientation, the authors conclude that the level of business partnering is not always optimal. In this context, they also note a partial lack of awareness regarding the opportunities for business partnering and its potential effects.

Empirical studies (academic)

The third stream of literature encompasses work published in academic journals. The identified relevant papers follow an empirical research approach employing survey-based[149] and case-based or interview-based[150] research.

Based on a comprehensive survey with 370 heads of management accounting departments in Denmark, *Mouritsen* (1996) shows that providing information is not the only responsibility of management accountants. He claims a trend toward business orientation and, in particular, a higher variation in tasks; in this regard, he distinguishes five different categories of management accountants' activities: Bookkeeping, consulting, banking, controlling, and administrating. He concludes that the work of management accountants is more influenced by interactions with general managers and other line functions instead of being determined by external factors like environmental uncertainty or production mode trends.[151] Furthermore, the study illustrates that management accounting departments favor specific roles and that this impacts the activities of management accountants. For instance, management accounting departments with an emphasis on consulting tasks generally participate more intensively in the organization's operational activities than those who do not stress this task.

Whereas the study of *Mouritsen* (1996) addresses the variation of management accountants' tasks and offers evidence for the existence of the role as internal consultant, the study of *Coad* (1999) focuses on a lack of matching between the claim that the management accountant becomes an internal consultant and the corresponding motivational and behavioral patterns. He especially addresses two variants of goal orientation

149 E.g., *Mouritsen* (1996); *Coad* (1999); *Yazdifar/Tsamenyi* (2005).

150 E.g., *Granlund/Lukka* (1998); *Burns/Baldvinsdottir* (2005); *Byrne/Pierce* (2007); *Järvenpää* (2007).

151 Ref. *Mouritsen* (1996), p. 295.

of management accountants: Learning and performance goal orientation. Whereas individuals with a learning goal orientation typically have an intrinsic interest in their work and intend to improve their competencies, individuals with a performance goal orientation act to achieve a positive evaluation from superiors or important others.[152] In 1997, he surveyed management accountants in the UK and reveals in his study that management accountants who possess or are able to develop a learning goal orientation are more likely to become proactive internal business consultants or business partners than management accountants with a performance goal orientation. In particular, performance goal orientation prevents management accountants from becoming proactive. Furthermore, he adds aspects on leadership to his research and finds that goal orientation of management accountants is influenced by the behavior of the management accountants' superiors.

The transition of the roles of management accountants in Finland is in scope of the study from *Granlund/Lukka* (1998). In their field study with six Finnish corporations in the mid 1990s they find an expansion of the management accountants' job descriptions with an increasing emphasis on advisory tasks, higher business orientation, and closer connections to the management team of the organization. The authors highlight the importance of national culture on the roles of management accountants as well as the link between business orientation and decision making in organizations. As an indicator for the transformation toward increasing business orientation, they identify an increasing importance of management accountants in decision making.

The change of management accountants' roles over a specific time period is in the focus of the study of *Burns/Baldvinsdottir* (2005). To capture possible changes, the authors conducted a longitudinal case study with a UK manufacturing division of a multinational pharmaceuticals organization in the late 1990s. They analyze when, why, and who changed the roles of management accountants in this organization. Similar to the results of *Mouritsen* (1996), their analysis reveals a change of the management accountants' roles toward 'hybrid accountants', management accountants with accounting knowledge and business awareness, which was foremost driven by an organizational restructuring initiative triggered by changing business conditions.

[152] Ref. *Coad* (1999), p. 110f.

Possessing sound business knowledge is a prerequisite for business orientation. This was one of the essential findings from *Byrne/Pierce* (2007) who conducted 36 interviews by the end of 2004 with financial and operational managers in Irish manufacturing corporations. The authors reveal that management accountants' specific knowledge positively impacts the interaction between the two groups. Furthermore, such capabilities enhance decision-making processes and affect the degree of influence of management accountants on business results.

The recent study of *Järvenpää* (2007) reports findings from a comprehensive longitudinal case study on the making of business partners. Based on observations from 1992 to 2001, the author derives a framework covering a set of interventions conducted to trigger change toward a business orientation of the management accounting culture in a Finnish company. His results suggest that informal interventions – besides formal interventions such as changes in the organizational structure or the implementation of new accounting systems – are of great importance for a change in management accounting culture. In this respect, he points out the importance of paying attention by top management, role modeling, and storytelling in order to induce such a change of organizational culture.

To sum up this literature overview, it becomes evident that research on business orientation or on the business partner role of management accountants is still fragmented. However, to accentuate the main similarities it can be concluded that there is a trend toward a higher variation of management accountants' tasks and a partial shift of capacities toward non-traditional accounting tasks. Furthermore, an increased internal customer orientation of management accountants can be noted, especially regarding the provision of information that is critical for management. Sufficient business knowledge, appropriate organizational structures, and adequate accounting systems are among the important enablers and prerequisites for a business orientation of management accountants. Finally, the required changes should also be triggered and supported by top management to achieve a sustainable change in management accounting culture.

Apart from the previous aspects, the quintessence of business orientation and business partnering is the proactive involvement of management accountants in strategic and operational decision making. Management accountants who act as business partners are respected members in teams that are in charge of important decisions and

exhibit the willingness as well as the ability to contribute more value to their organization.[153] To sum up, management accountants in their role as business partners are supposed to have solid competencies in (management) accounting, have sound business knowledge, and act on par with general managers.

Furthermore, gaps in prior results support the need to investigate the topics represented in the research question. For instance, previous work addressed reasons and characteristics of business orientation. However, except for the early study of *Coad* (1999), there still remains a lack of knowledge regarding reasons for individual management accountants acting as business partners. Additionally, whereas the study of *Järvenpää* (2007) analyzed the process of creating a business partner culture for management accountants, it remains unclear what the result of management accountants' business orientation is.

1.2 Hypotheses development and research model

The research question aims firstly at the reasons for management accountants to act as business partners and secondly on the impact of such behavior on management accountants' contribution. To answer the first aspect on reasons for management accountants to act as business partners, I especially rely on the thoughts of the theory of reasoned action. In order to answer the second aspect, I expand the theoretical model to derive a more comprehensive research model.

Theory of reasoned action

The theory of reasoned action[154], which serves as a focal basis to derive the hypotheses, is designed to predict and explain the behavior of individuals in specific contexts. The validity of the theory and its extensions has been supported by a broad strand of research in various academic disciplines.[155] However, there have only been a few applications in an accounting context so far.[156]

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153 Ref. *Järvenpää* (2007), p. 100; *Siegel/Sorensen* (1999), p. 5.

154 Ref. *Ajzen/Fishbein* (1980); *Fishbein/Ajzen* (1975).

155 Prior research addressed, for instance, voting behavior (*Bowman/Fishbein* (1978)), abortion decisions (*Smetana/Adler* (1980)), or drug use (*Pomazal/Brown* (1977)). The meta analysis of *Sheppard/Hartwick/Warshjaw* (1988), p. 332-335, also offers an over-

The core idea of the theory of reasoned action is that the behavior of an individual is a function of its intentions. Intentions are, in turn, shaped by the individual's attitude and by subjective norms (ref. Figure C-1[157]). Attitude toward a certain behavior is determined by the individual's evaluation on performing the behavior. Whether positive or negative in nature, attitude captures the individual's beliefs concerning the consequences of its behavior. Subjective norms refer to the perceived social pressure that the individual is exposed to when performing or not performing a certain behavior. This aspect especially applies to the perceived social pressure originating from people who are important to the individual.[158]

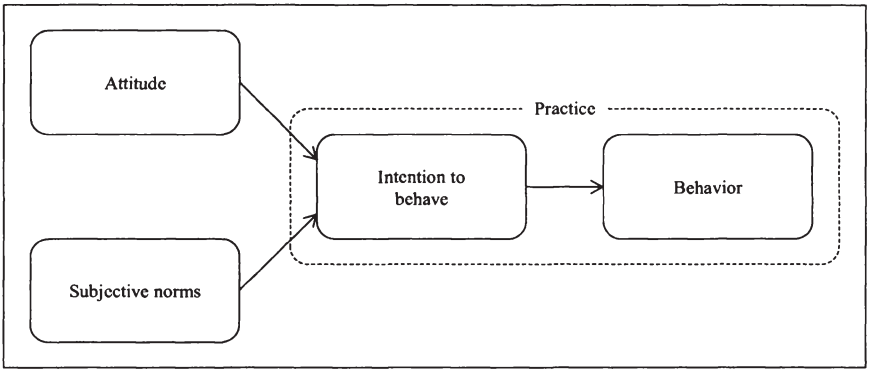

Figure C-1: Theory of reasoned action

The present research especially addresses behaviors and actions of management accountants from an ex-post perspective. Consequently, intentions are of reduced importance compared to the actual practice of acting in a business-oriented way reflecting the strong association between the two constructs. The strong association between behavior and intentions as its immediate antecedent is confirmed by meta analy-

view of behaviors which have been examined in prior research relying on the theory of reasoned action.

156 E.g., *Bobek/Hatfield* (2003); *Dowling* (2009); *Hanno/Violette* (1996); *Uddin/Gillet* (2002).

157 Adapted from *Ajzen* (1988), p. 118.

158 Ref. *Ajzen* (1988), p. 116-122; *Fishbein/Ajzen* (1975), p. 301-303.

tic evidence[159] as well as several single research activities in an accounting[160] or non-accounting[161] context.[162] Against this background and in line with prior literature, I omit aspects on intentions in my research and use the construct "Practice" as proxy for the actual behavior of management accountants acting in a business-oriented way.

Hypotheses

The theoretical basis offers two determinants for the practice of management accountants acting in a business-oriented way: Attitude and subjective norms. The attitude of an individual is influenced by his or her beliefs embracing, for instance, opinion, knowledge, or stereotypes.[163] As described earlier, academic research, publications in professional journals, and communications of diverse interest groups postulate the positive outcome of a business orientation of management accountants. As a result, the postulated aspects might also change the beliefs and the attitude of management accountants, at least in a medium-range perspective. In this regard, management accountants who believe that acting as business partners leads to positive effects, for example, enhanced managerial decisions or performance, are more likely to have a more positive attitude toward this trend. Consequently, it can be expected that management accountants with such a positive attitude will be more likely to pronounce business-oriented activities.

This idea is also supported by the findings from *Coad* (1999) who reports that management accountants possessing a learning goal orientation are more likely to act as internal business consultants than management accountants with a performance goal orientation. If management accountants with such an emphasis on a learning goal orientation encounter the trend toward business orientation and the advocated positive outcome, they are likely to adapt their behavior and act more like a business partner because this adaption satisfies their needs for increasing competencies.[164] Thus, current trends in management accounting will presumably enforce the management ac-

159 E.g., *Kim/Hunter* (1993); *Sheppard/Hartwick/Warshjaw* (1988).
160 E.g., *Hanno/Violette* (1996), p. 65.
161 E.g., *Venkatesh/Davis* (2000).
162 Ref. *Ajzen* (2002), p. 107; *Ajzen* (1988), p. 113f.
163 Ref. *Fishbein/Ajzen* (1975), p. 13.
164 Ref. *Oliver/Bearden* (1985).

countants' attitude toward acting as business partners and will subsequently change their behavior. This argumentation leads to the first hypothesis:

H1: The more positive the attitude toward acting as a business partner, the more pronounced the practice of acting as a business partner.

Besides the individual's attitude, the underlying theory posits the subjective norm as the second determinant toward practice. Foremost, the individual's perception of whether people who are important to him or her approve or disapprove of a specific behavior impacts the individual's behavioral intention and practice.[165] This subjective norm might influence the behavior of the individual since he or she might behave accordingly even though he or she does not expect that the pursued goals will be achieved with the specific behavior.

Important persons for management accountants are, for example, the CFO, line managers, or the CEO of the organization. While the importance of CFOs and their role in changes in the management accounting systems has only recently attracted research activities[166], a broad strand of literature on the role and the importance of CEOs and other senior managers already exists.[167] Nevertheless, the importance of these groups to management accountants should be beyond question.

This reasoning leads to the conclusion that those management accountants, who perceive that a subjective norm on the importance of acting in this way is set by important others, are more likely to act as business partners. Consequently, I derive the second hypothesis as follows:

H2: The stronger the perceived subjective norm for acting as a business partner, the more pronounced the practice of acting as a business partner.

The rationale for management accountants acting as business partners is to increase the benefits of their activities. In particular, *Siegel/Sorensen* (1999), p. 6, claim

165 Ref. *Fishbein/Ajzen* (1975), p. 302.
166 E.g., *Baxter/Chua* (2008); *Naranjo-Gil/Maas/Hartmann* (2009).
167 Ref. *Carpenter/Geletkanycz/Sanders* (2004); *Hambrick/Mason* (1984).

that management accountants possessing enlarged responsibilities and occupying wider roles contribute more strongly to the organization and support the enhancement of decision-making processes. *Byrne/Pierce* (2007) support this notion as they postulate a positive effect of an enhanced business knowledge of management accountants on decision-making processes and an influence of management accountants on business results.

One of the prerequisites of the enlarged responsibilities and wider roles mentioned above is the advancement of IT systems that enable management accountants to shift capacities.[168] Released capacities allow management accountants to put more emphasis on a deeper analysis instead of the compilation and calculation of data as well as on enhanced recommendations based on relevant information which, in turn, should subsequently lead to improved performance. A higher degree of participation in the managerial decision-making processes, which should come along with a higher business orientation, also enables management accountants to carry out faster analysis. If they are involved in the development of decision opportunities, they can offer an earlier analysis.

Further support for this argumentation is provided by the thoughts of the resource-based view.[169] Capable management accountants – i.e., business partners – are typically the sole or an important provider of information required by the management and, therefore, are presumably able to add value to the firm. Management requires this information which might be a basis for better decisions and which represents a possible source of competitive advantage.

Hence, the third hypothesis summarizes the argumentation as follows:

H3: The more pronounced the practice of acting as a business partner, the higher the contribution of management accountants.

Research model

In summary, I argue that a higher business orientation of management accountants is deemed to be beneficial to organizations. More specifically, I derive a research model

168 Ref. *Granlund/Malmi* (2002).

169 E.g., *Barney* (1991).

embracing two elements: First, I address the actions and activities of management accountants. Based on the theory of reasoned action, I postulate that the practice of acting as a business partner is influenced by the attitude and subjective norms perceived by management accountants. Second, I focus on the impact of business orientation and argue that business orientation will result in a higher contribution of management accountants. Figure C-2 provides a summary of this theoretical argumentation and corresponding hypotheses.

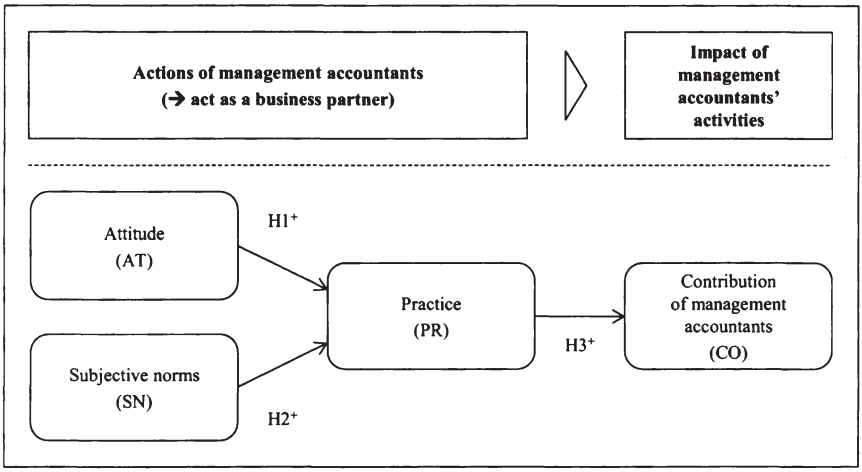

Figure C-2: Research model

1.3 Operationalization of constructs

The research model depicted in Figure C-2 contains four constructs to measure the respective theoretical concepts. I intended to draw upon existing instruments that have been used for empirical research in the past and have shown sufficient reliability and validity. Although having reviewed relevant literature carefully, I could not find appropriate and pre-validated scales to measure the constructs fitting to the research context. Thus, I generated new scales based on prior literature that should be better suited to the present research than other constructs and should also foster the scientific pro-

gress in the specific field of research.[170] I apply a six-point rating scale with 1, "Do not agree at all", and 6, "Totally agree", as anchors for all constructs.

As mentioned in Section 2.1 of Part B, prior research typically applied reflective measurement models for constructs on aspects related to attitudes or intentions.[171] In line with previous studies and reflecting the criteria of *Jarvis/Mackenzie/Podsakoff* (2003), p. 202f., which have also been introduced in Part B, I apply reflective measurement models for all constructs of the study.

Constructs "Attitude (AT)", "Subjective norms (SN)", and "Practice (PR)"

I rely on the recommendations of *Ajzen* (2006) to develop new scales related to the theory of reasoned action. In this regard, I reviewed the literature described earlier in the thesis to derive three scales with two items. Due to the intimate link between business orientation of management accountants and managerial decision making, I placed emphasis on the participation of management accountants in decision-making processes for the operationalization.[172] Attitudes of individuals focus on how individuals assess a specific behavior. In consequence, to measure the construct "Attitude (AT)", I asked the respondents how they evaluate a possible involvement of management accountants in decisions of general managers in terms of attractiveness and expedience. Subjective norms capture aspects which are expected of the individual. Thus, with the corresponding instrument "Subjective norms (SN)" I asked the management accountants whether general managers appreciate and expect an involvement of management accountants in decision making. Since the construct "Practice (PR)" reflects the actual behavior of individuals, I incorporated aspects of the effective participation and of the frequency of an involvement of management accountants in decision making in this construct. Table C-1 offers full details on item formulation as well as corresponding item codes of the three constructs.

170 Ref. *Kwok/Sharp* (1998), p. 156f.
171 Ref. *Jarvis/Mackenzie/Podsakoff* (2003), p. 200f.
172 Similarly, *Davis/McLaughlin* (2009a), p. 37; *Sathe* (1983), p. 31.

Label	Item
AT – Attitude	
AT_1	I assess it as very attractive to be involved in the decisions of general managers
AT_2	I assess it as expedient to be involved in the decisions of general managers
SN – Subjective norms	
SN_1	I assume that general managers would appreciate it if I were involved in their decision making
SN_2	General managers expect me to get involved in their decision making
PR – Practice	
PR_1	I effectively participate in the decision making of general managers
PR_2	I frequently get involved in the decision making of general managers

Notes:
6-point rating scale; anchors: 1 – Do not agree at all; 6 – Totally agree

Table C-1: Item formulation – "Attitude", "Subjective norms", and "Practice"

Construct "Contribution of management accountants (CO)"

To measure the construct "Contribution of management accountants (CO)", I basically rely on the underlying work of *Huselid* (1995), p. 637, who draws on the seminal work of *Barney* (1991). Whereas *Huselid* (1995) addressed the contribution of HR practices on corporate performance, I adapted his thoughts to my research setting and derived a three-item measure that especially focuses on the outcome of management accountants' activities. For item formulation, I devoted special attention to the impact of information provided by management accountants as well as to managerial decision making.[173] Details on item formulation and corresponding item codes are presented in Table C-2.

[173] Ref. *Sathe* (1983), p. 31.

Label	Item
CO – Contribution of management accountants	
CO_1	The group of management accountants makes a distinct contribution to our corporation's performance
CO_2	Information provided by the group of management accountants makes a significant contribution to support general managers
CO_3	Information from management accountants is acknowledged as a source of competitive advantage

Notes:
6-point rating scale; anchors: 1 – Do not agree at all; 6 – Totally agree

Table C-2: Item formulation – "Contribution of management accountants"

2 Results

In the following Chapter 2 of Part C I present the results to answer the first research question. The first section comprises the results of the main research model and the following Section 2.2 the results of an alternative model for additional analyses. The distinctive feature between the main research model and the alternative model is the applied data set. Whereas the main research model is based on the full dyadic data, the alternative model is based on the MA data set. Section 2.3 addresses procedures to check the robustness of the results.

2.1 Results of main research model

2.1.1 Results of measurement models

The first research question is on business orientation of management accountants. This subsection offers details on the assessment of the measurement models. In this regard, management accountants assess the constructs on attitude, subjective norms, and practice; general managers evaluate the construct on the contribution of management accountants. The results of the structural model and especially the tests of the hypotheses are presented in the subsequent subsection.

Content validity

According to the structure introduced in Section 2.2 of Part B of the thesis, content validity will be assessed first. In addition to thorough construct development and pre-

test procedures, exploratory factor analyses (principal component analysis) are suggested for assessing content validity. Results of the factor analysis are satisfactory for all constructs for the research model introduced in the previous chapter indicating sound content validity. In particular, eigenvalues are larger than the recommend level of one and variance explained exceeds the 50%-level for all constructs. Table C-3 offers corresponding details of the factor analyses.

Construct	Eigenvalue	Variance explained (percentage)
Attitude	1.670	83.51%
Subjective norms	1.900	95.01%
Practice	1.831	91.55%
Contribution of management accountants	2.083	69.43%

Table C-3: Results of exploratory factor analyses

Item reliability and convergent validity

Standardized factor loadings of the constructs are employed to assess item or indicator reliability. Results (0.784-0.976) show that the minimum recommendation of 0.7 is exceeded in all cases indicating adequate item reliability.

Data also exhibits satisfying results on convergent validity indicating that each item of the constructs strongly correlates with its own construct. The results are satisfactory since all relevant criteria – *Cronbach*'s alpha (CA), the composite reliability (CR) measure, and average variance extracted (AVE) statistics – are met (CA = 0.947-0.780 > 0.7; CR = 0.974-0.871 > 0.6; AVE = 0.950-0.692 > 0.5). Corresponding details and additional statistics like mean values, standard deviations, and a relative frequency distribution of the respondents' answers are presented in Table C-4.

Item		Mean	Std. dev.	Factor loading	Relative frequency distribution (%)					
					1	2	3	4	5	6
AT – Attitude										
AT_1		5.438	0.668	0.882	0.00%	0.00%	1.79%	4.46%	41.96%	51.79%
AT_2		5.464	0.629	0.941	0.00%	0.00%	0.00%	7.14%	39.29%	53.57%
CA	0.803									
CR	0.908									
AVE	0.832									
SN – Subjective norms										
SN_1		4.509	1.040	0.976	1.79%	1.79%	10.71%	29.46%	41.96%	14.29%
SN_2		4.455	1.146	0.974	1.79%	3.57%	14.29%	25.00%	38.39%	16.96%
CA	0.947									
CR	0.974									
AVE	0.950									
PR – Practice										
PR_1		4.759	1.109	0.959	1.79%	2.68%	7.14%	20.54%	41.96%	25.89%
PR_2		4.545	1.200	0.954	0.89%	5.36%	12.50%	25.89%	30.36%	25.00%
CA	0.908									
CR	0.956									
AVE	0.915									
CO – Contribution of management accountants										
CO_1		4.696	0.928	0.878	0.00%	2.68%	7.14%	25.00%	48.21%	16.96%
CO_2		4.813	0.844	0.831	0.89%	0.00%	5.36%	21.43%	55.36%	16.96%
CO_3		3.777	1.168	0.784	2.68%	13.39%	20.54%	34.82%	24.11%	4.46%
CA	0.780									
CR	0.871									
AVE	0.692									

Notes:
N = 112
6-point rating scale; anchors: 1 – Do not agree at all; 6 – Totally agree
CA – Cronbach's alpha; CR – Composite reliability; AVE – Average variance extracted

Table C-4: Construct assessment

Discriminant validity

To capture discriminant validity on construct level, I employ the *Fornell/Larcker*-criterion and for the assessment on indicator level, I evaluate cross-loadings. Table C-5

shows the correlation matrix and the square roots of AVE statistics. Discriminant validity on construct level can be assumed since the correlations between constructs are always lower than the two respective square roots of AVE statistics. According to the assessment of cross-loadings, discriminant validity can also be assumed on indicator level. Table C-6 exhibits that no item loads more highly on another construct than on the construct it intends to measure.

Construct		1	2	3	4
1	Attitude	*0.912*			
2	Subjective norms	0.326	*0.975*		
3	Practice	0.334	0.711	*0.957*	
4	Contribution of management accountants	0.088	0.314	0.206	*0.832*

Notes:
Diagonal elements are the square roots of average variance extracted statistics. Off-diagonal elements are the correlations between constructs

Table C-5: Construct correlations and square roots of AVE statistics

Item	1	2	3	4
1 – AT – Attitude				
AT_1	*0.882*	0.253	0.249	0.036
AT_2	*0.941*	0.331	0.346	0.113
2 – SN – Subjective norms				
SN_1	0.348	*0.976*	0.706	0.282
SN_2	0.286	*0.974*	0.679	0.332
3 – PR – Practice				
PR_1	0.355	0.695	*0.959*	0.192
PR_2	0.281	0.664	*0.954*	0.201
4 – CO – Contribution of management accountants				
CO_1	0.072	0.293	0.203	*0.878*
CO_2	0.154	0.232	0.159	*0.831*
CO_3	-0.014	0.255	0.142	*0.784*

Notes:
N = 112

Table C-6: Cross-loadings of constructs

Overall, the results of the construct assessment procedures exhibit sound operationalization and indicate no limitations for further analyses of the structural model.

2.1.2 Results of structural model

In the following, I present the results and a discussion of the assessment of the structural model. According to the criteria introduced in Part B to assess structural models, I rely on multiple squared correlations (R^2), path coefficients, effect sizes (f^2), and predictive relevance (Q^2). The results of my analysis are provided in Figure C-3 and described in the next paragraphs.

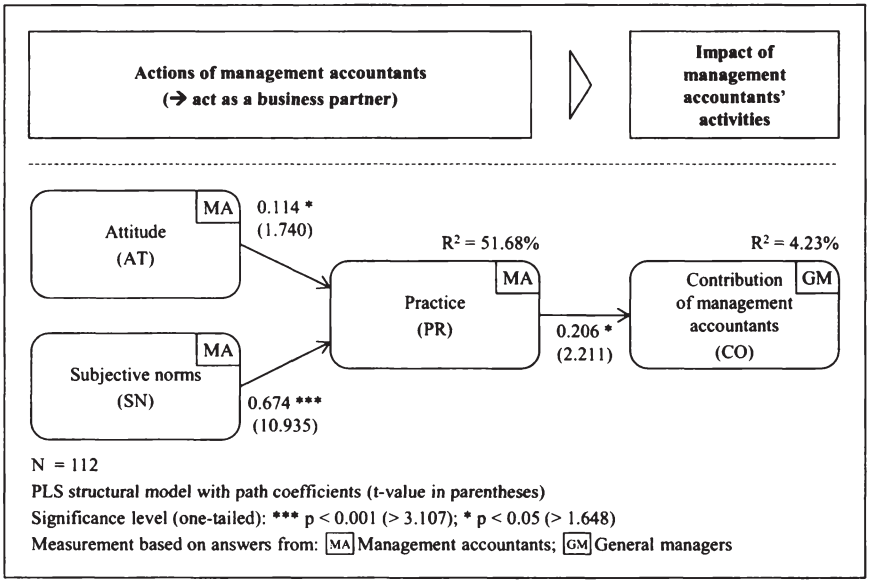

Figure C-3: Results of structural model analysis – main research model

Multiple squared correlations (R^2)

Multiple squared correlations, i.e., the R^2 value of a dependent construct, belong to the focal measures of the PLS approach. R^2 statistics of the research model are 51.68% for the construct "Practice" and 4.23% for the construct "Contribution of management ac-

countants". According to the categorization of *Chin* (1998a), p. 323, the first amount can be almost assessed as being substantial. It reflects that the two constructs "Attitude" and "Subjective norms" explain changes of the construct "Practice" to a relatively large extent. The R^2 value of the construct "Contribution of management accountants" is relatively low and indicates, at least from this perspective, that a trend toward business partnering does not explain changes of the contribution of management accountants to a large degree. A possible explanation might be that the construct "Practice" is especially linked to the self-conception of management accountants and that the contribution of management accountants is not only influenced from self-conception; contribution will probably also depend on how management accounting instruments, concepts, or processes are implemented. Nevertheless, the results can be evaluated as satisfactory since especially the research design can influence the R^2 value. In this regard, it must be reflected that there is only one construct explaining the construct "Contribution of management accountants" which might be an explanation for the relatively low value.

Path coefficients

Standardized β-statistics used as path coefficients – assessed in terms of sign, magnitude, and significance – are employed for hypotheses testing. Significances are determined by respective t-values that are derived from non-parametric resampling procedures[174]. The results of the hypothesis tests reveal that for all relationships the postulated sign matches the derived sign and that the path coefficients show significant relations. In particular, my first hypothesis predicted a positive effect of management accountants' attitude toward business partnering on the practice of acting as a business partner. The empirical data supports this hypothesis (H1: path coefficient = 0.114; t-value = 1.740; $p < 0.05$). The second hypothesis links the perceived subjective norms with the practice of acting as a business partner. My obtained empirical data allows me to corroborate the hypothesis as well (H2: path coefficient = 0.674; t-value = 10.935; $p < 0.001$). The third hypothesis proposes an association between the practice of acting as a business partner and contribution of management accountants. Reflecting the results, I am also able to confirm this hypothesis (H3: path coefficient = 0.206; t-

[174] Bootstrapping: 500 samples with replacement; cases: 112.

value = 2.211; $p < 0.05$). The results of the hypothesis tests are satisfactory since the results are consistent with the expectations and all hypotheses can be corroborated.

Effect sizes (f^2)

Effect sizes (f^2) can be calculated for the relations between the constructs "Attitude" and "Practice" as well as between the constructs "Subjective norms" and "Practice" to determine which of the independent constructs has a substantial impact on the dependent construct. Reflecting *Chin* (1998a), p. 316f., the effect size between "Attitude" and "Practice" can be evaluated as small (f^2 = (0.517-0.505)/(1-0.517) = 0.024) and the effect of "Subjective norms" on "Practice" as very strong (f^2 = (0.517-0.112)/(1-0.517) = 0.838). Thus, the results on effect sizes are consistent with the hypothesis tests as they reveal a comparatively stronger effect of subjective norms to act as a business partner than of attitude to act as a business partner.

Predictive relevance (Q^2)

The *Stone-Geisser*-test-criterion redundancy Q^2 offers information to what extent the data set can be reconstructed by the structural model and the parameters. Derived by the application of blindfolding procedures, redundancy Q^2 amounts of my study indicate predictive relevance since they are all larger than zero (PR: 0.438; CO: 0.187).

Discussion of results

The results of my analyses confirm that business orientation should be assessed as being positive and support the claim that business partnering has a positive effect for organizations. My analyses also suggest that business orientation is foremost influenced by the subjective norms perceived by management accountants. Attitude of management accountants has a statistically weaker impact on the decision whether to act or not to act as a business partner compared to subjective norms.

Linking my results with the findings of *Coad* (1999) on goal orientation of management accountants, it becomes evident that the results of the present analyses do only partly support his findings. Two aspects are of special interest: First, he reports that leadership style affects the goal orientation of management accountants. Since leadership style is expected to influence the subjective norms considerably, the results confirm his findings. Second, *Coad* (1999) also argues that a learning goal orientation

of management accountants – which is associated with intrinsic work interests of management accountants and with the intentions of management accountants to improve their competencies – positively influences the practice of acting in a business-oriented way. Assuming that learning goal orientation of management accountants is intimately linked with the attitudes of management accountants, the present results cannot reaffirm prior findings. In contrast, the findings are more connected with a performance goal orientation of management accountants which describes that individuals behave in such way to achieve a positive evaluation by superiors or important others. Thus, my results are rather the opposite than *Coad*'s (1999) findings who also argues that performance goal orientation might even prevent management accountants from becoming proactive. Against this background, future research activities could integrate the goal orientation of management accountants in the proposed research model to achieve a deeper understanding of the links between goal orientation, attitude, and the practice of business partnering.

Role theory[175] also offers possible explanations why the behavior of management accountants is mainly influenced by subjective norms. This theory, which has been recently employed in a similar context by *Byrne/Pierce* (2007), posits that individuals in organizations possess specific roles and tend to behave accordingly. Form and interpretation of the roles are especially determined by internal and external expectations and foremost by other members of the organization, so-called role senders. Furthermore, the expectations of those role senders, for instance, general managers or the CFO for management accountants, also influence the attitudes of individuals. Such argumentation would be in line with my findings that the practice of acting as a business partner is influenced by subjective norms and that a possible change in individual's attitude might be linked with subjective norms.

In the context of role theory, *Weber/Schäffer* (2008), p. 85-88, report a trend toward role-making, in contrast to role-taking, for management accountants. Role-making refers to situations in which individuals, for example, management accountants, are able to determine their tasks themselves whereas role-taking refers to situations in which individuals are directed from others, for example, general managers.[176] However, this argumentation is not contrary to the present results since role-making

[175] Ref. *Kahn et al.* (1964); *Katz/Kahn* (1978).

[176] Ref. *Weber/Schäffer* (2008), p. 85, and the underlying work of *Katz/Kahn* (1978), p. 195-197 and 219, and *Turner* (1962), p. 21f.

does not exclude that a specific behavior of management accountants is driven by their attitudes or by subjective norms.

Furthermore, it may be speculated whether management accountants, albeit communicating this aspect in a different way, may not want to become a business partner.[177] Critics argue that business orientation and involvement in managerial decision making could lead to a decrease in the independence of management accountants and a reduced objectivity of the information provided.[178] In contrast, *Davis/McLaughlin* (2009a) also address this possible threat and conclude that senior finance professionals do not assume that business orientation could result in a conflict with the independence of the finance function. However, the findings by *Burns/Baldvinsdottir* (2005), p. 749, might offer support for this speculation. They reveal that, with an enhanced business orientation, management accountants will also be more involved in cross-functional teams which implies that they may enter unfamiliar terrains, especially in terms of expertise and persons, in which they might not always be welcome. This would also be in line with *Lischeron/Wall* (1975), p. 502, who especially identify two reasons for a reduced participation of individuals in higher level decisions. On the one hand, they mention a lack of interest in participating by individuals; on the other hand, they refer to a possible lack of support by management. As consequence, management accountants might stick – consciously or unconsciously – to their 'traditional' attitude and behavior.

2.2 Results of an alternative research model

The present research might be linked with a stream of literature on perception gaps between preparers and users of management accounting information that attracted interest in recent management accounting research.[179] This stream focuses on heterogeneous assessments between preparers – management accountants – and corresponding users – general managers – of management accounting information or services.

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177 A possible explanation for such behavior is social desirability which describes tendencies of respondents to present themselves in a favorable position with regard to social norms, ref. *Podsakoff et al.* (2003), p. 882f.

178 Ref. *Indjejikian/Matějka* (2006); *Siegel* (2000).

179 Ref. *Bruns/McKinnon* (1993); *Pierce/O'Dea* (2003); *Weißenberger/Angelkort/Holthoff* (2010).

Within the broad strand of research on user orientation of management information systems, the study of *Pierce/O'Dea* (2003) found that management accountants assess the quality of management accounting information better than managers. As potential reasons for the lack of a common understanding, the authors exemplarily stress on an imbalance between technical and organizational validity of the information or the need for a functional or hierarchical individualization of management accountants' services. Furthermore, the work of *Weißenberger/Angelkort/Holthoff* (2010) also offers evidence for a perception gap between management accountants and general managers. Their research reveals that managers assess the impact of a consistency of the financial language on the quality of management accountants' services higher than management accountants themselves.

With respect to the present research, the question might emerge if management accountants assess the impact of business orientation on contribution similar to general managers. Results of the main research model basically support the argumentation that business orientation is beneficial to organizations but the statistical effect, especially in terms of R^2, is relatively small. Similar to the approach of *Weißenberger/Angelkort/ Holthoff* (2010), a sub-group analysis should enhance the understanding of this aspect.

Sub-group analyses

In order to process the sub-group analysis, I also included the items on management accountants' contribution in the questionnaire administrated to the management accountants. Thus, I am able to assess the research model only with data collected from management accountants. For the analysis, I compare the main research model with an alternative model embracing data of the 160 management accountants (MA data set). This comparison allows to shed light on a possible sub-group difference. A difference can be especially expected for the relationship between the constructs "Practice" and "Contribution of management accountants" since the respondents of the alternative model and the main research model differ. Sub-group differences for the relations between the constructs "Attitude" and "Practice" as well as between "Subjective norms" and "Practice" are not expected since all three constructs are assessed by management accountants for both models. The only difference is that the main research model only

contains the answers of management accountants of those companies of which also a general manager participated in the study.[180]

The analysis of the measurement models focuses on item reliability and convergent validity. Table C-7 discloses the results of the assessment of the measurement models and indicates sufficient values in terms of reliability and validity for all constructs.

Construct	CA	CR	AVE
AT	0.807	0.910	0.835
SN	0.937	0.970	0.941
PR	0.887	0.946	0.898
CO	0.672	0.819	0.601
N		160	

Notes:
CA – Cronbach's alpha; CR – Composite reliability; AVE – Average variance extracted
Constructs: AT – Attitude; SN – Subjective norms; PR – Practice; CO – Contribution of management accountants

Table C-7: Construct assessment – alternative models

According to the procedures introduced in Part B of the study, sub-group analyses related to the assessment of structural models focus on the comparison of path coefficients and R^2 values as well as on selected tests for significant differences between the path coefficients. An overview of the results of the alternative model (in comparison with the main research model) is offered in Figure C-4.

[180] In addition to the procedures described in the following, I conducted the sub-group analysis with a fragment of the MA data set. In this data set only those companies are included which are also part of the dyadic data set (N = 112). However, the results qualitatively remain unchanged.

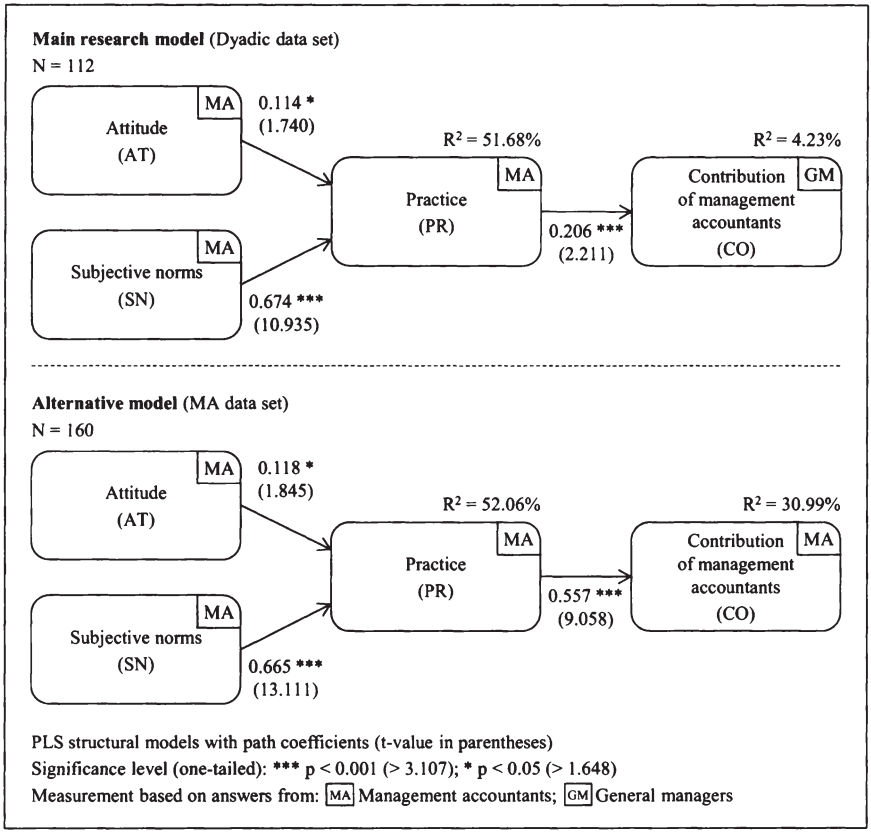

Figure C-4: Results of structural model analysis – comparison of main research model and alternative model

The assessment of the relationships between the constructs "Attitude" as well as "Subjective norms" and "Practice" initially confirms the prior presumption because they exhibit similar results in terms of path coefficients and R^2 values in both models. The results for the relationship between the constructs "Practice" and "Contribution of management accountants" reveal heterogeneous values. Both path coefficient and R^2 value are rather larger in the alternative model compared with the main research model signaling that management accountants assess the impact of the practice of acting as a business partner more positive than general managers.

This previous assessment can be supported by tests for significance of the differences of the path coefficients. The sub-group analysis shows a probability of 99.43% that the path coefficient in the alternative model is higher than in the main research model. Thus, the relationship in the alternative and the main research model are significantly different providing support for the initial expectation.

To conclude, the findings of the sub-group analysis suggest that management accountants assess the association between the practice of acting as business partners and the contribution of management accountants higher than general managers. A possible interpretation is that management accountants assume that their services are more important than general managers do. The interpretation would also be in line with *Pierce/ O'Dea* (2003), as already mentioned, who find that management accountants partly overstate the quality of information they provide. Thus, the results add further support for the discussion on the existence of perception gaps between preparers and users of management accounting services and for the call for future scholarly activities in this specific field.

Furthermore, the results should also lead to a rejection of the former speculation that management accountants might be reluctant to act as business partners.[181] If this would be the case, they would probably not assess the effect of business orientation on contribution in such positive way.

2.3 Robustness of results

For the evaluation of the robustness of the results, several influencing or contextual factors are integrated into the present research. Contingency thinking and the contingency approach basically describe that organizational effectiveness is influenced by various factors and that there is not one single optimal system or setting which fits to every organization.[182] In this regard, contingency factors might also influence the outcomes of the present analyses since a possible resulting impact on control processes and systems is also associated with effects on activities and roles of management accountants. By controlling for the selected factors it may be concluded on the one hand that – if the results remain qualitatively unchanged – the results hold across different

[181] Ref. p. 63.

[182] Ref. *Otley* (1980), p. 413. *Fisher* (1995) or *Otley* (1980) offer introductory overviews of the contingency approach to management accounting research.

circumstances or organizational configurations. On the other hand, differences of the results arising from the inclusion of the factors might offer additional insights or directions for future research activities.

A broad set of internal and external factors has been analyzed in prior management and management accounting literature.[183] For the present research four factors are examined for assessing the robustness of the theoretical models: (i) External environment, (ii) internal environment, (iii) company size, and (iv) organizational structure. These factors combine external and internal perspectives as well as refer to factors, which are commonly employed in the respective literature.

The external environment belongs to the focal contextual factors in management and management accounting research.[184] Changes and developments of the external environment, such as shifting market conditions or changes of production technologies, typically influence the market performance of corporations. In this regard, a changing external environment might also impact control systems and procedures because they must be configured to enable the organization to cope with corresponding challenges.[185] For example, planning procedures must be flexible and should allow the integration of different scenarios. To operationalize this aspect "Environmental dynamism" can be employed as proxy. In particular, it reflects the extent and the frequency of changes regarding activities of competitors, needs of customers, or developments of technologies.[186]

Effects due to changes of the internal environment can be interpreted as a complement to external environment.[187] Similar to the prior argumentation, changing internal conditions also affect, for example, working relationships or attitudes as well as control processes.[188] As proxy for a changing internal environment "Internal dynamism" is considered. It describes the extent and the frequency to which strategies, structures, or processes within organizations change.[189]

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183 Ref. *Chenhall* (2003) who offers a comprehensive overview. Exemplary studies analyzing the impact of contingency factors are *Chenhall/Morris* (1986); *Ezzamel* (1990); *Henri* (2010); *Henri/Journeault* (2010); *Hoque/James* (2000).

184 Ref. *Chenhall* (2006), p. 95; *Duncan* (1972).

185 Ref. *Henri* (2010), p. 75.

186 Ref. *Homburg/Jensen* (2007), p. 127; *Homburg/Jensen/Krohmer* (2008), p. 140.

187 Ref. *Duncan* (1972), p. 314f.

188 Ref. *Henri* (2010), p. 75.

189 Ref. *Homburg/Jensen* (2007), p. 127; *Homburg/Jensen/Krohmer* (2008), p. 139f.

Prior empirical research claims an impact of size of the organizations on management accountants' activities and corresponding departments.[190] In larger corporations control issues rather arise and management accounting processes tend to be more specialized and sophisticated.[191]

Organizational design might also influence controls and the work of management accountants.[192] Activities of management accountants, policies, or strategies are typically heterogeneous on different organizational levels. For instance, whereas activities on holding or group level may be more conceptual, on subsidiary or sub-unit level tasks and roles are typically rather operational and determined by standards set by higher level organizational institutions.

Procedures and measures

For assessing the robustness of the theoretical model and for reinforcing the hypothesis tests, I process sub-group analyses similar to the procedures applied by *Henri* (2006a), p. 539.[193] Sub-groups are derived by splitting the sample at the median according to the criteria introduced above. Before conducting the specific analyses and interpretations as described in Section 2.2 of Part B, I search for potential indications for sub-group differences. In this regard, I calculate the mean score of every construct for every respondent, create a mean score for every construct per sub-group, and compare the derived mean scores across the sub-groups. For assessing the differences of the comparisons, I rely on *Mann-Whitney*-U-tests. If possible, I additionally process this search for potential differences also with the MA data set. In the case of a significant mean difference, I conduct sub-group analyses with a special emphasis on the respective constructs (deviations to the procedures are indicated below).

The following measures and procedures are employed for assessing the influence of the contextual factors and to derive the respective sub-groups:

- To measure "External dynamism", I rely on a five-item scale from *Homburg et al.* (2008), p. 664, which was originally developed by *Maltz/Kohli* (1996), p. 60. The items of the instrument ask the respondents how frequently several as-

190 E.g., *Rosenzweig* (1981), p. 350.
191 Ref. *Ezzamel* (1990), p. 192; *Homburg/Stebel* (2009), p. 136; *Hoque/James* (2000), p. 3.
192 Ref. *Abernethy/Chua* (1996); *Chenhall* (2006), p. 97f.
193 Similarly, *Hartmann/Naranjo-Gil/Perego* (2010), p. 293f.

pects change in the market served by their organization. In particular, the items encompass customer needs, strategies of competitors, selling strategies of competitors, customers' preferences for product features, and customers' preferences on the price-performance ratio. The rating scale is anchored by 1, "Very seldom", and 6, "Very frequently". For deriving the sub-groups, I calculated a mean score for every respondent based on the items of the instrument, ranked the sample according to the mean scores, and split it at the median.

- The six-item scale employed to measure "Internal dynamism" is a slightly amended and extended scale from *Homburg/Jensen* (2007), p. 137. The construct aims at capturing the frequency of changes within the organizations of the respondents according to several aspects. The aspects cover work processes, financial and non-financial performance criteria, organizational structure, top managers, business strategy, and operating results. Anchors and procedures for deriving sub-groups are the same for internal dynamism as for external dynamism.
- Similar to the procedures applied in prior literature, I rely on revenue and employees to measure organizations' size for the robustness checks.[194] Since not all participating companies provided respective information[195], some corporations had to be discarded for this robustness analyses. Sub-groups are derived by ranking the organizations by the respective measure and splitting the sample at the median.
- For deriving the sub-groups on variants of the organizational structure, I asked the respondents to allocate their organization to one of the following four categories: Holding, intermediate holding, subsidiary/joint venture, or non-affiliated company.

The following paragraphs and tables provide details in terms of descriptive statistics and mean comparisons as well as selected sub-group analyses. Since the constructs "Attitude", "Subjective norms", and "Practice" are assessed by management accountants in the research model, the analyses to identify possible signals for a sub-

194 E.g., *Ezzamel* (1990), p. 188; *Homburg/Stebel* (2009), p. 136.
195 Ref. Part B, Section 1.2.

group difference can also be conducted with the "MA data set" for the three constructs.[196]

External dynamism

Table C-8 exhibits the descriptive statistics and the mean comparisons for the analyses of the sub-groups capturing corporations facing a lower versus a higher external dynamism. In particular, the mean values are similar for both groups and the *Mann-Whitney*-U-tests do not indicate any significant difference between the groups. Thus, it can be concluded that the research model should be robust and is not driven by the contextual factor "External dynamism".

Constructs/sub-groups	Dyadic data set				MA data set			
	Mean	p	Std. dev.	N	Mean	p	Std. dev.	N
Attitude								
ED – Low	5.455	0.607	0.656	56	5.389	0.838	0.649	95
ED – High	5.446		0.528	56	5.438		0.576	65
Subjective norms								
ED – Low	4.420	0.788	1.190	56	4.442	0.363	1.120	95
ED – High	4.545		0.931	56	4.338		0.948	65
Practice								
ED – Low	4.473	0.176	1.237	56	4.547	0.686	1.128	95
ED – High	4.830		0.931	56	4.700		0.979	65
Contribution of management accountants								
ED – Low	4.315	0.222	0.973	56				
ED – High	4.542		0.612	56				

Notes:
MA – Management accountant; ED – External dynamism

Table C-8: Descriptive statistics and mean comparisons – "External dynamism"

Internal dynamism

Details of the analyses regarding the sub-groups capturing the effects of internal dynamism are presented in Table C-9. The results show that for two constructs, namely

[196] *Mann-Whitney*-U-tests indicate no significant differences in central tendencies of the data sets ("Attitude": p = 0.625; "Subjective norms": p = 0.424; "Practice": p = 0.646).

"Subjective norms" and "Practice", significant differences are indicated across the sub-groups within the "MA data set". For further analyses, sub-group analyses should provide additional insights.

Constructs/sub-groups	Dyadic data set				MA data set			
	Mean	p	Std. dev.	N	Mean	p	Std. dev.	N
Attitude								
ID – Low	5.432	0.980	0.653	59	5.356	0.384	0.657	80
ID – High	5.472		0.523	53	5.463		0.578	80
Subjective norms								
ID – Low	4.381	0.265	1.096	59	4.194	0.006 **	1.060	80
ID – High	4.594		1.029	53	4.606		1.008	80
Practice								
ID – Low	4.500	0.136	1.110	59	4.431	0.046 *	1.081	80
ID – High	4.821		1.084	53	4.788		1.034	80
Contribution of management accountants								
ID – Low	4.475	0.301	0.900	59				
ID – High	4.377		0.719	53				

Notes:
MA – Management accountant; ID – Internal dynamism
Significance level: ** $p < 0.01$; * $p < 0.05$

Table C-9: Descriptive statistics and mean comparisons – "Internal dynamism"

The assessment of the structural model for the analysis of the two sub-groups requires adequate measurement models. Table C-10 shows sufficient results of the construct assessment in terms of the respective criteria. This indicates appropriateness for the analyses of the structural models.

Construct	Internal dynamism – Low			Internal dynamism – High		
	CA	CR	AVE	CA	CR	AVE
AT	0.770	0.896	0.811	0.860	0.929	0.867
SN	0.947	0.974	0.949	0.950	0.976	0.953
PR	0.904	0.954	0.912	0.913	0.958	0.920
CO	0.772	0.758	0.533	0.795	0.875	0.702
N		59			53	

Notes:
CA – Cronbach's alpha; CR – Composite reliability; AVE – Average variance extracted
Constructs: AT – Attitude; SN – Subjective norms; PR – Practice; CO – Contribution of management accountants

Table C-10: Construct assessment – "Internal dynamism"

Path coefficients of the structural models and corresponding t-values are reported for both groups in Table C-11, along with R^2 values for the constructs "Practice" and "Contribution of management accountants". Although not in the main focus of the sub-group analyses, the non-significant path coefficient between the constructs on attitude and practice initially attracts attention. A possible explanation could be that the statistical power of the smaller samples of the sub-groups is too low compared to the main research, which also revealed only a weak effect.

Prior mean comparisons provide hints to focus on the constructs "Subjective norms" and "Practice" for the sub-group analyses. In this regard, I analyze the path coefficients between the two constructs and in addition the path coefficient between the construct "Practice" and "Contribution of management accountants". The sub-group analysis for the first (second) relation shows a – non-significant – probability of 66.26% (76.51%) that the path coefficient of the sub-group with companies facing a higher internal dynamism is larger than the path coefficient of the companies facing a lower internal dynamism. Thus, this test does not support the indication of a possible sub-group difference. Notwithstanding this fact it could be speculated – also in reflection of the R^2 values of the construct "Contribution of management accountants" – that there are weak differences between the sub-groups. It can be argued that the stronger effects detected for the group with a higher internal dynamism are rooted in the fact that services of management accountants are more valued and needed in such surroundings. High-quality or business-oriented services of management accountants may serve the needs for general managers better in this context. However, statistics do not offer significant support for this speculation.

Construct	Internal dynamism – Low		Internal dynamism – High	
	Path coefficient	t-value	Path coefficient	t-value
Description of path				
AT ➔ PR	0.141 n.s.	1.336	0.083 n.s.	0.771
SN ➔ PR	0.647 ***	7.194	0.698 ***	7.600
PR ➔ CO	0.211 n.s.	0.731	0.440 ***	3.207
R^2				
PR	50.42%		52.79%	
CO	4.44%		19.32%	
N	59		53	

Notes:
Constructs: AT – Attitude; PR – Practice; SN – Subjective norms; CO – Contribution of management accountants
Significance level (one-tailed): *** $p < 0.001$ (> 3.107); n.s. – not significant

Table C-11: Overview results structural models – "Internal dynamism"

Company size

The following Tables C-13 and C-14 provide details on descriptive statistics and mean comparisons of the sub-groups capturing organizations' size in terms of revenue and number of employees. For both contextual factors, mean analyses and *Mann-Whitney*-U-tests do not provide an indication for a significant difference between the groups. It can be concluded that the research model should be robust for smaller and larger organizations but it must be reflected that the sample only contains medium- and large-sized companies.

Constructs/sub-groups	Dyadic data set				MA data set			
	Mean	p	Std. dev.	N	Mean	p	Std. dev.	N
Attitude								
REV – Small	5.421	0.336	0.549	57	5.392	0.310	0.564	79
REV – Large	5.491		0.641	54	5.456		0.641	79
Subjective norms								
REV – Small	4.491	0.892	1.007	57	4.405	0.861	1.035	79
REV – Large	4.472		1.143	54	4.411		1.076	79
Practice								
REV – Small	4.649	0.681	1.018	57	4.570	0.362	1.028	79
REV – Large	4.657		1.209	54	4.677		1.101	79
Contribution of management accountants								
REV – Small	4.404	0.818	0.901	57				
REV – Large	4.451		0.733	54				

Notes:
MA – Management accountant; REV – Size (Revenue)

Table C-12: Descriptive statistics and mean comparisons – "Size (Revenue)"

Constructs/sub-groups	Dyadic data set				MA data set			
	Mean	p	Std. dev.	N	Mean	p	Std. dev.	N
Attitude								
EMP – Small	5.421	0.351	0.533	57	5.394	0.337	0.555	80
EMP – Large	5.482		0.652	55	5.449		0.648	79
Subjective norms								
EMP – Small	4.447	0.718	0.999	57	4.325	0.382	1.019	80
EMP – Large	4.518		1.138	55	4.494		1.079	79
Practice								
EMP – Small	4.588	0.247	1.005	57	4.538	0.157	1.009	80
EMP – Large	4.718		1.205	55	4.709		1.108	79
Contribution of management accountants								
EMP – Small	4.509	0.292	0.819	57				
EMP – Large	4.345		0.814	55				

Notes:
MA – Management accountant; EMP – Size (Employees)

Table C-13: Descriptive statistics and mean comparisons – "Size (Employees)"

Organizational structure

Table C-14 exhibits the statistics regarding the sub-groups on different organizational structures. *Kruskal-Wallis*-tests to identify significant mean differences support the evaluation that the different organizational structures do not influence the results of the research model either.[197]

Constructs/sub-groups	Dyadic data set				MA data set			
	Mean	p	Std. dev.	N	Mean	p	Std. dev.	N
Attitude								
Holding	5.523		0.590	44	5.390		0.646	68
Interm. holding	5.413	0.451	0.596	23	5.442	0.993	0.589	26
Subsidiary/JV	5.419		0.607	43	5.418		0.620	61
Non-aff. company	5.000		0.000	2	5.400		0.548	5
Subjective norms								
Holding	4.511		1.274	44	4.412		1.165	68
Interm. holding	4.457	0.499	0.999	23	4.365	0.950	1.025	26
Subsidiary/JV	4.430		0.884	43	4.385		0.963	61
Non-aff. company	5.250		0.354	2	4.600		0.822	5
Practice								
Holding	4.443		1.322	44	4.449		1.201	68
Interm. holding	4.739	0.721	0.940	23	4.808	0.520	0.928	26
Subsidiary/JV	4.802		0.939	43	4.713		0.972	61
Non-aff. company	5.000		0.707	2	4.500		0.935	5
Contribution of management accountants								
Holding	4.598		0.799	44				
Interm. holding	4.217	0.166	1.008	23				
Subsidiary/JV	4.403		0.688	43				
Non-aff. company	3.667		0.943	2				

Notes:
MA – Management accountant; JV – Joint venture

Table C-14: Descriptive statistics and mean comparisons – "Organizational structure"

[197] *Yazdifar/Tsamenyi* (2005), p. 192, report similar results in their analyses of management accountants in dependent and independent organizations.

Overall, the results of the mean comparisons do not indicate major differences across the sub-groups reflecting the specific contextual factors. Thus, it can be concluded that the research model is robust and not driven by a contextual factor.

3 Summary of Part C

Part C of the thesis aims at answering the first research question and elaborates on business orientation of management accountants. The first chapter reviews relevant literature in the specific field of research, derives the research model and the hypotheses, and describes the constructs used in the model. The literature review concludes that the existing broad strand of work on the business orientation of management accountants is fragmented and further scholarly activities are required. To close one of the research gaps, a research model and corresponding hypotheses are derived. The model and the argumentation draw on and expand the ideas of the well-established theory of reasoned action.

The second chapter of this part presents the results of the analyses. I employ the data gathered for the present study and the PLS technique for conducting the analyses. The results of the main research model are satisfactory. The measurement models show sound reliability and validity and the structural model allows corroborating the hypotheses. It becomes evident that the subjective norms have a stronger effect on the practice of acting business-oriented than the attitude of the management accountants. Furthermore, the analysis provides empirical support for the postulated positive effect of the practice to act in a business-oriented way on the contribution of management accountants. Besides the analysis of the main research model, I derive and discuss an alternative model as well as procedures to assess the robustness of the model. The analysis of the alternative model basically shows that management accountants assess the effect of their contribution more highly than general managers do supporting the notion of an existing perception gap between preparers and users of management accounting services. Furthermore, the last activities of this part reveal no indication that the robustness of the research model should be put into question.

In conclusion and to reflect the first research question: Own attitudes and 'pressure' from their organizational environment influence management accountants to act in a business-oriented way; but, the subjective norms have a stronger effect on practice than management accountants' attitudes. Furthermore, the result of the business orien-

tation is a higher contribution of management accountants which is a positive effect resulting from this practice.

D Involvement of management accountants in incentive compensation

This part of the study aims at providing an answer to the second research question about the result of an involvement of management accountants in incentive compensation. In particular, the question is if there is a positive influence of an involvement of management accountants on the effects of incentive compensation and, subsequently, on firm performance. The first chapter of Part D derives the theoretical basis and offers a review of related literature for the specific context, the formulation of the hypotheses, and a description of the constructs employed in the derived research model. The second chapter is devoted to presenting corresponding results and findings. It starts with the results of the main research model and is followed by results regarding alternative models as well as selected procedures conducted for robustness checks.

1 Related literature, hypotheses, and constructs

1.1 Extended tasks and roles of management accountants

This subsection basically describes main tasks and roles of management accountants. The paragraphs are followed by a review of prior research in this specific context.

Tasks and roles of management accountants

The two main functions of management accounting systems are to facilitate managerial decision making and to alleviate control problems in organizations.[198] Tasks of management accountants can be deducted from those two functions. Management accountants have to provide relevant information and to design controls in order to allow appropriate economic decisions and to induce actions in the interest of the organization. In this regard, they support managers in their activities to enhance business performance.[199]

Management accountants are recognized as specialists in the area of accounting and typically have in addition sound knowledge on the activities of the organization's

[198] Ref. *Baiman/Demski* (1980); *Demski/Feltham* (1976); *Zimmerman* (2006), p. 2-5.
[199] Ref. *Zimmerman* (2006), p. 13f.

business.[200] Such expertise basically allows them to procure and to distribute appropriate information to management. This is an important aspect since access and availability of relevant information is one of the focal success factors for organizations in competitive business environments.[201] Nevertheless, management accountants do not only provide information to management; they also provide fiduciary information for financial reporting purposes. Especially recent developments in financial reporting like the increasing importance of the management approach require more internal information to be disclosed in the firm's financial statements.[202] For instance, the International Financial Reporting Standard 8 on segment reporting requires the identification of segments according to internal reports or a description of the definition of internal key performance indicators. Another typical example is International Accounting Standard 36 on impairment of assets. This standard defines how to derive value in use amounts based on internal planning and budgeting data. Thus, management accountants become co-responsible for the firm's financial statements and should, at least to a certain extent, bear responsibility for financial accounting information and disclosure.

Besides this role embracing book-keeping and the responsibility as a provider of (advanced) management accounting information, a second role can be attributed to management accountants: They also have a service provider role and act as an advisor to management.[203] The trend toward business orientation of management accountants, which was described and analyzed in Part C of the present study, enforces the development that this role has continued to receive more attention in recent years.[204] Nevertheless, business-oriented behavior also influences the role of management accountants as providers of information. For instance, information must better fit the needs of management, but, foremost, the trend influences the advisory role of management accountants. In this regard, additional tasks are assigned to management accountants and management accountants are requested to challenge managerial decisions, deeply

200 Ref. *Maas/Hartmann* (2009), p. 6; *Chenhall/Langfield-Smith* (1998), p. 362f.

201 Ref. *Mangaliso* (1995); *Porter/Millar* (1985).

202 E.g., *Berger/Hann* (2003).

203 Ref. *Byrne/Pierce* (2007), p. 472; *Hopper* (1980), p. 402; *Maas/Matějka* (2009), p. 1235; *Newman/Smart/Vertinsky* (1989), p. 135; *Sathe* (1982), p. 1f.; *Yazdifar/Tsamenyi* (2005), p. 181.

204 Ref. *Baines/Langfield-Smith* (2003), p. 680; *Burns/Baldvinsdottir* (2005); *Byrne/Pierce* (2007); *Granlund/Lukka* (1998); *Kaplan* (1995); *Mouritsen* (1996); *Regel* (2003); *Siegel/Sorensen* (1999); *Yazdifar/Tsamenyi* (2005).

analyze and scrutinize variances between actual and plan data, or discuss alternatives of business decisions.[205] Thus, they do not solely provide information within their regular reporting routines; managers request management accountants to closely collaborate with them and to emphasize advisory tasks.[206]

Prior literature on tasks and roles of management accountants

Whereas the literature introduced in Section 1.1 of Part C focused on the trend toward business orientation of management accountants in general, the following review especially addresses tasks and roles of management accountants. In particular, it is shown that previous empirical literature confirms that tasks and roles of management accountants have been widened and advisory tasks are becoming more important. However, early studies did not cover those wider roles and tasks of management accountants or an involvement in managerial decision-making processes.[207] Nevertheless, the drawback regarding a lack of advisory tasks or involvement has already been addressed. The seminal study of *Sathe* (1982) reveals tendencies for extended tasks of management accountants in large US corporations. He argues that in most cases management accountants belong to the management team and due to this reason they are, at least at a minimum level, involved in managerial decision making.

From a more European perspective, *Granlund/Lukka* (1998) analyze the role of management accountants in a Finnish context. In their field study they find an expansion of the management accountants' job descriptions with a higher level of advisory tasks. Furthermore, their research reveals that management accountants also act as change agents or consultants in their corporations.

Extended tasks of management accountants can lead to stronger interaction with other organizational functions or also to an involvement of management accountants in managerial decision making. The aspect of an involvement in managerial decision-making processes is analyzed by *Zoni/Merchant* (2007) for management accountants of large Italian corporations. They confirm that management accountants are indeed to some degree involved in management and describe factors influencing the extent as well as the breadth of involvement. In addition, they find a positive association be-

205 E.g., *Coad* (1999), p. 113.
206 Ref. *Pierce/O'Dea* (2003), p. 278-282.
207 E.g., *Hopper* (1980).

tween involvement of management accountants and performance. This supports the increasing advice to extend the involvement of management accountants in managerial processes. Furthermore, this involvement is also associated with business orientation of management accountants. In this context, *Emsley* (2005) connects such focus with innovativeness of management accountants, i.e., measured as the number of applied management accounting innovations, as well as the efforts attributed to them. One of his findings is that management accountants with business orientation are associated with a greater level of innovativeness which is assessed as being positive.

In addition to studies addressing broad managerial decision-making processes, the study of *Ferreira/Moulang* (2009) focuses on a specific aspect: the involvement of management accountants in strategic management processes. In their analysis in Australian companies, they differentiate the stages of the strategic management processes in which the management accountants are involved. From their perspective, strategic management processes embrace strategic formulation and strategic implementation which, in turn, results in strategic effectiveness. They explore that an involvement of management accountants in strategic formulation is positively linked with an involvement of management accountants in strategic implementation. Furthermore, the authors show a positive effect between the involvement in strategic formulation and strategic effectiveness which is fully mediated by the involvement in strategic implementation. In addition, the study of *Ferreira/Moulang* (2009) is distinguishing in terms of its research method since it is basically the only large-scale study in this special field of research. The authors are able to employ 280 observations gathered from a survey to analyze their research questions.

Moreover, *Collier/Fishwick/Floyd* (2004) add to this discussion as they analyze the involvement of managers of different hierarchy levels in strategy processes. They addressed participants of postgraduate education courses at a business school in the UK from 1993 to 1999. Their results showed for their sample of managers as well as for sub-samples covering single corporate functions like finance and accounting that managerial involvement leads to the perception of enhanced and more effective strategy processes.

Although the extension of roles and tasks of management accountants is increasingly advocated in theory and business practice, potentially arising conflicts are not to be ignored. For instance, critics posit that an involvement of management accountants in managerial decision-making processes might cause tension between the two responsibilities. If they are involved in decision-making processes, the information they pro-

vide on corresponding results might be less objective.[208] Nevertheless, management accountants, albeit having extended tasks and roles, are still ultimately responsible for the accuracy of the traditional accounting and reporting information. Involvement in decision making or other activities beyond their core tasks therefore does not necessarily lead to a decrease in quality or integrity of distributed information.[209]

1.2 Management accountants' tasks and roles in incentive compensation

The following paragraphs assign incentive compensation within the framework of management control systems as a package and provide details of incentive compensation's objectives. Furthermore, tasks and roles of management accountants related to incentive compensation will be derived.

Incentive compensation within packages of management control systems

Previous research as well as the above mentioned aspects advocate that management accountants are moving away from their pure reporting tasks, are becoming more involved in operational and strategic processes, and are enhancing their relevance within their organizations.[210] This also suggests that management accountants are capable of contributing to other selected organizational aspects related to their core activities. One of those aspects is incentive compensation. Incentive compensation belongs to the package of management controls of organizations. Packages of management control systems (MCS) encompassing several single controls and control mechanisms are in place to influence employees' behavior. Thus, managers deploy those controls to induce decisions of subordinated employees consistent with objectives and strategies of their organization.[211] Management accountants play an important role in the context of MCS since design and operation of MCS belong to their core tasks. In particular, their

208 Ref. *Indjejikian/Matějka* (2006); *Sathe* (1982), p. 25; *Siegel* (2000).
209 Ref. *Maas/Hartmann* (2009), p. 2.
210 Ref. *Otley* (2001); *Regel* (2003).
211 Ref. *Flamholtz/Das/Tsui* (1985), p. 35; *Malmi/Brown* (2008), p. 290f.; *Simons* (1995), p. 5.

activities comprise tasks like reporting, planning, performance measuring, system design, or communicating between involved parties.[212]

Figure D-1[213] depicts a possible typology of a MCS package that encompasses five elements of controls: Cultural controls, planning, cybernetic controls, rewards and compensation, and administrative controls.[214] Rewards and compensation embrace incentive compensation schemes and are tightly linked with planning and cybernetic controls. Although rewards and compensation also encompass non-monetary rewards, performance-depended incentive compensation schemes are foremost of monetary nature.

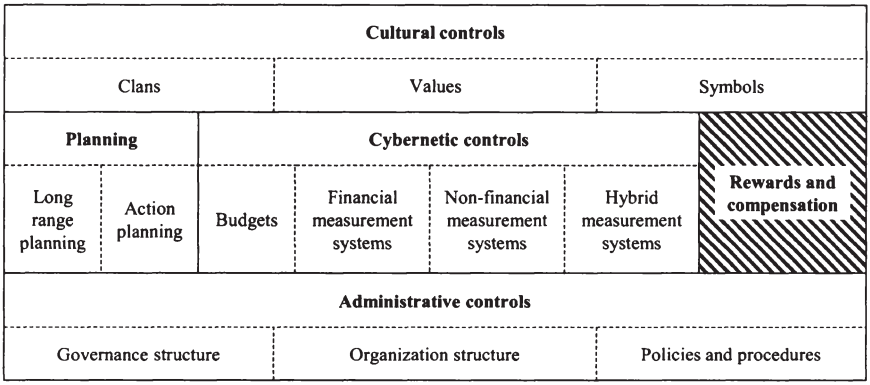

Figure D-1: Package of management control systems

Incentive compensation schemes play a focal role in organization's design and effectiveness and are, in particular, in place to align the interests of employees and owners.[215] The application of incentive compensation can be explained with microeconomics and especially principal agent theory as they provide a framework to understand reasons and desired outcomes of incentives as well as executive compen-

212 Ref. *Anthony/Govindarajan* (2004), p. 7; *Bonner/Sprinkle* (2002), p. 338; *Merchant/Van der Stede* (2007), p. 631f.; *Weißenberger/Angelkort* (2009), p. 11f.

213 Adapted from *Malmi/Brown* (2008), p. 291.

214 Ref. *Malmi/Brown* (2008), p. 291-295.

215 Ref. *Baker/Jensen/Murphy* (1988), p. 594f.; *Lawler* (1995), p. 14.

sation.[216] It is argued that agents, for instance, subordinates in an organization, who have more private information than their superiors, the principals, may act in a dysfunctional manner and follow their own objectives. Resulting problems may be reduced by implementing an incentive compensation scheme in order to achieve a commonality of interests between agent and principal. In particular, there are two desired effects to justify the application of incentive schemes: Effort and selection effects.[217] Whereas the effort effects intend to ensure that employees' efforts are channeled toward activities that facilitate the achievement of organizational goals, the selection effects shall attract and retain 'the right' employees.

The effort effects address the primary objective of incentive compensation systems to motivate employees in order to take specific actions and better allocate efforts that will create organizational performance.[218] Motivation in this case means that employees put extra efforts toward organizational objectives dependent on the opportunity to satisfy additional individual needs.[219] Efforts directed to enhance performance can be classified as effort direction, effort duration, and effort intensity.[220] Effort direction refers to the employee's choice of tasks, i.e., which tasks the employee focuses on. Incentive compensation provides information on expected results; against this background, the employees engage in those activities in which their expected benefits outweigh or exceed their cost of fulfilling the tasks. The effort duration aspect captures the time and length an employee works, i.e., how long they devote their individual resources to the assigned tasks or activities. Effort intensity refers to the amount of attention employees allocate to the respective tasks. It addresses what portion of the individual's cognitive resources is directed toward the particular activity.

In addition, the conceptual framework of *Bonner/Sprinkle* (2002), p. 304, depicted in a slightly adapted version in Figure D-2, offers a comprehensive summary on the postulated positive relations between incentives, efforts, and performance. The authors basically argue that incentives are in place to increase managerial efforts that are presumed to positively influence task performance. Furthermore, it is illustrated that various variables might influence both relations. Typical variables are person vari-

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216 Ref. *Aggarwal/Samwick* (1999), p. 1999.

217 Ref. *Merchant/Van der Stede* (2007), p. 394f.; *Prendergast* (1999); *Waller/Chow* (1985), p. 458.

218 Ref. *Lazear* (1999), p. 202; *Merchant/Van der Stede/Zheng* (2003), p. 252.

219 Ref. *Robbins* (1989), p. 147.

220 Ref. *Bonner/Sprinkle* (2002), p. 306.

ables that are apparently linked with selection effects of incentives or incentive scheme variables, which, for instance, embrace the design of the incentive systems.

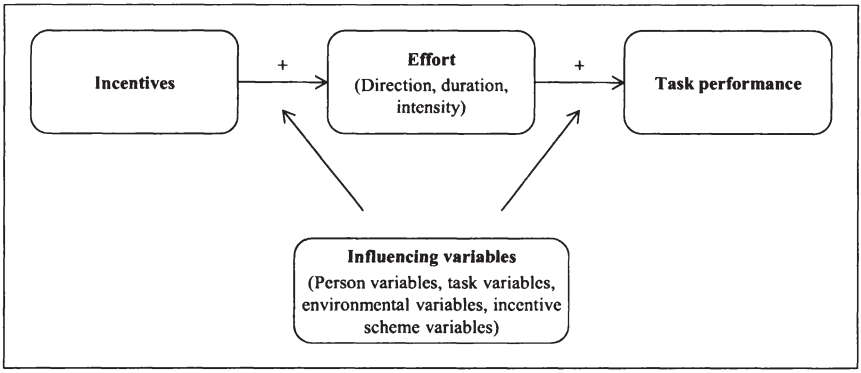

Figure D-2: Framework for the effects of incentives on efforts and performance

Despite the fact that incentive compensation facilitates employees to act goal congruent, possible limitations are also inherent. These should not be ignored since literature suggests that objectives of incentive compensation are not always achieved.[221] First, empirical evidence shows that there is partly no or only a weak correlation between executive pay and firm performance.[222] Nevertheless, it must be considered that studies addressing this caveat in most cases focus on CEO compensation and do not reflect managers on lower hierarchical levels in their analysis. Second, problems may arise if theory is not properly applied, for example, in cases when incentive schemes do not employ linear bonus functions and embrace performance thresholds like caps or floors. Possible results are that employees may reduce their activities as soon as respective targets are reached or are out of reach.[223] Third, incentive compensation may cause crowding-out problems, i.e., intrinsic motivation is replaced by extrinsic motivation. This effect covers over-justification effects, spill-over effects, and multitasking effects.[224] Fourth, counterproductive effects may arise from adjustment effects in a dy-

221 Ref., in the following, *Rost/Osterloh* (2009), p. 123-129.
222 E.g., *Tosi et al.* (2000).
223 Ref. *Healy* (1985); *Holthausen/Larcker/Sloan* (1995).
224 Ref. *Deci/Koestner/Ryan* (1999); *Rost/Osterloh* (2009), p. 127f.

namic perspective. A possible related limitation is budget gaming when managers hide information to avoid future demanding targets that would reduce the probability of achieving targets.[225]

Management accountant's tasks and roles related to incentive compensation

Notwithstanding possible caveats, incentive compensation systems are a predominantly used control mechanism to induce behavior in organizations. In this context, management accountants have an important role since they provide performance measures that are a focal element of those systems.[226] Performance measures employed for those purposes can embrace financial and non-financial metrics.[227] An emphasis typically lies on financial measures that can be clustered into three categories: Market-based measures, accounting-based measures (defined in residual or ratio terms), and combinations of both.[228] Furthermore and in order to fulfill the decision-influencing purposes of incentive compensation, the following criteria should be applied and considered when assessing performance measures: Congruence (with the organization's objectives), controllability (of managers being assessed), timeliness, accuracy, understandability, and cost effectiveness.[229] The selection of adequate performance measures received widespread attention in theory and is at the same time a tremendous challenge in business practice.[230] But, since none of the existing measures or combinations of measures offers a perfect solution, it is required to select a sufficient set-up depending on specific organizational characteristics like hierarchy or corporate functions. Reflecting this aspect and taking into account that an inadequate selection can induce dysfunctional managerial behavior as well as more appropriate performance measure properties can enhance desired effects, a thorough selection and evaluation of advantages and disadvantages of the implemented or suggested performance measures is of high importance.[231]

Management accountants provide relevant information and advice in order to choose the appropriate performance measures. However, performance measures con-

225 Ref. *Jensen/Murphy/Wruck* (2004), p. 71f.
226 Ref. *Bushman/Smith* (2001), Section 2; *Merchant/Van der Stede/Zheng* (2003), p. 252.
227 Ref. *Ittner/Larcker/Rajan* (1997), p. 231f.
228 Ref. *Merchant* (2006), p. 893f.
229 Ref. *Merchant* (2006), p. 894-897; *Merchant/Otley* (2007), p. 792f.
230 E.g., *Gibbs et al.* (2009), p. 237f.; *Ittner/Larcker* (1998), p. 205.
231 Ref. *Bouwens/van Lent* (2006), p. 69; *Kerr* (1975); *Otley* (2001), p. 243f.

stitute only a fragment of incentive compensation systems. Results of performance measurement are linked with dedicated rewards taking a special incentive function into account. Furthermore, incentive compensation is only part of comprehensive remuneration packages, which typically also comprise fixed and non-monetary components. Organizational tension might arise due to the fact that activities and responsibilities related to compensation systems belong to HR departments[232] and management accountants' tasks are typically limited to the provision of required performance measures.

Taking the possible extended roles and tasks as well as the financial and business expertise of management accountants into account, conceptual considerations suggest that management accountants could be more involved in incentive compensation activities. I.e., they should not only provide relevant information, they could also be involved in broader aspects in this context. Thus, the involvement of management accountants in incentive compensation describes the degree to which management accountants participate in conceptual and operational activities in the context of incentive compensation.[233] Against this background, respective activities include tasks to align incentive compensation systems with other controls, advisory tasks, or responsibilities to provide relevant information. For example, such tasks could encompass activities related to the definition of salary grading systems, the specification of the fragment of performance-dependent pay, or the enhancement of promotion processes. Consequently, involvement should be beneficial since only aligned incentive systems including congruent performance measures activate desired managerial activities.

1.3 Hypotheses development and research model

In literature and business practice it is generally argued that management accountants' extended tasks and roles are beneficial to organizations. Those benefits typically arise from an involvement of management accountants in extended responsibilities like managerial decision making[234] or strategic management[235]. Based on those findings and thoughts, an involvement in incentive compensation should also be beneficial.

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232 E.g., *Otley* (1999), p. 369; *Stone* (2005), p. 441.

233 Ref. *Bonner/Sprinkle* (2002), p. 338; *Maas/Hartmann* (2009), p. 5f.; *Mouritsen* (1996), p. 297; *Sathe* (1982), p. 9.

234 Ref. *Zoni/Merchant* (2007).

235 Ref. *Ferreira/Moulang* (2009).

Incentives belong to MCS packages of organizations that are characterized by complexity and higher levels of delegation. In particular, incentive systems are typically complex and interact with other controls. To serve their purposes and especially to affect performance, it is required that design and operation of incentive systems are aligned with other controls and objectives of the organization.[236] Foremost, management accountants' expertise can contribute to better align incentive compensation with other controls to enhance the effort effects of the incentives. For example, due to their responsibilities in planning and budgeting, management accountants have sound proficiency about the organizations' activities and about past as well as expected developments. With this expertise, management accountants are, for instance, able to align, in cooperation with superior general managers and HR managers, targets and controls to avoid gaming.[237] In this regard, it is not the question of whether the incentive compensation triggers any activities at all; more in focus is the argument that an involvement of management accountants increases the probability of aligned controls which is, in turn, an important factor for effective incentive compensation.

Based on those arguments, a positive association between the involvement of management accountants in conceptual and operational activities related to incentive compensation and the desired effort effects of incentives is proposed. Thus, the first hypothesis can be derived as follows:

H1: The higher management accountants are involved in incentive compensation, the stronger the effort effects of incentive compensation.

The involvement of management accountants in incentive compensation and the assumed enhanced alignment of controls may contribute to the effort effects of incentive compensation. Nevertheless, as displayed in the introduced figure of *Bonner/ Sprinkle* (2002), other factors might impact the effort effects as well. A prerequisite for desired efforts are high-quality employees. Empirical results confirm that total effects as well as effort effects of incentive compensation substantially depend on the ability

236 Ref. *Lawler* (1995), p. 14; *Rajagopalan/Finkelstein* (1992), p. 138f.

237 *Maas/Hartmann* (2009) add to this aspect since they show that budget gaming especially depends on the personality of management accountants.

to attract and retain adequate-skilled and -motivated managers.[238] However, the presence of incentives has not only effort effects; incentive compensation also serves as a selection device. Incentives help to support the self-selection of high-quality managers into the organization as well as to retain them.[239] Compensation schemes with an essential performance-dependent element are likely to attract those employees who believe themselves to be comparatively more skilled and productive as well as who assume themselves able to obtain additional income.[240] This selection effect also encourages employees to retain or to leave the organization if the relation between the individuals' expected cost and utility is not satisfactory. Reflecting those arguments it can be assumed that enhanced selection effects are positively linked with the effort effects of incentive compensation since adequate skills and potentials enable managers to act in a desired fashion. This leads to the second hypothesis:

H2: The stronger the selection effects of incentive compensation, the stronger the effort effects of incentive compensation.

Several research activities addressed performance effects of comprehensive or strategic performance measurement systems.[241] Foremost in the scope of this research have been the diversity of performance measures as well as the alignment between performance measurement systems and strategy. The results basically support the positive association between those two aspects and performance. This finding can also be transferred to the present research setting since incentives are an integral part of performance measurement systems and involvement of management accountants in incentive compensation should also ensure the alignment between the incentive systems and other controls as well as with strategy. Thus, aligned incentive systems should positively affect performance.

A similar conclusion can be drawn from evidence reported by *Siegel/Sorensen* (1999). The authors argue that management accountants possessing enlarged responsibilities and occupying wider roles contribute more strongly to the organization and

238 Ref. *Bouwens/van Lent* (2006), p. 71.
239 Ref. *Prendergast* (1999), p. 14.
240 Ref. *Lawler* (1995), p. 15.
241 E.g., *Burney/Widener* (2007); *Ittner/Larcker/Randall* (2003); *Van der Stede/Chow/Lin* (2006).

support the enhancement of better decision-making processes.[242] Transferred to this research setting, it can be assumed that management accountants involved in incentive compensation can also positively influence managerial decision making and may contribute to the performance of their organization.

With regard to incentive compensation, *Banker et al.* (2001), p. 347, confirm in their study that incentives help to attract and retain particularly productive employees as well as motivate them to channel their efforts to organizational objectives. But, this does not imply that controls themselves improve performance, interpreted as market performance, directly. Controls and, in particular, incentive compensation are in place to influence managerial behavior, i.e., the efforts of managers, which is intended to result in higher levels of performance.[243] Performance has a complex and multilayer character and its concept is strongly associated with confounding factors and time lags within its dimensions.[244] Against this background and to cope with potential difficulties in the analysis, I transfer the idea that incentives indirectly improve performance to the present research setting. Thus, I do not propose a direct link between the effects of incentive compensation and a single measure of performance. Instead, an initially positive effect of incentive compensation on managerial decision making is suggested. Beyond this link, I propose that those enhanced decision-making processes should, in turn, increase internal efficiency and, subsequently, firm performance from a market perspective. Three hypotheses capturing the links between effort effects of incentive compensation, managerial decision making, internal efficiency, and market performance are derived.

The first of those three hypotheses addresses the link between incentives and managerial decision making. Incentives are foremost in place to influence managerial behavior. Managerial behavior or actions embrace decisions as core tasks. Taking into account that incentives and in particular the demanded effort effects should create shared understandings within the corporation and trigger managerial decisions in line with the company's targets, incentives should consequently also enhance the decision-making processes. Furthermore, incentives should also support decision-making processes by reducing friction in corresponding procedures and information exchange.[245]

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242 Ref. *Siegel/Sorensen* (1999), p. 6.
243 Ref. *Bonner/Sprinkle* (2002), p. 310.
244 Ref. *Lenz* (1981).
245 Ref. *Kelly* (2010), p. 45-48.

Incentives might create a basis for cooperation between involved team members which is a requirement for effective strategic decisions.[246] Based on these considerations and keeping in mind that the ultimate goal of control systems is "to improve managerial decision making"[247] the third hypothesis is specified as follows:

H3: The stronger the effort effects of incentive compensation, the better the decision-making processes.

Organizational theory, in principle, suggests that the performance of an organization depends on actions of individuals, especially managers.[248] For managers, such actions typically are decisions. Consequently, high-quality decisions should lead to enhanced performance. The quality of decisions depends on the quality of the decision-making process.[249] Thus, good decision-making processes enable enhanced decisions that should be followed by enhanced performance.[250] More specifically, the argumentation considers that increased quality of decisions initially leads to enhanced implementation processes, for instance, in terms of acceptance and feasibility. This is reflected in situations distinguished by, for instance, a better allocation of resources and improved internal processes. Hence, I state the fourth hypothesis as follows:

H4: The better the decision-making processes, the higher internal efficiency.

Finally, performance from a market perspective should be a consequence arising from those prior arguments. If efficient usage of resources leads to realized cost reduction potentials, it should be assumed that this therewith also leads to profitability and growth in consequence. Thus, the fifth hypothesis can be postulated as follows:

H5: The higher internal efficiency, the higher market performance.

246 Ref. *Amason* (1996), p. 125.
247 *Lipe/Salterio* (2002), p. 531.
248 Ref. *Burney/Widener* (2007), p. 44.
249 Ref. *Steiner* (1972), p. 35.
250 Ref. *Amason* (1996).

Furthermore, the argumentation of hypotheses H3 to H5 is basically also in line with the reasoning of *Callen/Morel/Fader* (2008). The authors explicitly address the linkage of incentives, actions (i.e., in their terminology breadth and intensity of just-in-time practices), and performance. They report that incentives have an impact on the decision to adopt just-in-time practices, i.e., incentives influence managerial actions. Furthermore, they reveal an association between actions and performance. However, although they posit a direct link between incentives and performance, they cannot confirm this association.

In summary, extended roles and tasks of management accountants are deemed to be beneficial to organizations. I presume that this also applies for conceptual and operational responsibilities related to incentive compensation. Such involvement of management accountants should enhance the alignment of control mechanisms and foremost positively influence the effort effects of incentive compensation. I also argue, in line with economic theory, that incentives serve as a selection device and that selection effects also have a positive effect on effort effects. Finally, I expect that effort effects of incentive compensation enhance performance; I postulate links between effort effects, decision-making processes, internal efficiency, and market performance. This theoretical argumentation as well as the hypotheses are summarized in the research model depicted in Figure D-3.

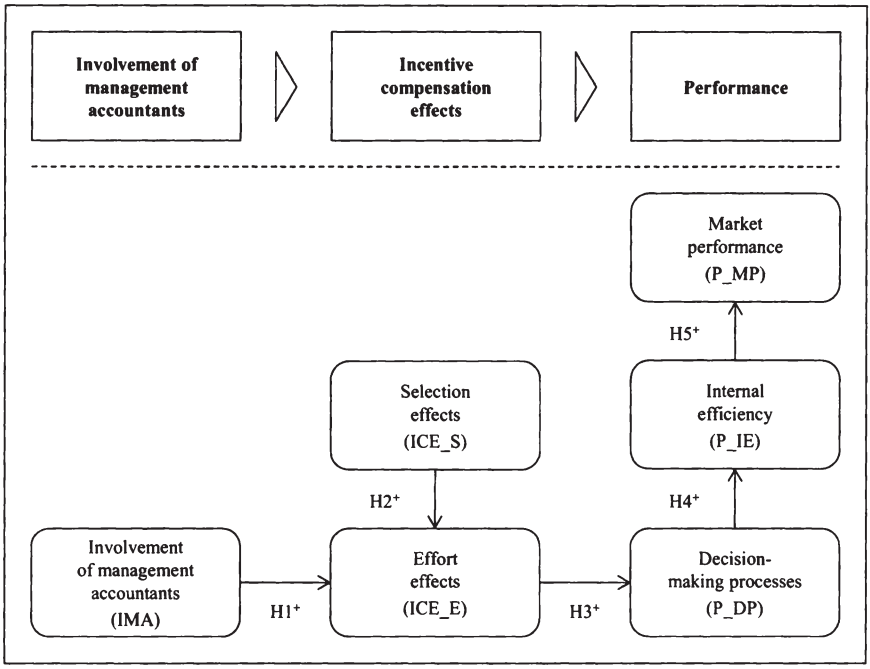

Figure D-3: Research model

1.4 Operationalization of constructs

The research model in Figure D-3 contains one construct to measure the involvement of management accountants in incentive compensation (IMA), two constructs focusing on the effects of incentive compensation (ICE_E; ICE_S), and three constructs addressing the dimensions of performance (P_DP; P_IE; P_MP). This section of the thesis presents details of the constructs employed. As already pointed out in Section 1.3 of Part C of the present study, I intended to draw upon existing instruments that have been used for empirical research in the past and have shown sufficient reliability and validity. If I could not find an appropriate instrument in the relevant literature, I adjusted existing constructs in a way that they better fit to the present research design, or employed newly generated scales drawn from the relevant literature. With two ex-

ceptions[251], I apply a six-point rating scale with 1, "Do not agree at all", and 6, "Totally agree", as anchors for all measures (deviations are indicated below).

Construct "Involvement of management accountants (IMA)"

The first construct of the research model is "Involvement of management accountants (IMA)". In the present research context it addresses the tasks of management accountants related to incentive compensation with regard to conceptual and operational aspects. As there is no scale for this construct available in literature, I apply a self-developed instrument. For deriving the instrument, I basically follow the thoughts of *Zoni/Merchant* (2007) who use a scale to measure the involvement of management accountants in managerial decision making on the basis of the work from *Sathe* (1982). I amended and narrowed the ideas for my purposes and derived a seven-item instrument. Aspects deemed to be part of the construct are, for instance, the mentioned involvement of management accountants in conceptual issues, aligned control and compensation systems, consistently applied performance measures, management accountants' duties as information provider, and collaboration and information exchange between involved parties. Although *Zoni/Merchant* (2007) split their construct into two areas, i.e., operating and strategic decisions, they treat the construct as uni-dimensional. I also assume that the construct is uni-dimensional; an exploratory factor analysis conducted for verification purposes, confirmed this assumption. Table D-1 offers details of the item formulation.

[251] For the constructs "Internal efficiency (P_IE)" and "Market performance (P_MP)", I apply a six-point rating scale with 1, "Much worse", and 6, "Much better", as anchors.

Label	Item
IMA – Involvement of management accountants	
IMA_1	Management accountants are involved in conceptual issues regarding incentive compensation
IMA_2	Performance measures implemented in control systems are utilized as performance indicator for variable compensation schemes
IMA_3	Changes in control systems or processes are followed by adjustments of incentive compensation systems
IMA_4	Expertise of management accountants is taken into account in case of amendments of incentive compensation systems
IMA_5	Management accountants regularly provide information required for incentive compensation systems, e.g., financial performance measures
IMA_6	Management accountants are asked for advice in case of queries related to performance measures and corresponding influencing factors
IMA_7	Management accountants and HR managers actively collaborate on tasks related to incentive compensation

Notes:
6-point rating scale; anchors: 1 – Do not agree at all; 6 – Totally agree

Table D-1: Item formulation – "Involvement of management accountants"

Constructs "Effort effects (ICE_E)" and "Selection effects (ICE_S)"

The instruments to measure the effects of incentive compensation were also partly developed for this study. As the conceptualization follows two dimensions, the constructs are operationalized accordingly. Details on the formulation of the items of the two constructs are presented in Table D-2.

First, the construct "Effort effects (ICE_E)" describes the extent to which incentives influence efforts of managerial actions. As conceptualized, efforts embrace aspects of effort direction, duration, and intensity.[252] The carefully self-developed scale comprises seven items. More specifically, the instrument covers facets of intentions and directions during decision-making processes, sustained and goal-oriented behavior, and the overall attention managers devote to activities and the possible connected impact on their incentive compensation.

Second, the "Selection effects (ICE_S)" construct is also related to incentive compensation effects. It addresses the impact of incentive compensation on attracting

252 Ref. *Bonner/Sprinkle* (2002), p. 306f.

and retaining employees and managers. I apply and enhance a three-item instrument from *Bouwens/van Lent* (2006), p. 63, for my study. I added two items in order to achieve a more comprehensive measure. In addition to the items from *Bouwens/van Lent* (2006)[253], which, for instance, embrace market attractiveness of the company or 'fit' of recruited managers, I included one item related to competitiveness of the compensation and one associated to the retention goal of incentives.

Label	Item
ICE_E – Incentive compensation effects_Effort effects	
ICE_E_1	Without incentive compensation, different decisions would often be taken
ICE_E_2	Incentive compensation causes decisions in line with our company's targets
ICE_E_3	Managers of our company are motivated by the application of incentive compensation
ICE_E_4	Incentive compensation schemes support the pursuit of our company's long-term goals
ICE_E_5	The application of incentive compensation influences the behavior of managers
ICE_E_6	During decisions, managers consider possible effects on their incentive compensation
ICE_E_7	Overall, the application of incentive compensation implies a control effect
ICE_S – Incentive compensation effects_Selection effects	
ICE_S_1	Our company is an attractive employer at the market
ICE_S_2	Compensation for our managers is competitive
ICE_S_3	Changes in our annual wage expense are in a proper relation to changes in our performance
ICE_S_4	Managers recruited in the last two to three years 'fit' our company
ICE_S_5	Good managers remain with our company and do not leave for our competitors

Notes:
6-point rating scale; anchors: 1 – Do not agree at all; 6 – Totally agree

Table D-2: Item formulation – "Incentive compensation effects"

[253] ICE_S_1, ICE_S_3, and ICE_S_4.

Constructs "Decision-making processes (P_DP)", "Internal efficiency (P_IE)", and "Market performance (P_MP)"

A fundamental challenge for researchers in management accounting or other business disciplines is the selection of constructs to measure success or performance of companies.[254] One of the pivotal points in this discussion is whether the mode of assessment should be objective or rather subjective. In the present study, I follow a subjective or perceptual approach. Although it is sometimes argued that objective measures are superior, it must be reflected that performance is always of context-specific nature and there is actually no single performance measure that is appropriate for measuring performance in all different industries or companies.[255] Furthermore, financial profits, which are typically employed as objective measure, do not compulsorily reflect the 'true' performance since they might be influenced – in some cases rather biased – due to earnings management.[256] Additionally, prior studies confirm positive associations between subjective and objective measures of performance.[257]

Reflecting the complex and multilayer character of performance, I follow my conceptualization as well as my hypotheses, distinguish three levels of performance, and specify three corresponding constructs.[258] These constructs cover facets of the quality of decision-making processes, organizational or internal effectiveness, and aspects of market performance.[259] The three dimensions of performance also reflect the consecutive character of the three constructs: Decision-making processes enhance internal efficiency that, in turn, shall result in market performance.[260] Details of the constructs are described below; the item formulation for the three constructs is presented in Table D-3.

The construct "Decision-making processes (P_DP)" covers aspects of managerial decision making and the company's management cycle. It comprises the phases planning, implementation, and finally monitoring of decisions. The construct reflects

254 Ref. *Van der Stede/Young/Chen* (2005), p. 675; *March/Sutton* (1997); *Wall et al.* (2004).

255 Ref. *Malagueño* (2009), p. 7.

256 Ref. *Healy/Wahlen* (1999) for an overview regarding earnings management; the paper offers, for instance, definitions and reviews existing empirical evidence.

257 E.g., *Wall et al.* (2004).

258 Ref. *Lenz* (1981).

259 Ref. *Venkatraman/Ramanujam* (1986), p. 803f.

260 Ref. *Degraeve/Roodhooft* (1999); *Vandenbosch* (1999), p. 81.

the immediate outcome of control processes. It is measured by means of a (in German management accounting research) well-established instrument adopted from *Spillecke* (2006), p. 165, and comprises five indicators.

Label	Item
P_DP – Performance_Decision-making processes	
	Managers of our company are satisfied with …
P_DP_1	… the information basis for important decisions
P_DP_2	… the process of decision making
P_DP_3	… the results of important decisions
P_DP_4	… the course of actions after important decisions
P_DP_5	… the monitoring of important decisions
P_IE – Performance_Internal efficiency	
P_IE_1	Realization of cost reduction potentials
P_IE_2	Efficient resource allocation
P_IE_3	Cost awareness
P_IE_4	Enhancement of internal processes
P_MP – Performance_Market performance	
P_MP_1	Profitability
P_MP_2	Market share
P_MP_3	Growth
P_MP_4	Size

Notes:
6-point rating scale; anchors (P_DP): 1 – Do not agree at all; 6 – Totally agree
6-point rating scale; anchors (P_IE; P_MP): 1 – Much worse; 6 – Much better (compared with competitors)

Table D-3: Item formulation – "Performance"

"Internal efficiency (P_IE)" is measured with a four-item scale from *Homburg et al.* (2008), p. 663, which was originally adopted from *Mahmood/Soon* (1991). The items, which measure the construct relative to the company's competitors in the last three years, cover aspects of cost efficiency, resource allocation, and internal processes. I apply for this and the following construct reflecting market performance a different rating scale with 1, "Much worse", and 6, "Much better", as anchors.

To measure "Market performance (P_MP)", I adhere to the underlying work of *Buzzell/Gale* (1987) and employ the instrument from *Deshpandé/Farley* (2004), p. 9. They measure market performance in comparison to the performance of the firm's competitors' performance with a four-item instrument. The items embrace profitability, market share, growth rate, and size.

2 Results

In the following chapter, I present the second part of the study's results. Similar to the structure of Chapter 2 in Part C, the first section provides the results of the main research model allowing the second research question to be answered. Section 2.2 offers some alternative models to deepen the findings. Section 2.3 is devoted to several validation procedures to check the robustness of the results. As introduced in Part C of the thesis, I distinguish between a main research model and alternative models. The distinctive feature is basically again the data set. The alternative model presented in Subsection 2.2.2 marks a deviation to this assumption since it links the research model introduced in Part C of the study with the construct related to the involvement of management accountants in incentive compensation.

2.1 Results of main research model

2.1.1 Results of measurement models

The next two subsections are especially devoted to providing answers to the second research question. In particular, they offer evidence on the impact of an involvement of management accountants on the effects of incentive compensation and, subsequently, performance. I employ the dyadic data covering both responses from management accountants and general managers to answer this research question. Management accountants assess the construct on involvement in incentive compensation and general managers evaluate the constructs on incentive compensation effects and performance.

In this subsection, the measurement models of the research model are evaluated. Similar to the approach applied for the research model introduced in Part C of the study, I apply reflective measurement models for all constructs. Sufficient reliability and validity of the measurement models are a prerequisite for analyzing structural models. The results of the structural model and especially the tests of the hypotheses are presented in the subsequent section.

Content validity

Following the structure to assess measurement models introduced in Part B of the thesis, content validity will be assessed first. Besides construct development and pretest procedures, exploratory factor analyses (principal component analysis) are suggested in literature to assess content validity. The results of the factor analysis for the constructs of this part's research model are satisfactory indicating adequate content validity since eigenvalues are higher than one in all cases and variance explained exceeds the 50%-level for all constructs. Details of the factor analyses are presented in Table D-4 below.

Construct	Eigenvalue	Variance explained (percentage)
Involvement of management accountants	4.525	64.64%
Effort effects	4.274	61.05%
Selection effects	2.761	55.21%
Decision-making processes	3.369	67.38%
Internal efficiency	2.410	60.26%
Market performance	2.574	64.34%

Table D-4: Results of exploratory factor analyses

Item reliability and convergent validity

The following two paragraphs discuss the results of the activities to assess item reliability and convergent validity. Corresponding results as well as additional details like mean values, standard deviations, and a relative frequency distribution of the respondents' answers are presented in Tables D-5, D-6, and D-7.

The analysis of item or indicator reliability relies on the assessment of factor loadings of the constructs. As mentioned in Part B, factor loadings should exceed the threshold of 0.7. As shown in the following three tables, only four items of the study load marginally below 0.7 (ICE_E_1: 0.680; ICE_E_4: 0.698; ICE_S_4: 0.688; P_IE_4: 0.664) which can be assessed as acceptable since they partly belong to newly developed scales and other loadings are well above the threshold.[261]

The assessment of comprehensive constructs – convergent validity – relies on *Cronbach*'s alpha (CA), the composite reliability (CR) measure, and average variance extracted (AVE) statistics. It can be concluded that the constructs employed in the present study possess a sufficient level of convergent validity since all constructs meet the three criteria (CA = 0.908-0.777 > 0.7; CR = 0.925-0.857 > 0.6; AVE = 0.673-0.547 > 0.5).

Item	Mean	Std. dev.	Factor loading	Relative frequency distribution (%)					
				1	2	3	4	5	6
IMA_1	3.893	1.673	0.738	12.50%	16.07%	6.25%	15.18%	34.82%	15.18%
IMA_2	5.179	0.872	0.812	0.00%	0.89%	6.25%	6.25%	47.32%	39.29%
IMA_3	4.107	1.479	0.831	5.36%	14.29%	12.50%	16.07%	35.71%	16.07%
IMA_4	3.982	1.577	0.817	9.82%	12.50%	9.82%	23.21%	26.79%	17.86%
IMA_5	5.214	0.981	0.773	0.89%	2.68%	0.89%	11.61%	37.50%	46.43%
IMA_6	5.036	1.090	0.796	1.79%	4.46%	1.79%	7.14%	50.00%	34.82%
IMA_7	3.741	1.609	0.823	13.39%	14.29%	10.71%	18.75%	32.14%	10.71%
CA	0.908								
CR	0.925								
AVE	0.639								

Notes:
N = 112
6-point rating scale; anchors: 1 – Do not agree at all; 6 – Totally agree
CA – Cronbach's alpha; CR – Composite reliability; AVE – Average variance extracted

Table D-5: Construct assessment – "Involvement of management accountants"

[261] Ref. *Barclay/Higgins/Thompson* (1995), p. 295f.

Item		Mean	Std. dev.	Factor loading	Relative frequency distribution (%)					
					1	2	3	4	5	6
ICE_E – Incentive compensation effects_Effort effects										
ICE_E_1		2.982	1.178	0.680	8.04%	33.04%	23.21%	25.00%	9.82%	0.89%
ICE_E_2		3.830	1.192	0.792	5.36%	9.82%	15.18%	39.29%	26.79%	3.57%
ICE_E_3		4.232	1.057	0.721	1.79%	5.36%	11.61%	38.39%	34.82%	8.04%
ICE_E_4		3.795	1.171	0.698	3.57%	14.29%	15.18%	33.93%	32.14%	0.89%
ICE_E_5		4.241	1.093	0.854	2.68%	5.36%	9.82%	37.50%	36.61%	8.04%
ICE_E_6		4.214	1.173	0.824	3.57%	4.46%	16.07%	27.68%	39.29%	8.93%
ICE_E_7		4.259	1.168	0.872	2.68%	7.14%	10.71%	30.36%	39.29%	9.82%
CA	0.892									
CR	0.915									
AVE	0.609									
ICE_S – Incentive compensation effects_Selection effects										
ICE_S_1		4.821	0.841	0.782	0.00%	0.89%	7.14%	18.75%	55.36%	17.86%
ICE_S_2		4.688	0.783	0.719	0.00%	0.89%	4.46%	32.14%	50.00%	12.50%
ICE_S_3		4.161	1.127	0.756	0.89%	10.71%	11.61%	32.14%	37.50%	7.14%
ICE_S_4		4.554	0.868	0.688	0.00%	0.89%	11.61%	29.46%	47.32%	10.71%
ICE_S_5		4.688	0.860	0.750	0.00%	2.68%	6.25%	22.32%	57.14%	11.61%
CA	0.796									
CR	0.858									
AVE	0.547									

Notes:
N = 112
6-point rating scale; anchors: 1 – Do not agree at all; 6 – Totally agree
CA – Cronbach's alpha; CR – Composite reliability; AVE – Average variance extracted

Table D-6: Construct assessment – "Incentive compensation effects"

Item		Mean	Std. dev.	Factor loading	Relative frequency distribution (%)					
					1	2	3	4	5	6
P_DP – Performance_Decision-making processes										
P_DP_1		4.143	0.919	0.787	0.00%	6.25%	14.29%	41.07%	35.71%	2.68%
P_DP_2		4.009	0.935	0.847	0.00%	8.04%	17.86%	40.18%	33.04%	0.89%
P_DP_3		4.241	0.883	0.878	0.89%	1.79%	15.18%	40.18%	38.39%	3.57%
P_DP_4		4.080	0.829	0.791	0.00%	3.57%	17.86%	47.32%	29.46%	1.79%
P_DP_5		4.000	0.900	0.795	0.89%	2.68%	25.89%	37.50%	32.14%	0.89%
CA	0.878									
CR	0.911									
AVE	0.673									
P_IE – Performance_Internal efficiency										
P_IE_1		4.384	0.903	0.814	0.89%	0.89%	11.61%	41.07%	36.61%	8.93%
P_IE_2		4.339	0.964	0.838	0.00%	3.57%	16.96%	28.57%	43.75%	7.14%
P_IE_3		4.482	0.949	0.775	0.00%	0.89%	14.29%	35.71%	33.93%	15.18%
P_IE_4		4.214	0.905	0.664	0.00%	3.57%	15.18%	43.75%	31.25%	6.25%
CA	0.777									
CR	0.857									
AVE	0.602									
P_MP – Performance_Market performance										
P_MP_1		4.339	1.078	0.839	0.00%	5.36%	16.07%	32.14%	32.14%	14.29%
P_MP_2		4.161	1.167	0.818	0.89%	8.93%	15.18%	36.61%	25.00%	13.39%
P_MP_3		4.196	1.122	0.764	1.79%	4.46%	19.64%	31.25%	32.14%	10.71%
P_MP_4		4.196	1.192	0.759	1.79%	8.04%	12.50%	39.29%	23.21%	15.18%
CA	0.814									
CR	0.873									
AVE	0.633									

Notes:
N = 112
6-point rating scale; anchors (P_DP): 1 – Do not agree at all; 6 – Totally agree
6-point rating scale; anchors (P_IE; P_MP): 1 – Much worse; 6 – Much better (compared with competitors)
CA – Cronbach's alpha; CR – Composite reliability; AVE – Average variance extracted

Table D-7: Construct assessment – "Performance"

Discriminant validity

Discriminant validity exhibits that the operationalization of two constructs diverges from each other. It can be assessed on construct level based on the *Fornell/Larcker*-criterion and on indicator level based on cross-loadings. Table D-8 shows the correlation matrix and the square roots of AVE statistics and reveals that all construct pairs fulfill the criterion of *Fornell/Larcker* requiring that the square roots of AVE statistics of each construct exceed the correlations between the two constructs. The assessment of cross-loadings requires that there should be no items loading more highly on another construct than on the construct they intend to measure. As presented in Table D-9, all items pass this requirement. Thus, discriminant validity can be assumed for the constructs of the research model.

Construct		1	2	3	4	5	6
1	IMA	*0.799*					
2	ICE_E	0.305	*0.781*				
3	ICE_S	0.157	0.569	*0.740*			
4	P_DP	0.156	0.351	0.621	*0.821*		
5	P_IE	0.126	0.194	0.420	0.502	*0.776*	
6	P_MP	0.095	0.099	0.402	0.416	0.485	*0.796*

Notes:
Diagonal elements are the square roots of average variance extracted statistics. Off-diagonal elements are the correlations between constructs
Constructs: IMA – Involvement of management accountants; ICE_E – Effort effects; ICE_S – Selection effects; P_DP – Decision-making processes; IE – Internal efficiency; MP – Market performance

Table D-8: Construct correlations and square roots of AVE statistics

Item	1	2	3	4	5	6
1 – IMA – Involvement of management accountants						
IMA_1	*0.738*	0.158	0.043	0.062	0.036	-0.036
IMA_2	*0.812*	0.344	0.127	0.189	0.193	0.188
IMA_3	*0.831*	0.234	0.135	0.054	0.054	-0.018
IMA_4	*0.817*	0.182	0.084	0.071	-0.035	0.016
IMA_5	*0.773*	0.265	0.168	0.086	0.201	0.160
IMA_6	*0.796*	0.190	0.143	0.191	0.126	0.103
IMA_7	*0.823*	0.237	0.141	0.178	0.029	0.012
2 – ICE_E – Incentive compensation effects_Effort effects						
ICE_E_1	0.352	*0.680*	0.240	0.156	0.104	-0.036
ICE_E_2	0.224	*0.792*	0.438	0.247	0.104	-0.027
ICE_E_3	0.244	*0.721*	0.488	0.253	0.076	0.012
ICE_E_4	0.175	*0.698*	0.463	0.329	0.215	0.182
ICE_E_5	0.280	*0.854*	0.435	0.300	0.163	0.088
ICE_E_6	0.247	*0.824*	0.469	0.315	0.251	0.165
ICE_E_7	0.189	*0.872*	0.509	0.275	0.125	0.109
3 – ICE_S – Incentive compensation effects_Selection effects						
ICE_S_1	0.059	0.426	*0.782*	0.553	0.334	0.423
ICE_S_2	0.077	0.395	*0.719*	0.281	0.305	0.166
ICE_S_3	0.259	0.545	*0.756*	0.532	0.321	0.371
ICE_S_4	0.102	0.330	*0.688*	0.480	0.388	0.171
ICE_S_5	0.021	0.340	*0.750*	0.419	0.203	0.303
4 – P_DP – Performance_Decision-making processes						
P_DP_1	0.109	0.321	0.502	*0.787*	0.335	0.338
P_DP_2	0.128	0.331	0.586	*0.847*	0.379	0.392
P_DP_3	0.108	0.294	0.533	*0.878*	0.464	0.388
P_DP_4	0.046	0.181	0.473	*0.791*	0.416	0.398
P_DP_5	0.234	0.303	0.453	*0.795*	0.452	0.205
5 – P_IE – Performance_Internal efficiency						
P_IE_1	0.045	0.119	0.326	0.388	*0.814*	0.438
P_IE_2	0.136	0.087	0.316	0.443	*0.838*	0.454
P_IE_3	0.154	0.269	0.301	0.335	*0.775*	0.324
P_IE_4	0.056	0.162	0.375	0.383	*0.664*	0.253
6 – P_MP – Performance_Market performance						
P_MP_1	0.062	0.061	0.381	0.357	0.498	*0.839*
P_MP_2	0.078	0.083	0.332	0.372	0.327	*0.818*
P_MP_3	0.111	0.080	0.250	0.304	0.394	*0.764*
P_MP_4	0.044	0.114	0.305	0.276	0.227	*0.759*

Notes:
N = 112

Table D-9: Cross-loadings of constructs

2.1.2 Results of structural model

The assessment of the structural model also follows the criteria introduced in Part B and relies on multiple squared correlations (R^2), path coefficients, effect sizes (f^2), and predictive relevance (Q^2). Procedures and results of the analysis are depicted in Figure D-4 and described below.

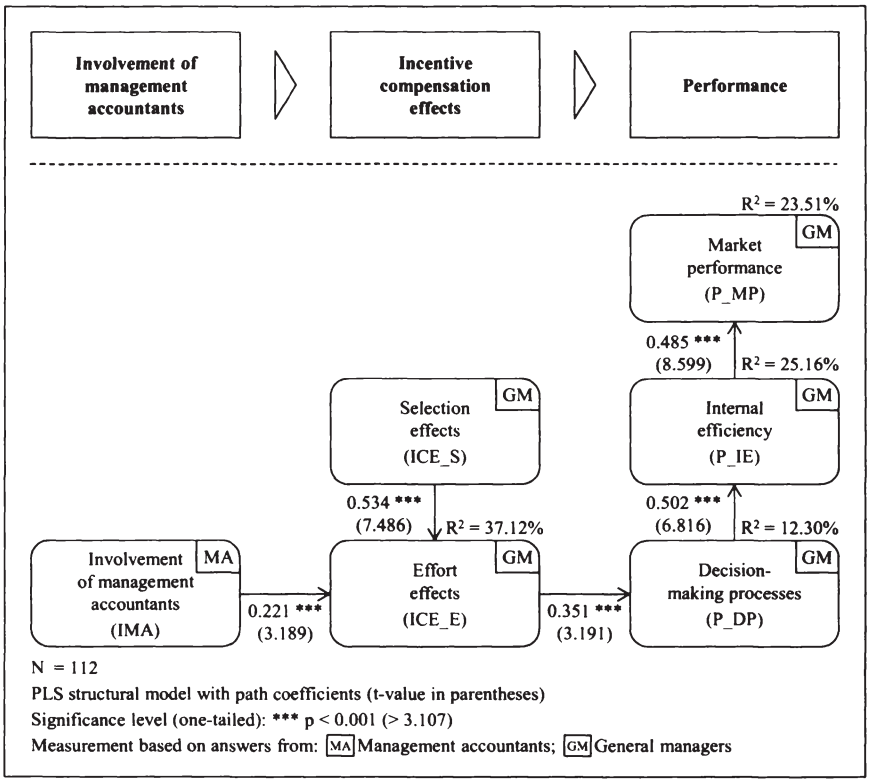

Figure D-4: Results of structural model analysis – main research model

Multiple squared correlations (R^2)

Values of R^2 statistics of the main research model are between 12.30% and 37.12%. According to the suggestions of *Chin* (1998a), p. 323, the values can be labeled as 'weak' and 'moderate'. Bearing in mind that only one of the constructs has more than one antecedent construct, this research design will rather lead to lower R^2 values.

Thus, the results can be considered as satisfactory reflecting the research design and comparing them with results of other recent management accounting studies.[262]

Path coefficients

For hypotheses testing, I evaluate the path coefficients in terms of sign, magnitude, and significance. Significances of the path coefficients are determined by respective t-values that are derived from non-parametric resampling procedures[263]. The first hypothesis predicted that if management accountants are more involved in the design and the operation of incentive compensation systems, this should enhance the effort effects of the incentives with regard to direction, duration, and intensity of managerial activities. The empirical data support this hypothesis (H1: path coefficient = 0.221; t-value = 3.189; $p < 0.001$) and underpin the positive effects of an involvement of management accountants in responsibilities beyond their core tasks. This also supports the call for broader scopes of management accountants' activities and roles since they can contribute to the effectiveness of the firm's controls. The second hypothesis embraces the two constructs of incentive compensation effects. I predicted that there is a positive association between the selection and the effort effects. The obtained empirical data allow to corroborate the hypothesis (H2: path coefficient = 0.534; t-value = 7.486; $p < 0.001$). As presumed, the results of this hypothesis are stronger than the results of the first hypothesis underpinning the importance of managerial competencies. The third hypothesis connects the incentive compensation effects elements with the performance dimension. Initially, I predicted a positive association between the ICE_E construct and decision-making processes. Empirical results show that the proposed relation is supported (H3: path coefficient = 0.351; t-value = 3.191; $p < 0.001$). The subsequent hypothesis on the performance path links decision-making processes with internal efficiency. Reflecting the results, I also corroborate the fourth hypothesis (H4: path coefficient = 0.502; t-value = 6.816; $p < 0.001$). The last hypothesis of the research model proposes an association between internal efficiency and market performance. Empirical data suggest to confirm this hypothesis as well (H5: path coefficient = 0.485; t-value = 8.599; $p < 0.001$). Overall, results are satisfactory since they are consistent with the expectations and all hypotheses of the main research model are cor-

262 E.g., *Bouwens/van Lent* (2007); *Homburg/Stebel* (2009); *Naranjo-Gil/Hartmann* (2007).

263 Bootstrapping: 500 samples with replacement; cases: 112.

roborated taking sign, magnitude, and significance of path coefficients into consideration.

Effect sizes (f^2)

After analyzing the path coefficients, I proceed with effect sizes (f^2) as next element of the research agenda. A calculation of effect sizes is possible for the relations between IMA and ICE_E and between ICE_S and ICE_E. Following *Chin* (1998a), p. 316f., results indicate a small effect for the former relation (f^2 = (0.371-0.328)/(1-0.371) = 0.069) and a strong effect (f^2 = (0.371-0.099)/(1-0.371) = 0.433) for the latter one. This result is generally consistent with my expectations; I assumed and could verify with the empirical data that involvement of management accountants has a significant impact on the effort effects of incentive compensation. Nevertheless, I am aware that effects that result from the ICE_S construct have presumably a stronger impact on the ICE_E construct since 'good' managerial actions and decisions initially depend on the abilities of the managers whereas management accountants 'only' potentially enhance the controls.

Predictive relevance (Q^2)

As last criterion to assess the structural model, I review the *Stone-Geisser*-test-criterion redundancy Q^2. The predictive relevance is satisfactory since all redundancy Q^2 amounts of the research model that have been derived by the application of blindfolding procedures meet this criterion as they are all above zero (ICE_E: 0.198; P_MP: 0.125; P_IE: 0.131; P_MP: 0.125).

The second research question of the present study is intended to elaborate on the influence of a possible involvement of management accountants in incentive compensation. The research model derived to answer the question as well as gathered empirical data allow it to be concluded that the impact of an involvement of management accountants in incentive compensation is, in principle, positive for organizations. In particular, data provide adequate support and indicate robustness of the hypotheses, which postulated an enhancement of the effort effects of the incentive schemes and, subsequently, firm performance. The results of this part of the thesis also provide further support to reaffirm the importance of management accountants' roles. Management

accountants may contribute to their organizations with their core tasks and with responsibilities that lie beyond their 'traditional' activities.

Albeit the results presented above are satisfactory, two aspects might be of further interest; they will be analyzed and discussed in the following Section 2.2 on alternative research models:

- The previous reasoning dealt with the increasing breadth of management accountants' tasks. In spite of this thought, management accountants are typically exposed to role conflicts and one of their roles dominates their activeties.[264] Following the ideas of *Mouritsen* (1996), p. 297, I accordingly presume that the role with the highest priority for the management accountant has an impact on the involvement in incentive compensation. For example, management accountants placing a higher weight on advisory tasks – measured in terms of workload – will supposedly be more involved in incentive compensation compared to management accountants emphasizing information providing tasks.
- Besides role emphases in terms of workload, the trend toward business-oriented behavior will probably also impact the involvement of management accountants in incentive compensation. In this regard, I presume that management accountants who act in a business-oriented way will accordingly also be more strongly involved in inventive compensation. For testing this presumption, I combine the research model introduced in Part C of the present study with the construct related to the involvement of management accountants in incentive compensation.

2.2 Results of alternative research models

2.2.1 Impact of dominant role types on the involvement of management accountants in incentive compensation

In order to gain more insights into tasks and roles of management accountants in incentive compensation, I include specific role models in the analysis. To obtain required data, I basically followed the ideas of *Newman/Smart/Vertinsky* (1989), p. 131, and asked management accountants to distribute their workload (percentage) among

[264] Ref. *Maas/Matějka* (2009), p. 1234-1236.

three roles. Apart from the role as advisor to management, I split the role as information provider due to the reason that there are two addressees of management accounting information, i.e., management itself and financial reporting. I denoted those two roles as "Provider of advanced management accounting information" and as "Provider of information for financial reporting purposes".[265] Against the background that literature and my presumptions suggest that the role model with the highest priority for the respective management accountants might have an impact on the results of the research model, I tried to derive in addition a 'dominant role type'[266] for every respondent. This dominant role type is obtained by selecting the role with the highest allocated workload. I am aware that those roles and especially the derived dominant role types are just ideals since management accountants in the most cases fulfill – at least partially – all roles and do not only adopt one of them. Furthermore, it is not always possible to clearly cluster their activities into those three roles. Although this marks a limitation, I am confident that the data is suitable for sub-group analyses and to gain further insights.

Prior to the sub-group analyses, selected descriptive statistics and mean comparisons offer first insights. The following results are especially derived from answers of all 160 participating management accountants ("MA data set").

Descriptive statistics and mean comparisons

Results of respondents' answers regarding their roles are presented in Table D-10 and basically provide evidence that all three roles are existent. Reflecting the mean scores, the respondents spend the largest portion of their working time with advisory tasks to management (43.21%). The roles as information provider to management (33.83%) and for financial reporting purposes (22.96%) are of lower importance. Despite the fact that this research setting and the corresponding results do not reveal any intertemporal effects it can be concluded that those results are basically consistent with recent literature introduced earlier in the present study, which suggest a stronger and an increasing focus of management accountants on advisory tasks.

265 Ref. *Weißenberger* (2007), p. 40; *Angelkort/Sandt/Weißenberger* (2008), p. 16.
266 Similarly, *Henri* (2006b), p. 80.

Role of management accountant	Mean	Std. dev.	Min	Max
Advisor to management	43.21%	20.582	0.00%	85.00%
Provider of advanced management accounting information	33.83%	16.967	5.00%	80.00%
Provider of information for financial reporting purposes	22.96%	17.132	0.00%	80.00%

Notes:
N = 160

Table D-10: Descriptive statistics of management accountants' roles

Dominant role types are especially derived to deepen the analyses. I was able to allocate 136 (dyadic data set: 95) management accountants to a specific dominant role type. The answers of 24 respondents (dyadic data set: 17) have been excluded since a distinct allocation to one of the roles was not possible. Data in Table D-11 indicate that most management accountants (73; dyadic data set: 49) basically see themselves as an advisor to management. This is consistent with the results previously described that management accountants spend – on average – 43.21% of their working time on consulting activities. 42 (dyadic data set: 34) of the respondents allocated most of their working time to their role as provider of advanced management accounting information. Finally, 21 (dyadic data set: 12) of the respondents could be allocated to the third dominant role type, management accountants as a provider of information for financial reporting purposes.

To broaden the analysis regarding the degree of involvement of management accountants in incentive compensation, I check whether the dominant role type has an impact on the degree of involvement. First, I derive a mean score based on the seven items of the construct on the involvement of management accountants in incentive compensation for every respondent. Second, I group those scores by the dominant role types and derive a mean for the three dominant roles. Results indicate that management accountants who deem themselves more as an advisor to management tend to be more strongly involved in incentive compensation than the other two groups; corresponding details are presented in Table D-11. I computed a non-parametric *Kruskal-Wallis*-test to check if there are significant differences of involvement due to the dominant role types. Results of the test (chi-square = 6.151; p = 0.046) confirm differences in the assessments.

Role of management accountant	N (%)	Involvement of MAs			
		Mean	Std. dev.	Min	Max
Dominant role type					
Advisor to management	73 (53.68%)	4.605	0.909	2.143	6.000
Provider of advanced management accounting information	42 (30.88%)	4.187	1.211	1.714	6.000
Provider of information for financial reporting purposes	21 (15.44%)	4.041	0.973	2.429	5.857

Notes:
N = 160 (thereof allocated: 136)
MA – Management accountant

Table D-11: Involvement of management accountants according to dominant role types

Sub-group analyses

Sub-group analyses start with the generation of specific data sets. In this regard, I split the dyadic data according to the dominant role types. The first alternative data set (denoted as "Alternative model A") consists of 49 companies with respondents maintaining the dominant role type "Advisor to management". The second alternative data set (denoted as "Alternative model B") embraces assessments of 34 companies with management accountants allocating most of their time to the dominant role type "Provider of advanced management accounting information". I did not set up a third data set since only 12 management accountants have been allocated to the role type "Provider of information for financial reporting purposes" resulting in an insufficient sample size to process PLS analyses.

As presented in Table D-12, the measurement models analyzed with the two alternative data sets reveal sound reliability and validity. Thus, the results indicate no limitations for the analyses of the structural models.

Construct	Alternative model A			Alternative model B		
	CA	CR	AVE	CA	CR	AVE
IMA	0.891	0.912	0.599	0.932	0.935	0.673
ICE_E	0.887	0.913	0.602	0.907	0.925	0.640
ICE_S	0.819	0.872	0.578	0.802	0.860	0.559
P_DP	0.831	0.881	0.599	0.937	0.951	0.796
P_IE	0.843	0.894	0.678	0.731	0.835	0.569
P_MP	0.801	0.866	0.619	0.830	0.875	0.638
N		49			34	

Notes:
CA – Cronbach's alpha; CR – Composite reliability; AVE – Average variance extracted
Constructs: IMA – Involvement of management accountants; ICE_E – Effort effects; ICE_S – Selection effects; P_DP – Decision-making processes; IE – Internal efficiency; MP – Market performance

Table D-12: Construct assessment – alternative models

To conduct sub-group analyses for assessing the impact of dominant role types, I rely on the procedures introduced in Part B of the study and especially evaluate path coefficients and R^2 values. Details on the evaluation of the three structural models are provided in Table D-13 and Figure D-5.

Construct	Main research model		Alternative model A		Alternative model B	
	Path coef.	t-value	Path coef.	t-value	Path coef.	t-value
Description of path						
IMA → ICE_E	0.221 **	3.052	0.405 ***	5.803	0.118 n.s.	0.495
ICE_S → ICE_E	0.534 ***	6.976	0.487 ***	4.720	0.508 ***	3.499
ICE_E → P_DP	0.351 **	3.095	0.526 ***	3.985	0.392 *	1.949
P_DP → P_IE	0.502 ***	7.032	0.594 ***	7.133	0.469 ***	3.448
P_IE → P_MP	0.485 ***	8.684	0.454 ***	4.896	0.600 ***	8.018
R^2						
ICE_E	37.12%		55.30%		27.41%	
P_DP	12.30%		27.65%		15.40%	
P_IE	25.16%		35.33%		22.02%	
P_MP	23.51%		20.57%		36.04%	
N	112		49		34	

Notes:
Constructs: IMA – Involvement of management accountants; ICE_E – Effort effects; ICE_S – Selection effects; P_DP – Decision-making processes; IE – Internal efficiency; MP – Market performance
Significance level (one-tailed): *** $p < 0.001$ (> 3.107); ** $p < 0.01$ (> 2.334); * $p < 0.05$ (> 1.648); n.s. – not significant

Table D-13: Overview results structural models

Results of the alternative models are in general satisfying and similar to those of the main research model. Differences are especially indicated for the relation between the IMA and the ICE_E constructs. In this regard, I especially conduct three comparisons: The main research model with alternative model A, the main research model with alternative model B, and the two alternative models.

- Alternative model A embracing answers of management accountants allocating most of their time to advisory tasks reveals a stronger effect of an involvement of management accountants on the effort effects of incentive compensation than the one of the main research model. Results of the subgroup analysis reveal a probability of 96.62% that the path coefficient of the alternative model A is larger than the path coefficient of the main research model.
- Analyzing alternative model B, especially two aspects are of interest: First, there is no significant path for the relation between the involvement of man-

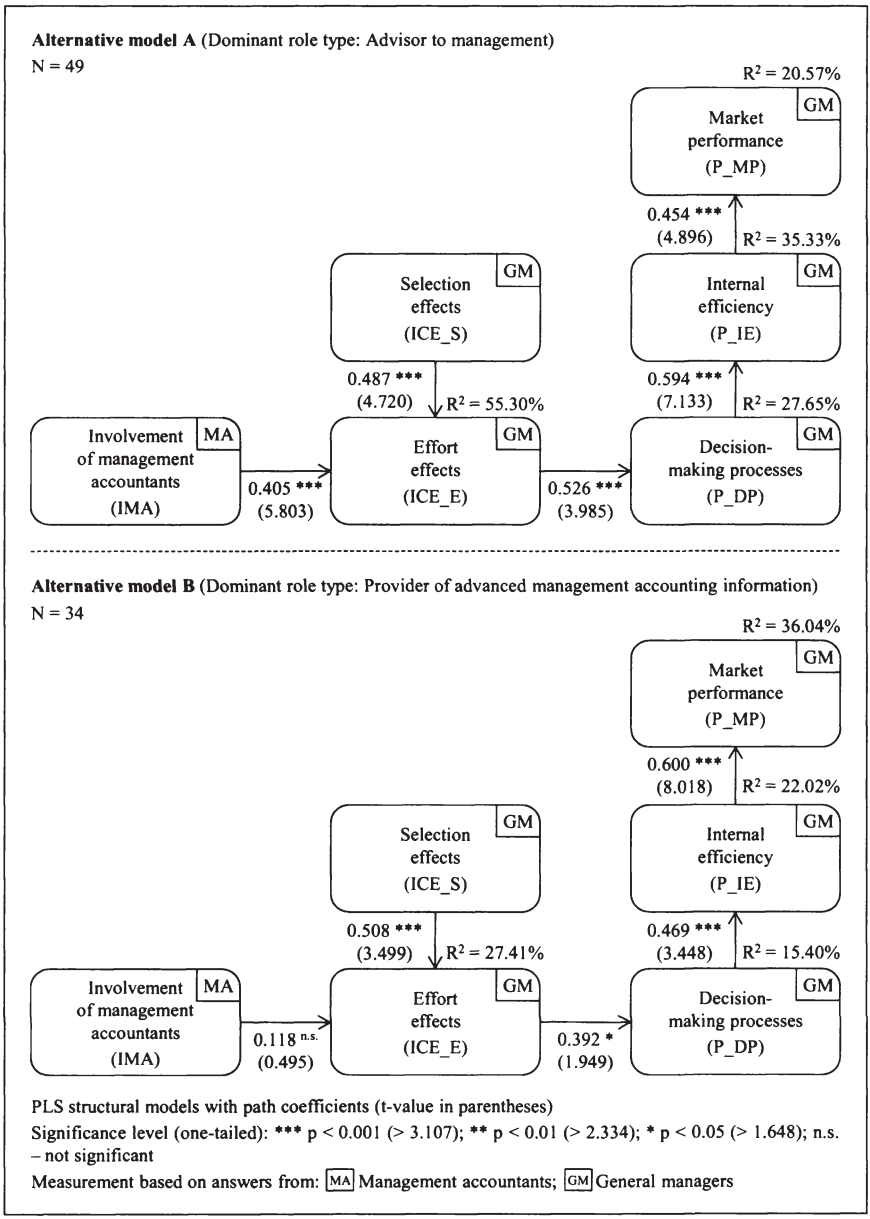

Figure D-5: Results of structural model analysis – alternative models

agement accountants and the effort effects of incentive compensation. Second, the comparison of this alternative model with the main research models shows only a probability of 57.56% that the path coefficient of the main research model is larger than the one of the alternative model.

- The comparison of the results of the two alternative models reveals different path coefficients and a probability that the path coefficient of alternative model A is larger than the one of alternative model B of 89.28%.

To complete those three comparisons it must be noted that only the first comparison between the alternative model A and the main research model indicates a significant difference ($p < 0.05$); the other two comparisons do not show significant results of the sub-group analyses.

Reflecting the R^2 values of the effort effects construct, the results also support the prior assessment as the highest amount is shown for alternative model A ($R^2 = 55.30\%$) and the lowest ($R^2 = 27.41\%$) for alternative model B.

Overall, the observations and results of the sub-group analyses lead to the conclusion that management accountants who predominantly act as an advisor to management are more involved in design and operation of incentive compensation systems compared to management accountants which spend most of their time with providing information; and they have obviously a stronger impact on the effort effects of incentive compensation.

2.2.2 Combination of research models

Previous argumentation led to the conclusion that management accountants who spend large portions of their working time budget on advisory tasks are more involved in incentive compensation and have a stronger impact on related controls. Individual attitude, perceived subjective norms, and especially the practice of acting business-oriented might also influence the involvement of management accountants. Both argumentations might have overlaps; nevertheless, they can be distinguished. Whereas the approach applied in the previous section focuses on working time spent on dedicated advisory tasks, the latter one, introduced in Part C of the thesis, addresses more attitudinal aspects of management accountants, i.e., business-oriented behavior which influences the broad scope of management accountants activities and roles. Against this background and to extend previous findings, I combine the research model introduced in Part C of the thesis with the construct related to the involvement of management ac-

countants in incentive compensation. The derived research model captures the idea of *Emsley* (2005) who reveals a positive association between business orientation of management accountants and the application of innovative management accounting services. The rationale of the model is that management accountants participating in managerial decision making in general are presumed to be also more involved in selected aspects that are beyond their core tasks.

Figure D-6 presents the research model and also the results of the structural model. The assessment of measurement models is not required since all measurement models have already been evaluated and have shown satisfying results. The path coefficient between the constructs "Practice" and "Involvement of management accountants" as well as the R^2 value of the latter construct reveal relatively high values (path coefficient = 0.515; t-value = 9.211; $p < 0.001$; $R^2 = 26.51\%$). Thus, the results confirm the presumption that business-oriented management accountants are more strongly involved in incentive compensation.

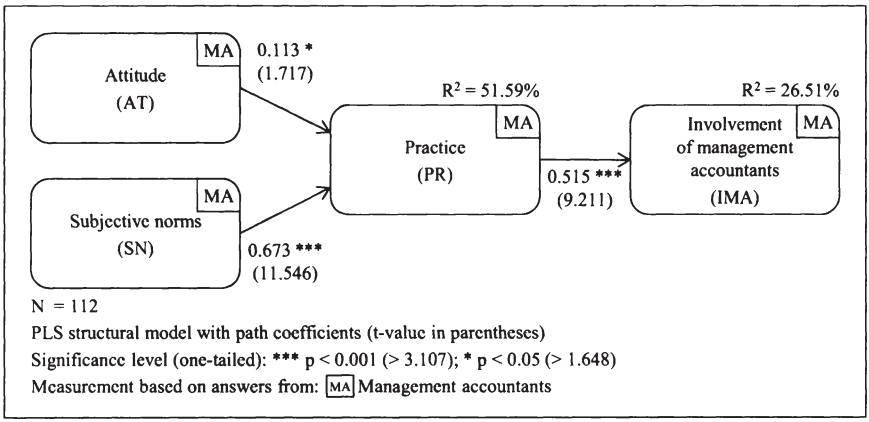

Figure D-6: Results of structural model analysis – alternative model

2.3 Robustness of results

The procedures to assess the robustness of the results basically follow the approach applied in Section 2.3 of Part C, including selected contextual factors and applied statistical techniques. The analyses rely in most cases on the dyadic data of the research; the

construct "Involvement of management accountants" is additionally also assessed by employing the "MA data set".[267]

External dynamism

Table D-14 provides descriptive statistics and mean comparisons for the first contextual factor on external dynamism. Similar to the results of the first research model, no indication for a sub-group difference can be identified signaling robustness of the research model.

Constructs/sub-groups	Dyadic data set				MA data set			
	Mean	p	Std. dev.	N	Mean	p	Std. dev.	N
Involvement of management accountants								
ED – Low	4.375	0.435	1.099	56	4.386	0.985	1.042	95
ED – High	4.526		1.067	56	4.363		1.067	65
Effort effects								
ED – Low	3.844	0.416	0.992	56				
ED – High	4.028		0.780	56				
Selection effects								
ED – Low	4.607	0.736	0.658	56				
ED – High	4.557		0.674	56				
Decision-making processes								
ED – Low	4.157	0.528	0.704	56				
ED – High	4.032		0.762	56				
Internal efficiency								
ED – Low	4.348	0.790	0.831	56				
ED – High	4.362		0.599	56				
Market performance								
ED – Low	4.161	0.528	0.973	56				
ED – High	4.286		0.856	56				

Notes:
MA – Management accountant; ED – External dynamism

Table D-14: Descriptive statistics and mean comparisons – "External dynamism"

[267] A *Mann-Whitney*-U-test indicates no significant difference in the central tendency of the data sets ("Involvement of management accountants": p = 0.534).

Internal dynamism

Table D-15 exhibits the statistics regarding the sub-groups on lower and higher internal dynamism. *Mann-Whitney*-U-tests reveal significant mean differences for the constructs "Selection effects" and "Market performance". This result indicates a possible sub-group difference and requires more detailed sub-group analyses.

Constructs/sub-groups	Dyadic data set				MA data set			
	Mean	p	Std. dev.	N	Mean	p	Std. dev.	N
Involvement of management accountants								
ID – Low	4.400	0.605	1.116	59	4.314	0.594	1.123	80
ID – High	4.507		1.048	53	4.439		0.973	80
Effort effects								
ID – Low	3.942	0.786	0.909	59				
ID – High	3.930		0.884	53				
Selection effects								
ID – Low	4.725	0.004 **	0.669	59				
ID – High	4.423		0.626	53				
Decision-making processes								
ID – Low	4.241	0.059	0.661	59				
ID – High	3.932		0.779	53				
Internal efficiency								
ID – Low	4.343	0.643	0.724	59				
ID – High	4.368		0.725	53				
Market performance								
ID – Low	4.419	0.019 *	0.840	59				
ID – High	4.005		0.951	53				

Notes:
MA – Management accountant; ID – Internal dynamism
Significance level: ** $p < 0.01$; * $p < 0.05$

Table D-15: Descriptive statistics and mean comparisons – "Internal dynamism"

Table D-16 offers details of the assessment of the measurement models. With one exception, all values are well above the respective thresholds. The average variance extracted statistics of the construct "Effort effects" is slightly below the minimum requirement of 0.5 (sub-group: "Internal dynamism – High"). Due to the reason that this scale is newly developed and the other requirements are fulfilled, a substantial bias is not to be expected.

Construct	Internal dynamism – Low			Internal dynamism – High		
	CA	CR	AVE	CA	CR	AVE
IMA	0.902	0.919	0.620	0.920	0.936	0.676
ICE_E	0.896	0.918	0.618	0.743	0.821	0.482
ICE_S	0.824	0.876	0.589	0.891	0.915	0.608
P_DP	0.848	0.892	0.623	0.896	0.923	0.706
P_IE	0.801	0.870	0.626	0.756	0.846	0.584
P_MP	0.791	0.858	0.604	0.818	0.877	0.642
N		59			53	

Notes:
CA – Cronbach's alpha; CR – Composite reliability; AVE – Average variance extracted
Constructs: IMA – Involvement of management accountants; ICE_E – Effort effects; ICE_S – Selection effects; P_DP – Decision-making processes; IE – Internal efficiency; MP – Market performance

Table D-16: Construct assessment – "Internal dynamism"

The results of the assessment of the structural models are displayed in Table D-17. A first qualitative evaluation of the constructs "Selection effects" and "Market performance" does not indicate possible sub-group differences. Path coefficients and R^2 values are similar for both sub-groups. Hypothesis tests do not confirm sub-group differences as well. The analysis for the relation between the constructs "Selection effect" and "Effort effect" ("Internal efficiency" and "Market performance") shows a non-significant probability of 72.34% (55.81%) that the path coefficient of the sub-group with companies facing a lower internal dynamism is larger than the path coefficient of the companies facing a higher internal dynamism. Thus, sub-group differences cannot be confirmed and the robustness of the model can still be assumed.

Construct	Internal dynamism – Low		Internal dynamism – High	
	Path coefficient	t-value	Path coefficient	t-value
Description of path				
IMA → ICE_E	0.211 *	1.978	0.217 *	1.713
ICE_S → ICE_E	0.599 ***	5.871	0.519 ***	5.395
ICE_E → P_DP	0.327 *	1.896	0.380 **	2.431
P_DP → P_IE	0.640 ***	8.004	0.411 ***	3.777
P_IE → P_MP	0.517 ***	8.564	0.500 ***	6.012
R^2				
ICE_E	45.67%		34.06%	
P_DP	10.71%		14.45%	
P_IE	40.94%		16.93%	
P_MP	26.72%		24.96%	
N	59		53	

Notes:
Constructs: IMA – Involvement of management accountants; ICE_E – Effort effects; ICE_S – Selection effects; P_DP – Decision-making processes; IE – Internal efficiency; MP – Market performance
Significance level (one-tailed): *** $p < 0.001$ (> 3.107); ** $p < 0.01$ (> 2.334); * $p < 0.05$ (> 1.648)

Table D-17: Overview results structural models – "Internal dynamism"

Company size

Tables D-18 and D-19 show descriptive statistics and results of the mean comparisons of the sub-groups referring to smaller and larger organizations in terms of revenue and employees. Whereas no signals for sub-group differences are indicated for the first contextual factor, the construct "Involvement of management accountants" shows a potential sub-group difference for the contextual factor referring to the number of employees in both data sets.

Constructs/sub-groups	Dyadic data set				MA data set			
	Mean	p	Std. dev.	N	Mean	p	Std. dev.	N
Involvement of management accountants								
REV – Small	4.388	0.611	1.140	57	4.288	0.420	1.128	79
REV – Large	4.508		1.032	54	4.463		0.976	79
Effort effects								
REV – Small	3.825	0.188	0.975	57				
REV – Large	4.061		0.797	54				
Selection effects								
REV – Small	4.540	0.771	0.762	57				
REV – Large	4.622		0.553	54				
Decision-making processes								
REV – Small	4.053	0.722	0.829	57				
REV – Large	4.122		0.616	54				
Internal efficiency								
REV – Small	4.399	0.396	0.759	57				
REV – Large	4.315		0.689	54				
Market performance								
REV – Small	4.154	0.485	0.993	57				
REV – Large	4.301		0.835	54				

Notes:
MA – Management accountant; REV – Size (Revenue)

Table D-18: Descriptive statistics and mean comparisons – "Size (Revenue)"

Constructs/sub-groups	Dyadic data set				MA data set			
	Mean	p	Std. dev.	N	Mean	p	Std. dev.	N
Involvement of management accountants								
EMP – Small	4.185	0.029 *	1.195	57	4.055	0.0003 ***	1.104	80
EMP – Large	4.725		0.878	55	4.705		0.891	79
Effort effects								
EMP – Small	3.905	0.995	0.978	57				
EMP – Large	3.969		0.805	55				
Selection effects								
EMP – Small	4.621	0.416	0.686	57				
EMP – Large	4.542		0.644	55				
Decision-making processes								
EMP – Small	4.119	0.625	0.770	57				
EMP – Large	4.069		0.698	55				
Internal efficiency								
EMP – Small	4.456	0.175	0.636	57				
EMP – Large	4.250		0.792	55				
Market performance								
EMP – Small	4.158	0.344	0.949	57				
EMP – Large	4.291		0.880	55				

Notes:
MA – Management accountant; EMP – Size (Employees)
Significance level: *** $p < 0.001$; * $p < 0.05$

Table D-19: Descriptive statistics and mean comparisons – "Size (Employees)"

Table D-20 discloses the results of the assessment of the measurement models and basically indicates appropriate values for the respective criteria. *Cronbach*'s alpha of the construct "Internal efficiency" is slightly below the threshold of 0.7 (sub-group: "Size (Employees) – Small"). However, a major distortion of the results is not to be expected since the more conservative criteria composite reliability and average variance extracted are above the respective minimum requirements.

Construct	Size (Employees) – Small			Size (Employees) – Large		
	CA	CR	AVE	CA	CR	AVE
IMA	0.912	0.929	0.653	0.884	0.903	0.571
ICE_E	0.923	0.939	0.688	0.845	0.884	0.524
ICE_S	0.805	0.863	0.558	0.792	0.852	0.537
P_DP	0.889	0.918	0.693	0.869	0.905	0.655
P_IE	0.667	0.799	0.506	0.842	0.894	0.679
P_MP	0.838	0.891	0.672	0.793	0.859	0.605
N		57			55	

Notes:
CA – Cronbach's alpha; CR – Composite reliability; AVE – Average variance extracted
Constructs: IMA – Involvement of management accountants; ICE_E – Effort effects; ICE_S – Selection effects; P_DP – Decision-making processes; IE – Internal efficiency; MP – Market performance

Table D-20: Construct assessment – "Size (Employees)"

As displayed in Table D-21, the path coefficients between the constructs "Involvement of management accountants" and "Effort effects" are similar for both sub-groups. This assessment is confirmed by a test for significance; the analysis shows a non-significant probability of 53.53% that the path coefficient of the sub-group with smaller companies is larger than the path coefficient of the larger companies. The results also add to the prior conclusions that the research model is basically robust against influencing factors.

Construct	Size (Employees) – Small		Size (Employees) – Large	
	Path coefficient	t-value	Path coefficient	t-value
Description of path				
IMA → ICE_E	0.218 *	2.175	0.205 *	1.792
ICE_S → ICE_E	0.596 ***	5.914	0.473 ***	4.292
ICE_E → P_DP	0.376 *	2.278	0.347 **	2.641
P_DP → P_IE	0.537 ***	5.590	0.506 ***	4.500
P_IE → P_MP	0.505 ***	6.340	0.505 ***	5.977
R^2				
ICE_E	43.79%		32.44%	
P_DP	14.13%		12.05%	
P_IE	28.84%		25.60%	
P_MP	25.55%		25.49%	
N	57		55	

Notes:
Constructs: IMA – Involvement of management accountants; ICE_E – Effort effects; ICE_S – Selection effects; P_DP – Decision-making processes; IE – Internal efficiency; MP – Market performance
Significance level (one-tailed): *** $p < 0.001$ (> 3.107); ** $p < 0.01$ (> 2.334); * $p < 0.05$ (> 1.648)

Table D-21: Overview results structural models – "Size (Employees)"

Organizational structure

The last contextual factor to be explored is the organizational structure of corporations. Table D-22 offers the respective details on descriptive statistics and mean comparisons. A *Kruskal-Wallis*-test for the construct "Selection effects" indicates a possible sub-group difference, which will be further explored below. Nevertheless, due to sample size requirements it is only possible to create sub-groups for "Holding" and "Subsidiary/joint venture".

Constructs/sub-groups	Dyadic data set				MA data set			
	Mean	p	Std. dev.	N	Mean	p	Std. dev.	N
Involvement of management accountants								
Holding	4.682		1.001	44	4.613		1.005	68
Interm. holding	4.180	0.150	1.038	23	4.143	0.086	0.982	26
Subsidiary/JV	4.322		1.160	43	4.244		1.078	61
Non-aff. company	5.214		0.707	2	4.000		1.266	5
Effort effects								
Holding	4.110		0.915	44				
Interm. holding	3.845	0.398	0.843	23				
Subsidiary/JV	3.807		0.893	43				
Non-aff. company	3.929		1.111	2				
Selection effects								
Holding	4.777		0.639	44				
Interm. holding	4.513	0.020 *	0.542	23				
Subsidiary/JV	4.451		0.712	43				
Non-aff. company	3.900		0.424	2				
Decision-making processes								
Holding	4.236		0.669	44				
Interm. holding	4.070	0.165	0.689	23				
Subsidiary/JV	3.995		0.810	43				
Non-aff. company	3.400		0.283	2				
Internal efficiency								
Holding	4.409		0.645	44				
Interm. holding	4.163	0.625	0.952	23				
Subsidiary/JV	4.413		0.666	43				
Non-aff. company	4.125		0.177	2				
Market performance								
Holding	4.420		0.902	44				
Interm. holding	4.109	0.150	0.742	23				
Subsidiary/JV	4.134		0.978	43				
Non-aff. company	3.125		0.884	2				

Notes:
MA – Management accountant; JV – Joint venture
Significance level: * $p < 0.05$

Table D-22: Descriptive statistics and mean comparisons – "Organizational structure"

Results of the assessment of the measurement models are displayed in Table D-23. Requirements in terms of composite reliability are not met for three constructs of the sub-group "Holding" (IMA; ICE_S; P_IE). Furthermore, *Cronbach*'s alpha of the construct "Internal efficiency" is below the threshold for the sub-group "Subsidiary/joint venture". Results of the structural models should be evaluated with caution reflecting possible limitations due to an eventually limited quality of measurement models. However, the values are only slightly below the respective thresholds and should not hinder a careful analysis of the structural models.

Construct	Organizational structure – Holding			Org. structure – Subsidiary/JV		
	CA	CR	AVE	CA	CR	AVE
IMA	0.904	0.574	0.904	0.926	0.939	0.690
ICE_E	0.922	0.628	0.901	0.897	0.920	0.628
ICE_S	0.876	0.587	0.825	0.790	0.853	0.538
P_DP	0.906	0.658	0.870	0.898	0.925	0.711
P_IE	0.847	0.584	0.763	0.686	0.810	0.532
P_MP	0.885	0.658	0.827	0.823	0.870	0.627
N		44			43	

Notes:
CA – Cronbach's alpha; CR – Composite reliability; AVE – Average variance extracted; JV – Joint venture
Constructs: IMA – Involvement of management accountants; ICE_E – Effort effects; ICE_S – Selection effects; P_DP – Decision-making processes; IE – Internal efficiency; MP – Market performance

Table D-23: Construct assessment – "Organizational structure"

Table D-24 displays the two structural models of the sub-groups "Holding" and "Subsidiary/joint venture". The path coefficient between the constructs "Selection effects" and "Effort effects" as well as the R^2 value of the construct "Effort effects" are at a first glance higher in the sub-group "Subsidiary/joint venture" than in the sub-group "Holding" signaling a stronger impact of the selection effect in subsidiaries or joint ventures. However, the test for significance does not confirm this assessment revealing a non-significant probability of 87.80%.

Construct	Organizational structure – Holding		Org. structure – Subsidiary/JV	
	Path coefficient	t-value	Path coefficient	t-value
Description of path				
IMA → ICE_E	0.245 *	1.793	0.262 *	2.255
ICE_S → ICE_E	0.474 ***	4.139	0.638 ***	7.411
ICE_E → P_DP	0.482 ***	3.983	0.404 **	2.373
P_DP → P_IE	0.646 ***	6.557	0.409 **	2.796
P_IE → P_MP	0.547 ***	5.748	0.507 ***	6.303
R^2				
ICE_E	33.07%		56.83%	
P_DP	23.22%		16.28%	
P_IE	41.79%		16.72%	
P_MP	29.93%		25.66%	
N	44		43	

Notes:
JV – Joint venture
Constructs: IMA – Involvement of management accountants; ICE_E – Effort effects; ICE_S – Selection effects; P_DP – Decision-making processes; IE – Internal efficiency; MP – Market performance
Significance level (one-tailed): *** $p < 0.001$ (> 3.107); ** $p < 0.01$ (> 2.334); * $p < 0.05$ (> 1.648)

Table D-24: Overview results structural models – "Organizational structure"

Overall, the results of the procedures to check the robustness of the research model are satisfactory. The evaluation of descriptive statistics, mean comparisons, and sub-group analyses do not reveal an argumentation that the model is influenced by a specific contextual factor.

3 Summary of Part D

Part D of the present study addresses the second research question about the involvement of management accountants in incentive compensation. The first chapter is devoted to reviewing related literature, deriving the hypotheses and the research model, and illustrating the constructs employed in the model. In particular, the literature review offers descriptions of the changing tasks and roles of management accountants with a special emphasis on activities related to incentive compensation. The hypotheses and the theoretical model are derived from prior knowledge in the respective field of research and the argumentation in this chapter. The model proposes a positive effect of an involvement of management accountants in incentive compensation on the effort

effects of incentives and, subsequently, also on performance. Furthermore, it posits a positive association between selection and effort effects. With regard to its multilayer and complex character, performance is measured with three consecutive constructs, namely "Decision-making processes", "Internal efficiency", and "Market performance".

Results of the analyses are reported in the second chapter of this part. For conducting the analyses, I basically rely on the gathered empirical data and the PLS technique. The criteria for assessing the measurement models reveal satisfying results and indicate sound operationalization. All hypotheses of the main research model can be confirmed, supporting the proposition of a positive impact of management accountants' involvement in incentive compensation on the effects of incentives and on performance. The first alternative model incorporates dominant role types into the research. The analyses show that management accountants who deem themselves more as an advisor to management are typically more involved in incentive compensation and contribute more strongly to the effects of incentives. The second analysis on alternative models combines the research model introduced in Part C with the construct on the involvement of management accountants. It becomes evident that business-oriented management accountants tend to be more strongly involved in incentive compensation. Finally, the last procedures basically confirm the robustness of the theoretical model.

To conclude, this part responds the second research question and confirms a positive influence of an involvement of management accountants in incentive compensation on the effects of incentive compensation and on performance.

E Conclusion

This final part of the thesis concludes the study discussing its theoretical and methodological contributions, its practical implications, its inherent limitations, and possible avenues for future research.

1 Contributions

The starting point of this research was the claim of a possible relevance loss of management accounting and the following debate in business practice and academic research. A review of prior work highlighted that research in this field is rather fragmented and exhibits several research gaps. Accordingly, the purpose of this study is to close selected gaps and gain a deeper understanding of management accountants' business orientation and extended responsibilities. In particular, two research questions were raised:

Research question 1:	Why do management accountants act as business partners and what is the impact of this practice on management accountants' contribution?
Research question 2:	Does the involvement of management accountants in incentive compensation positively influence the effects of incentive compensation systems and, subsequently, firm performance?

In order to answer the two research questions, I decided to follow an empirical research strategy. I derived two research models and corresponding hypotheses and tested the hypotheses using the PLS technique. Dyadic data for the analyses were gathered by means of a questionnaire-based survey with management accountants and general managers of medium- and large-sized German companies from different industries.

Regarding the first research question, the results offer evidence and robust support for the derived hypotheses. The analyses show that especially subjective norms have a stronger impact on the practice of management accountants acting business-oriented than management accountants' attitude. Moreover, the empirical data reinforce the frequently postulated positive effect of management accountants' business ori-

entation since the analysis shows a positive association between management accountants' practice of acting business-oriented and their contribution.

Regarding the second research question, the analyses show positive associations between the involvement of management accountants in incentive compensation, the effort effects of incentive schemes, and firm performance. Simultaneously, the selection effects have a stronger influence on the effort effects than the consequences resulting from an involvement of management accountants. However, the analyses provide support for the claimed positive effects of wider responsibilities of management accountants.

The findings of the study contribute to management accounting research by providing further evidence on the avenue of regaining relevance. More specifically, the study contributes to the growing stream of literature on management accountants' roles in organizations and supports the claim that management accountants' business orientation and wider responsibilities are valuable. The research shows that management accountants can contribute to managerial decision making and that the task bundle of management accountants should also embrace responsibilities which lie beyond their core activities as information providers.

The study contributes to research in the field of management accounting since it responds the call for more research on management accountants. Furthermore, it especially adds to the empirical management accounting research conducted in German-speaking countries by gathering data in Germany and analyzing the responses with advanced statistical techniques.

The research also contributes to literature and business practice as it addresses management problems. In theory and business practice it is partly questioned if management accountants' business orientation is more favorable than management accountants' independence or if management accountants are capable to have extended responsibilities. The results do not provide an answer as to which of these options is better; however, they offer evidence for the positive effects of a business orientation and an involvement in incentive compensation.

The study also contributes to literature since it employs the well-established theory of reasoned action for answering the first research question. Moreover, thoughts of other established theoretical frameworks are used for answering the second research question. Thus, the study is basically consistent with the calls for more theoretically grounded scholarly activities.

Additionally, the present work contributes to literature with the expansion of existing research instruments and the development of some new scales for measuring the theoretical concepts of the study. Statistics on reliability and validity of those instruments disclose satisfactory results and may serve as basis for future activities in this field.

Finally, whereas other work in this stream of research uses case-based or interview-based approaches or exhibits only smaller sample sizes, I have been able to use a relatively large dyadic data set and advanced multivariate statistics which proved to serve well for data analysis. This approach is also consistent with the request of *Atkinson et al.* (1997), p. 99f., to apply more multi-informant research designs.

2 Implications for business practice

The results of the study may provide insights for management accountants and general managers in business practice. First of all, the findings should spark a stronger business-oriented behavior of management accountants. To enforce such transformations, general managers should clearly communicate their needs and expectations regarding the services of management accountants. Furthermore, findings encourage management accountants to contribute to their organization in broader areas and to play a part in responsibilities beyond their core tasks. Management accountants should propose and signal to general management that they have the required aptitudes and if general managers' perception of the competencies of management accountants improves, general managers might allocate wider tasks to management accountants.

However, some organizations might fear a reduced level of objectivity or quality of management accountants' services if management accountants are getting involved in expanded responsibilities. The results of the study may help management accountants to convince general managers, who might expect a more 'traditional' role from management accountants, to involve management accountants more strongly in decision-making processes or in additional responsibilities.

Business partnering and expanded responsibilities require, however, management accountants to have adequate competencies in terms of finance know how, a broad set of soft skills, sound business knowledge, and familiarity regarding organization's functions and operations. Selected management accountants might exhibit relevant expertise but there might also be management accountants requiring proper training. In addition to individual training programs, corporations should review their HR develop-

ment curriculum accordingly and amend it if necessary.[268] Enhanced schedules could, for instance, embrace programs on effective communication or on business topics and could also include joint get-togethers or social events with general managers to strengthen the relationships. However, this does not mean that programs on rather 'technical' management accounting instruments should be removed from the agenda; but it should be highlighted within the programs that business orientation helps and will probably increases the acceptance of the application of these instruments.

3 Limitations

As it is the case for most research activities, limitations have to be kept in mind when drawing conclusions. Basically, there are five aspects to be mentioned which are beyond the limitations typically mentioned concerning the application of questionnaire-based surveys (for example, limited possibility to answer queries from respondents or reduced flexibility).

First, I selected the theory of reasoned action as theoretical framework to answer research question number one. I am confident that this approach is appropriate for the present research objective which is to analyze the reasons why management accountants act as business partners. Nevertheless, there might also be other predictors of business orientation. Characteristics of management accountants or general managers, for instance the educational background[269], could influence business orientation or capabilities for wider tasks; these aspects might be, as described in the following explanations on suggestions for future research, a starting point for additional analyses.

Second, I implicitly assume that higher involvement of management accountants is always associated with an increase of the quality of provided services. Taking the discussion of possible concerns of extended tasks of management accountants into account, for example, reduced objectivity due to a higher involvement in managerial decision making, this aspect might reduce the validity of the results.

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268 Ref. *Matthews* (1998).

269 For example, the work of *Naranjo-Gil/Maas/Hartmann* (2009) analyzes the impact of CFO characteristics on the use of management accounting innovations and could be a starting point for future research activities.

Third, similar to prior work in this field, I conducted data gathering procedures for the study in a single country, in this case Germany. A possible limitation in terms of generalizability might originate from the fact that roles of management accountants are, at least slightly, different in heterogeneous national or cultural surroundings.[270]

Fourth, I partly applied newly developed scales in the present research. Even if the instruments exhibit sound reliability and validity statistics, I am aware that they are subject to potential limitations and should be validated in future research activities. The instruments should be further discussed and developed in order to demonstrate appropriateness and to ensure that they capture the relevant subjects.

Fifth, the response rate is lower than desired. Nevertheless, it is deemed acceptable reflecting the complex research design because of the need for dyadic data and the growing number of firms with a policy generally not to participate in survey research.

Reflecting the possible limitations and caveats, I am still confident that the results contribute to management accounting literature and serve as one exhibit for management accounting on its way to regaining and assuring relevance.

4 Suggestions for future research

Although the study offers several insights and findings, the limitations already suggest ample room and potentials to further advance the knowledge in the analyzed field of management accounting research.

First of all, future scholarly activities could extend the findings on the reasons and motifs of management accountants to act in a business-oriented way. Personal characteristics of management accountants and general managers – for instance, aspects on education, career paths, or, as already mentioned, goal orientation of individuals – could be incorporated into the respective research models for future research activities. A starting point for those research activities could also be psychological theories or frameworks like the "Big Five"-factors[271] for the analysis of personality

[270] Ref. *Ahrens* (1996); *Granlund/Lukka* (1998).
[271] Ref. *Barrick/Mount* (1991).

traits or prior management accounting research on knowledge of management accountants[272].

A higher business orientation or extended responsibilities might also affect management accountants' job satisfaction and might be of interest for future research activities. Linking the present research with studies on job satisfaction could (i) respond the call for more research on management accountants' job satisfaction[273] and (ii) could also offer evidence for the validity of other management studies suggesting positive associations between participation in managerial decision making and job satisfaction.[274]

Future scholarly activities could combine aspects of the present study with career paths and promotion criteria of management accountants.[275] In this regard, potential activities could also pursue prior research on the image of accountants[276] and link possible changes in accountants' image with the trend toward business partnering or additionally occupied tasks.

As mentioned before, a possible limitation of the results might be caused due to the fact that the research is conducted in only one country. Since there is no doubt that replication is beneficial,[277] it might be illuminating to administer a research project across different countries to gain further insights into possible country-specific characteristics and differences. This would also be in line with research on changing roles of management accountants conducted in several countries[278] or on research on national differences in compensation practices[279]. In principle, international and cross-cultural studies are regularly suggested in management accounting research and offer room for scholarly activities.[280]

Moreover, future research activities could validate and further develop the measurement instruments applied in the present research. It may be possible to transfer the

272 Ref. *Stone/Hunton/Wier* (2000).
273 Ref. *Chenhall* (2003), p. 133.
274 Ref. *Lischeron/Wall* (1975), p. 499.
275 Ref. *Wier/Stone/Hunton* (2002).
276 Ref. *Baldvinsdottir et al.* (2009).
277 Ref. *Lindsay* (1995).
278 E.g., *Sathe* (1982), USA; *Byrne/Pierce* (2007), Ireland; *Zoni/Merchant* (2007), Italy; *Granlund/Lukka* (1998), Finland.
279 Ref. *Jansen/Merchant/Van der Stede* (2009).
280 Ref. *Kwok/Sharp* (1998), p. 158; *Merchant/Van der Stede/Zheng* (2003), p. 275.

ideas toward other management disciplines which also encounter a trend of an increasing business orientation, for instance HR.[281]

Additional research might be beneficial to better understand the causality between activities of management accountants, effects of control mechanisms, and performance. Whereas the cross-sectional data I obtained offers an adequate basis for the present analyses, longitudinal data could offer further insights into the effects of business orientation or extended activities of management accountants. Future research could also address the long-run effects possibly caused by an amended training program for management accountants. Those studies might embrace survey or in-depth case-based research initiatives.

The present research addressed the rather broad aspect of business orientation of management accountants and the particular aspect of an involvement of management accountants in incentive compensation. Future scholarly activities could reaffirm and extend the findings and could analyze an involvement of management accountants in other areas which do not belong to the core activities of management accountants as well. Those could, for instance, embrace corporate functions like marketing or procurement to which management accountants could contribute.

To sum up, the thesis focuses on important aspects for management accounting research and practice. Nevertheless, the conclusion and particularly the last paragraphs on future research potentials, which supposedly cannot be comprehensive, indicate that the field offers a broad set of opportunities for future interesting research endeavors.

[281] E.g., *Ulrich* (1997).

F Appendix

As noted in the introduction of the study, the appendix contains a tabular overview of prior empirical research addressing tasks and roles of management accountants. The studies are ordered by publication year.

Study/author(s)	Research method	Research objectives and results
Simon et al. (1954)	**Sample:**[282] More than 400 interviews with executives ((management) accountants, general managers, etc.) in seven companies (USA; cross-sectional sample) **Research strategy:**[283] Field research	**Research objective:** Investigate the organization of the management accounting function. **Results:** The authors derive a classification of management accountants' tasks and roles (score keeping, attention directing, and problem solving). Furthermore, they argue that services of management accountants, particularly provided information, are beneficial to managers and organizations.
Hopper (1980)	**Sample:** Twelve semi-structured interviews with management accountants in seven companies (UK; cross-sectional sample) **Research strategy:** Field research	**Research objective:** Analyze management accounting roles under conditions of centralization and decentralization of the management accounting function. **Results:** The author derives two partly conflicting roles for management accountants, namely a bookkeeping role and a service role. He finds criticism of the management accountants' passivity in management. However, he also explores that management accountants favoring the service role tend to prefer decentralization which is associated with stronger interaction between management accountants and general managers.

[282] Details of the sample descriptions are sometimes incomplete due to missing information in the respective sources.

[283] I basically distinguish between surveys, field research, which includes case-study- and interview-based research, and hybrid forms as research strategy, ref. *Shields* (1997), p. 8-13.

Study/author(s)	Research method	Research objectives and results
Sathe (1982)	**Sample:** 336 questionnaire-based interviews in 24 companies (USA; cross-sectional sample); respondents: (management) accountants/general managers **Research strategy:** Hybrid (Field research and survey) **Statistical analysis:** Correlation analysis	**Research objective:** Investigate the involvement of management accountants in managerial decision making. In particular, analyze (i) why management accountants are in some companies more involved than in other companies, and (ii) what are the consequences of the involvement for company performance. **Results:** The author argues that an involvement of management accountants is driven by management's demand for information which is, in turn, determined by environmental, internal business, and management characteristics. Especially, characteristics of general managers strongly influence involvement. Furthermore, he reports a positive correlation between involvement and financial performance.
Newman/Smart/ Vertinsky (1989)	**Sample:** 134 respondents (management) accountants/finance directors (Canada; cross-sectional sample) **Research strategy:** Survey **Statistical analysis:** t-test, ANOVA, factor analysis	**Research objective:** Investigate the occupational role dimensions (score keeping, attention directing, and problem solving) of management accountants. **Results:** The results show that score keeping is the most important role – measured in terms of time input – for (management) accountants. The authors also conclude that management accountants need adequate training to allow better problem-solving services.
Mouritsen (1996)	**Sample:** 370 management accountants (Denmark; cross-sectional sample) **Research strategy:** Survey **Statistical analysis:** Factor analysis	**Research objective:** Analyze the variety of management accountants' activities and derive corresponding clusters. **Results:** The analysis reveals five main activities of management accountants: bookkeeping, consulting, banking, controlling and administrating. Furthermore, the focus of management accountants' activities is more strongly influenced by the interaction with other organizational functions compared to external factors.
Friedman/Lyne (1997)	**Sample:** Eleven medium- and large-sized companies (UK); interviews conducted in 1992 and 1993 **Research strategy:** Field research	**Research objective:** Analyze the image of management accountants with a special emphasis on the effects of an implementation of activity-based management accounting techniques. **Results:** The study shows that management accountants were basically seen as 'bean counter' by operational managers. The implementation of activity-based management accounting techniques improved the image of management accountants.

Study/author(s)	Research method	Research objectives and results
Granlund/Lukka (1998)	**Sample:** Eight semi-structured interviews with (management) accountants in six companies (Finland; cross-sectional sample); interviews conducted in 1995 and 1996 **Research strategy:** Field research	**Research objective:** Analyze how Finnish culture impacts management accounting practice in the context of an ongoing cultural change. **Results:** The results of the analysis show an expansion of the management accountants' job descriptions with an increasing emphasis on advisory tasks, higher business orientation, and closer connections to the management team of the organizations. This trend is accompanied by a change in the Finnish culture triggered by a trend toward internationalization of Finnish companies.
Siegel/Sorensen (1999)	**Sample:** 300 telephone interviews (employing a standardized questionnaire) with management accountants (USA; cross-sectional sample); data gathering at the end of the 1990s **Research strategy:** Hybrid (telephone interviews/survey) **Statistical analysis:** Descriptive statistics	**Research objective:** Evaluate the work of management accountants with a special focus on changes in the last five years prior data gathering and expected changes in the next three years. **Results:** The results of the study show various changes in the profession of management accountants. In particular, management accountants spend more time on analyzing data and participating in decision-making processes, they shift more capacities toward non-traditional accounting tasks like strategic planning, internal consulting, or process improvement, and they increasingly hold leadership roles in cross-functional team. The authors particularly conclude that management accountants are able to provide more value to the company, have an improved image, and positively impact decision making.
Coad (1999)	**Sample:** 190 management accountants (UK; cross-sectional sample); data gathering in spring 1997 **Research strategy:** Survey **Statistical analysis:** Factor analysis	**Research objective:** Analyze learning and performance goal orientation of management accountants. **Results:** The research shows that management accountants with a learning goal orientation typically have an intrinsic interest in their work and intend to improve their competencies. In consequence, they are more likely to become a proactive internal business consultant than management accountants with a performance goal orientation. He also adds aspects on leadership to his research and finds that goal orientation of management accountants is influenced by the behavior of the management accountants' superiors.

Study/author(s)	Research method	Research objectives and results
Stone/Hunton/Wier (2000)	**Sample:** 2,941 management accountants of a US management accountants' industry association (cross-sectional sample) **Research strategy:** Survey **Statistical analysis:** ANOVA, MANOVA	**Research objective:** Explore rank-based differences (ranks are: junior management accountant, senior management accountant, and manager) regarding ability and knowledge (technical, industry, and tacit managerial knowledge) of management accountants. **Results:** The results of the study cannot confirm rank-based differences for ability; but the results offer evidence for differences regarding knowledge. In particular, with increases in rank, technical knowledge decreases and industry as well as tacit managerial knowledge increase.
Hunton/Wier/Stone (2000)	**Sample:** 2,941 management accountants of a US management accountants' industry association (cross-sectional sample) **Research strategy:** Survey **Statistical analysis:** SEM (generally weighted least squares)	**Research objective:** Examine if knowledge, ability, and experience of management accountants impact management accounting success. **Results:** The results suggest that (i) for junior management accountants technical accounting knowledge, ability, and experience predict management accounting success, (ii) for senior management accountants industry knowledge, tacit managerial knowledge, and experience predict management accounting success, and (iii) for managers industry and tacit managerial knowledge predict management accounting success.
Ahrens/Chapman (2000)	**Sample:** 64 autobiographical interviews with management accountants conducted in 17 German and 12 British companies (manufacturing and service sector) **Research strategy:** Field research	**Research objective:** Explore and compare the occupational identity of management accountants in Britain and Germany. **Results:** The analysis concludes that management accountants in Britain and Germany act in two quite different institutional contexts. For German management accountants, occupational identity is especially driven by their academic education and is framed by distanced economic analyses and activities as moderators between organizational units. For British management accountants, technical accounting knowledge is more taken for granted and specific management accounting education is uncommon. Their occupational identity is framed by mobility within their companies and by a possible corresponding 'exposure' to allow an easier access to general management positions.

Study/author(s)	Research method	Research objectives and results
Johnston/Brignall/ Fitzgerald (2002)	**Sample:** First study: 40 semi-structured interviews with operations managers in 40 companies. Second study: case studies with six companies (UK; cross-sectional sample), contact persons: (management) accountants **Research strategy:** Field research	**Research objective:** Analyze the involvement of management accountants in operational process change. **Results:** The results of the research suggest a tension between operations managers and management accountants in operational change programs. First, the interviews highlight that management accountants were only involved in about half of the change processes. Second, the case studies derive prerequisites for successful involvement of management accountants; for example, team orientation, sound accounting systems, business knowledge, flexibility, or communication skills.
Granlund/Malmi (2002)	**Sample:** 16 interviews with (management) accountants and (IT) project managers in ten companies (Finland; cross-sectional sample); interviews conducted in 1999 and 2000 **Research strategy:** Field research	**Research objective:** Explore the effects of integrated enterprise-wide information systems on management accounting and management accountants' work. **Results:** The findings of the study indicate that, so far, the implementation projects have led to relatively small changes in management accounting and control processes. However, with the application of advanced IT systems, management accountants have more capacities for analysis instead of routine tasks.
Caglio (2003)	**Sample:** One medium-size case company (Italy; pharmaceutical sector); interviews conducted between 1999 and 2000 **Research strategy:** Field research	**Research objective:** Examine how the adoption of a new enterprise resource planning system challenges the definition of the expertise and the roles of accountants within organizations. **Results:** The results of the study highlight the process of 'hybridization' between information systems managers and management accountants during the implementation. With the use of advanced IT systems, it is possible to transfer accounting tasks to non-accountants and accountants are able to develop broader roles for themselves due to increased capacities. However, the author warns about the lack of an a priori predictability and a generalizability of the findings.
Pierce/O'Dea (2003)	**Sample:** Interviews with management accountants and production or sales managers in eleven companies (cross-sectional sample) **Research strategy:** Field research	**Research objective:** Analyze perceptions of management accountants and managers in the same organizations regarding information supplied by management accountants. **Results:** The results of the study provide evidence for a perception gap between management accountants and general managers. Identified reasons for this gap are, for example, an imbalance between technical and organizational validity, lack of functional differentiation, or an inherent tension between the requirements to act independent and in a business-oriented way.

Study/author(s)	Research method	Research objectives and results
Burns/Baldvinsdottir (2005)	**Sample:** 24 interviews conducted with finance and operations managers in one company (UK manufacturing division of a multinational pharmaceuticals organization) in the late 1990s **Research strategy:** Longitudinal field research	**Research objective:** Describe the emergence of new team/process-oriented roles for so-called 'hybrid accountants'. **Results:** The authors analyze when, why, and how accountants' roles are changing within the case organization. Their analysis reveals that the change of management accountants' roles is driven by an organizational restructuring initiative triggered by changing external business conditions.
Granlund/ Taipaleenmäki (2005)	**Sample:** Eight companies (Finland; cross-sectional sample); seven questionnaire-based interviews and several questionnaire responses (open-ended questions); respondents: management accountants and chief executives; interviews with one auditor and one analyst **Research strategy:** Field research	**Research objective:** Describe and explain current management accounting and control practices in new economy firms. **Results:** The study reveals that there are certain similarities and notable differences of management accounting practices between new economy firms and firms operating in traditional operating environments. The authors highlight the higher time pressure as well as higher priorities for planning than for control aspects. Furthermore, they highlight pressures placed by certain external parties like venture capitalists to develop management control systems.
Yazdifar/Tsamenyi (2005)	**Sample:** 279 management accountants (UK; manufacturing and service sector) **Research strategy:** Survey **Statistical analysis:** *Mann-Whitney*-U-tests	**Research objective:** Investigate management accounting change and changing roles of management accountants in dependent and independent organizations. **Results:** The authors only report little significant differences between the two groups of management accountants. As consequence, they conclude that other institutional factors might influence practice, change, and roles of management accountants and recommend future research to study those aspects.
Emsley (2005)	**Sample:** 33 senior management accountants in medium- and large-sized companies (Ireland; cross-sectional sample) **Research strategy:** Hybrid (survey and follow-up telephone interviews) **Statistical analysis:** Regression analysis	**Research objective:** Analyze the effect of management accountants' business orientation on management accountants' innovativeness. **Results:** The author shows that management accountants' innovativeness, which depends on the degree and the radicalism of the application of management accounting innovations, is associated with business orientation of management accountants.

Study/author(s)	Research method	Research objectives and results
Indjejikian/Matějka (2006)	**Sample:** 308 respondents (management accountants/general managers) of six companies (The Netherlands); data gathering in 2000 and 2001 **Research strategy:** Survey **Statistical analysis:** SEM (generally weighted least squares)	**Research objective:** Study the determinants of organizational slack in decentralized firms and analyze how management accounting systems (represented by management accountants of the business unit) affect slack. **Results:** The results show that organizational slack is higher in situations where management accountants of decentralized business units focus more on local decision support than on control responsibilities. But, the results also show that this focus is beneficial to the business units.
Järvenpää (2007)	**Sample:** One case company (Finland; telecommunication/information technology); undisclosed number of interviewees and interviews conducted between 1992 and 2001 **Research strategy:** Longitudinal field research	**Research objective:** Examine how a case company is trying to change management accounting culture, analyze changes in the management accounting organization, the implementation of new accounting systems, corresponding HR practices (e.g., training), and of changing corporate values. **Results:** Decentralization of management accounting function, centralization of IT systems, and HR practices are drivers to foster business orientation of management accountants. Moreover, the author stresses the importance of informal interventions by top management and financial executives for a change in management accounting culture.
Byrne/Pierce (2007)	**Sample:** 36 interviews conducted with financial and operating managers in 16 companies (Ireland; manufacturing sector) by the end of 2004 **Research strategy:** Field research	**Research objective:** Identify a comprehensive set of antecedents and characteristics of management accountants' roles. **Results:** The results show that possessing sound business knowledge is a prerequisite for business orientation of management accountants. However, business orientation is found as a rather ambiguous and uncertain objective. However, specific knowledge positively impacts the interaction between management accountants and operating managers and such capabilities might enhance decision-making processes and affect the degree of influence of management accountants on business results.

Study/author(s)	Research method	Research objectives and results
Zoni/Merchant (2007)	**Sample:** 17 management accountants and 14 CEOs (Italy; industrial companies) **Research strategy:** Survey **Statistical analysis:** Correlation analysis	**Research objective:** Analyze the involvement of management accountants in managerial decision making. In particular, the authors raise two questions: (i) what causes involvement of management accountants, and (ii) is the involvement significantly associated with performance? **Results:** The results of the study show that most management accountants are at least somewhat involved in managerial decision making. Involvement is, for instance, positively associated with capital intensity, operating interdependency, or line managers' financial competence. Furthermore, the study offers evidence for a positive association between involvement and performance.
Maas/Matějka (2009)	**Sample:** 134 management accountants of 88 companies (The Netherlands; cross-sectional sample) **Research strategy:** Survey **Statistical analysis:** CBSEM	**Research objective:** Examine how management accountants of business units balance their dual roles of providing information for both local decision making and corporate control. **Results:** The results reveal that an emphasis of management accountants on corporate control is positively associated with role conflict and role ambiguity. Furthermore, role conflict and role ambiguity are associated with data misreporting on business unit level.
Ferreira/Moulang (2009)	**Sample:** 280 management accountants (Australia; cross-sectional sample): members of CPA Australia **Research strategy:** Survey **Statistical analysis:** PLS	**Research objective:** Examine whether the involvement of management accountants in strategic management processes enhances organizations' strategic effectiveness. **Results:** The authors find in their study that strategic effectiveness is significantly influenced by management accountants' involvement in strategic implementation. Their results reveal a positive effect between the involvement in strategic formulation and strategic effectiveness which is fully mediated by the involvement in strategic implementation.
Naranjo-Gil/Maas/ Hartmann (2009)	**Sample:** 98 CFOs of public hospitals (Spain); data gathering in 2002 **Research strategy:** Survey (and archival data) **Statistical analysis:** PLS	**Research objective:** Analyze the role of CFOs in adopting and implementing innovative management accounting systems. **Results:** The results of the research show that individual characteristics of CFOs are predictive of organizations' use of innovative management accounting systems. For example, younger and business-oriented CFOs are more likely to adopt innovative systems. Furthermore, the authors conclude that CFO characteristics moderate the extent to which organizations rationally adapt to (environmental) contingencies.

Study/author(s)	Research method	Research objectives and results
Davis/McLaughlin (2009a); *Davis/McLaughlin* (2009b)	**Sample:** 112 senior financial executives of US-Fortune 1,000 companies (cross-sectional sample) **Research strategy:** Survey **Statistical analysis:** Descriptive statistics	**Research objective:** Examine the finance department's involvement in top-level business decision making as well as the orientation of sub-functional areas of finance and cross-functional relationships with other business units. **Results:** Their results show, especially on senior level, a high degree of business partnering and involvement in top-level business decision making for broad areas. Furthermore, the study shows wide variations regarding the extent of business partnering for sub-functions of the finance function. The authors also conclude that the level of business partnering is not always optimal due to a lack of awareness regarding the opportunities for business partnering and its potential effects. In addition, they report that finance professionals do not expect a trade-off between a business-oriented role and the need to remain independent since they assume that the finance function can basically satisfy both requirements.
Brandau/Hoffjan (2010)	**Sample:** 17 semi-structured interviews in 14 multinational companies (headquartered in Germany, The Netherlands, Switzerland, UK, and USA; cross-sectional sample) **Research strategy:** Field research	**Research objective:** Explore the extent of an involvement of management accounting in strategic inter-organizational relationships (with a focus on decisions and control) in the context of offshoring of organizational services. **Results:** The paper explores that management accounting is involved to a rather lower extent in offshoring activities than the authors expected. Identified reasons range from contractual agreements between the different parties to competence problems in accounting departments. As consequence, management accounting departments often fail to provide adequate support for strategic planning and coordination in inter-organizational relationships.

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