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– Empirical results from a cross-sectional survey –**

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# **Involvement of management accountants in incentive compensation – Empirical results from a cross-sectional survey**

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## **Abstract**

Recent research revealed evidence on additional tasks and wider responsibilities of management accountants. The aim of this study is to analyze a possible involvement of management accountants in the field of incentive compensation. More specifically, two research questions are investigated: (i) to what extent are management accountants involved in design and operation of incentive compensation systems, and (ii) has the involvement of management accountants in incentive compensation a positive impact on the effects of incentive compensation and subsequently firm performance?

We employ the partial least squares approach as structural equation modeling technique and survey data gathered from German management accountants and general managers to answer our research questions. The results suggest that management accountants are indeed involved in design and operation of incentive compensation systems and that this involvement is beneficial for the desired effects of incentive compensation systems as well as for firm performance.

## **Keywords**

Management accountants, incentive compensation systems, survey, partial least squares

# 1 Introduction

The relevance lost statement of Johnson and Kaplan (1987) triggered a debate on new management accounting techniques and changing roles of management accountants. In the course of the discussion how to regain relevance a considerable body of literature on changing tasks and roles of management accountants evolved in recent years. A substantial strand of this literature suggests that management accountants should extend their tasks and should be more involved in operational and strategic decision making processes.

Empirical research initiatives in this field addressed, for instance, the different roles and responsibilities of management accountants. Research approaches vary and comprise case-based or interview-based research (e.g., Friedman and Lyne, 1997; Burns and Baldvinsdottir, 2005; Granlund and Taipaleenmäki, 2005), survey research (e.g., Mouritsen, 1996; Indjejikian and Matějka, 2006), or hybrid approaches combining, for instance, survey with field evidence (e.g., Emsley, 2005; Maas and Matějka, 2009). In this discussion, one of the most popular aspects is the change of management accountants' roles from 'bean counter'-type to more 'advisor'-type roles (e.g., Granlund and Lukka, 1998; Siegel and Sorensen, 1999; Burns and Baldvinsdottir, 2005). Despite this amount of research on changing tasks and wider responsibilities, there is ample room for studies immersing those findings and investigating the effects of an involvement of management accountants in activities beyond their traditional tasks. However, research in this context is still scarce with but few exceptions. For instance, the study of Zoni and Merchant (2007) measures and analyzes possible effects of an involvement of management accountants in managerial decision making; and Ferreira and Moulang (2009) focus on the effects of an involvement of management accountants in strategic management processes.

Against this background we decided to explore activities of management accountants related to incentive compensation in more detail to pursue the stream of literature on extended responsibilities of management accountants. We address especially two research questions. First, to what extent are management accountants involved in design and operation of incentive compensation systems? Second, has the involvement of management accountants in incentive compensation a positive impact on the effects of incentive compensation and subsequently firm performance?

We selected incentive compensation systems since (a) they take a special position to ensure that organizational objectives are achieved and (b) management accountants are already partly involved in design and operation of those systems since they provide relevant information, i.e., performance measures. 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 inadequate designed incentive compensation can trigger dysfunctional managerial behavior. In this context, management accountants may contribute and reduce the risk of dysfunctional effects. But, beyond their core tasks as information provider, 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. Furthermore, we chose incentive compensation since findings on those aspects are from a management accounting perspective, e.g., on how incentive compensation is embedded in control systems and performance measurement, still scarce (e.g., Berry et al., 2009: 5) and empirical management accounting studies mainly emphasize decision making rather than control aspects (e.g., Otley, 2003: 324; Zimmerman, 2001: 424).

In our study, we derive a theoretical model and test it with empirical data gathered from German management accountants and general managers from a cross-sectional survey. This approach is consistent with the call for more management problem-based research and for a stronger focus on management accounting practice (Otley, 2001; Merchant et al., 2003: 251). Thus, our study intends to contribute to management accounting research by providing further evidence on the avenue of regaining relevance. More specifically, our study should contribute to the growing stream of literature on management accountants' roles in organizations. We aim for providing evidence that management accountants are increasingly involved in wider responsibilities, i.e., in our case incentive compensation, and that those extended tasks and roles are beneficial for organizations. Whereas a large part of empirical literature in this field applies case-based research approaches (e.g., Hopper, 1980; Burns and Baldvinsdottir, 2005; Byrne and Pierce, 2007) or exhibits only smaller sample sizes (e.g., Zoni and Merchant, 2007) we are able to further contribute to literature by relying on a comparatively large dyadic data set.

The remainder of the paper is structured as follows. The next section derives the theoretical basis: we review relevant literature, specify our hypotheses, and set up the research model. Section 3 describes the research design, the sample, employed variables, and the econometric procedures we apply to analyze our model. This is followed by details and findings of our study in Section 4. We conclude our work in Section 5 with final remarks and suggestions of directions for future research.

## **2 Related literature and hypotheses**

This section comprises three parts. The first part derives the tasks and roles of management accountants with a special focus on ongoing changes of the profession. The second part develops the involvement of management accountants in incentive compensation based on the postulated advent of extended management accountants' responsibilities. The third part is devoted to the development of our research model and the corresponding hypotheses.

### **2.1 Extended 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 (e.g., Baiman and Demski, 1980; Demski and Feltham, 1976; Zimmerman, 2006: 2-5). Tasks of management accountants (or controllers as they are also denoted)<sup>1</sup> 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 (Weber and Schäffer, 2008: 19f.; Zimmerman, 2006: 13-14).

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 business (Maas and Hartmann, 2009: 7; Chenhall and Langfield-Smith, 1998: 362-3). 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 (Mangaliso, 1995; Porter and Millar, 1985). Nevertheless, management accountants do not only provide information to management; they do 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 (e.g., Berger and Hann, 2003). For instance, the International Financial Reporting Standard 8 on segment reporting requires the identification of segments according to internal reports or a description on the definition of internal key performance indicators. Thus, management accountants become co-responsible for the firm's financial statements and

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<sup>1</sup> In this paper we only use the term 'management accountant'. We do also follow this terminology in those cases where the original reference applies the term 'controller'.

should, at least to a certain extent, bear responsibility for financial accounting information and disclosure.

Beside 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 do also have a service provider role and act as a consultant or navigator to management (e.g., Byrne and Pierce, 2007: 472; Maas and Matějka, 2009: 1235; Yazdifar and Tsamenyi, 2005: 181). Especially this role is continuously receiving more attention in recent years. A lot of evidence is supporting this development; examples among others are the longitudinal case study of Burns and Baldvinsdottir (2005) conducted with the UK-based manufacturing division of a multinational pharmaceuticals company or the study of Siegel and Sorensen (1999) in which they interviewed a large number of members of AICPA and IMA, professional associations of accountants and management accountants rooted in the US, by phone. This development implies that additional tasks are assigned to management accountants and they have to challenge managerial decisions, deeply analyze and scrutinize variances between actual and plan data, or discuss alternatives of business decisions. Thus, they do not solely provide information within their regular reporting routines; managers request management accountants to closely collaborate with them and to emphasize the business orientation to the activities of management accountants (Pierce and O’Dea, 2003: 278-82).

Empirical literature confirms that tasks and roles of management accountants have been widened and advisory tasks are getting more important. Early studies did not cover those wider roles and tasks of management accountants or an involvement in managerial decision making processes (e.g., Hopper, 1980). Nevertheless, the drawback of inadequate business orientation and involvement was already addressed. The seminal study of Sathe (1982) revealed tendencies for extended tasks of management accountants in large US corporations. He argued that in most cases they 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 and Lukka (1998) analyzed the role of management accountants in a Finnish context. In their field study they found 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. Their research revealed that management accountants do also act as change agents or consultants in their corporations.

The findings of Byrne and Pierce (2007) indicated that business knowledge of management accountants positively impacts the interaction between management accountants and operational managers, enhances decision making processes, and affects the degree of influence of management accountants on business results. The authors derived those findings from interviews conducted with financial and operational managers in Irish manufacturing 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 involvement in managerial decision making processes is analyzed by Zoni and Merchant (2007) for management accountants of large Italian corporations. They confirmed that management accountants are indeed to some degree involved in management and described factors influencing the extent as well as the breadth of involvement. In addition, they found a positive association between 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) connected 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 was that management accountants with business orientation are associated with a greater level of innovativeness which is assessed as positive.

In addition to studies addressing broad managerial decision making processes, the study of Ferreira and Moulang (2009) focused on a specific aspect: the involvement of management accountants in strategic management processes. In their analysis in Australian companies they differentiated the stages of the strategic management processes in which the management accountants are involved. Strategic management processes embrace from their perspective strategic formulation and strategic implementation which in turn results in strategic effectiveness. They explored that an involvement of management accountants in strategic formulation is positively linked with an involvement of management accountants in strategic implementation. Furthermore, the authors showed a positive effect between the involvement in strategic formulation and strategic effectiveness which is fully mediated by the involvement in strategic implementation.

Moreover, Collier et al. (2004) added to this discussion as they analyzed the involvement of managers of different hierarchy levels in strategy processes. They addressed participants of postgraduate education courses at a business school in 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 provide on corresponding results might be less objective (Indjejikian and Matějka, 2006; Sathe, 1982: 25; Siegel, 2000). 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 (Maas and Hartmann, 2009: 2).

## **2.2 Management accountants' tasks and roles in incentive compensation**

Previous research as well as the above mentioned aspects advocate that management accountants move away from their pure reporting tasks, are more involved in operational and strategic processes, and enhance their relevance within their organizations (e.g., Otley, 2001; Regel, 2003). This does also suggest that management accountants are capable to contribute 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) which encompass 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 (e.g., Flamholtz et al., 1985: 35; Malmi and Brown, 2008: 290-1; Simons, 1995: 5).

MCS packages basically encompass five elements of controls: cultural controls, planning, cybernetic controls, rewards and compensation, and administrative controls (Malmi and Brown, 2008: 291-5). Rewards and compensation embrace incentive compensation schemes and are tightly linked with planning and cybernetic controls. Although rewards and



compensation do also encompass non-monetary rewards, performance-dependent incentive compensation schemes are foremost of monetary nature.

Incentive compensation schemes play a focal role in organization's design and effectiveness and are in place to align the interests of employees and owners (Baker et al., 1988: 594-5; Lawler, 1995: 14). 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 compensation (Aggarwal and Samwick, 1999: 1999). It is argued that agents, e.g., subordinates in an organization, who have more private information than their superiors, the principals, may act in a dysfunctional manner and follow 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 (Merchant and Van der Stede, 2007: 394-5; Prendergast, 1999; Waller and Chow, 1985: 458). Whereas the effort effect intends 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 effect addresses 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 (Lazear, 1999: 202; Merchant et al., 2003: 252). Motivation in this case means that employees put extra efforts toward organizational objectives dependent on the opportunity to satisfy additional individual needs (Robbins, 1989: 147). Efforts directed to enhance performance can be described by effort direction, effort duration, and effort intensity (Bonner and Sprinkle, 2002: 306). Effort direction refers to the employee's choice of tasks, i.e., on which tasks the employee focuses on. Incentive compensation provides information what results are expected; against this background, the employees engage in those activities where their expected benefits outweigh or exceed their cost of doing 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.

Notwithstanding possible caveats (e.g., Deci et al., 1999; Tosi et al., 2000), 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 which are a focal element of those systems (Bushman and Smith, 2001: Section 2; Merchant et al., 2003: 252). The selection of adequate performance measures received widespread attention in theory and is at the same time a tremendous challenge in business practice (e.g., Gibbs et al., 2009: 237-8; Ittner and Larcker, 1998: 205). 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 (Bouwens and van Lent, 2006: 69; Kerr, 1975; Otley, 2001: 243-4).

Management accountants provide relevant information and advice in order to choose the appropriate performance measures. But, performance measures constitute 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 (e.g., Otley, 1999: 369; Stone, 2005: 441) 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, management accountants 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 (Bonner and Sprinkle, 2002: 338; Maas and Hartmann, 2009: 5-6; Sathe, 1982: 9). 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.

### **2.3 Hypotheses development and research model**

In literature and business practice it is generally argued that management accountants' extended tasks and roles are beneficial for organizations. Those benefits typically arise from an involvement of management accountants in extended responsibilities like managerial decision making (Zoni and Merchant, 2007) or strategic management (Ferreira and Moulang, 2009). Based on those findings and thoughts, an involvement in incentive compensation should also be beneficial.

Incentives belong to MCS packages of organizations that are characterized by complexity and strong interaction among the different controls. To serve their purposes and especially to affect performance it is required that their design and operation is aligned with other controls and objectives of the organization (Lawler, 1995: 14; Rajagopalan and Finkelstein, 1992: 138-9). Foremost, management accountants' expertise can contribute to better align incentive compensation with other controls to enhance the effort effects of the incentive compensation. For example, due to management accountants' responsibilities in planning and budgeting they have sound proficiency about the organizations' activities and past as well as expected development. 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. In this regard, it is not the question if 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 we propose 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. Thus, we derive our first hypothesis as follows:

H1: The more management accountants are involved in incentive compensation, the stronger the effort effect 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, other factors might impact this effect 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 to attract and retain adequate-skilled and -motivated managers (Bouwens and van Lent, 2006: 71). However, the presence of incentives has not only efforts 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 (Prendergast, 1999: 14). Compensation schemes with an essential performance-dependent element are likely to attract those employees whom believe to be comparatively more skilled and productive as well as who assume to be able to obtain additional income (Lawler, 1995: 15). 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 we assume that an enhanced selection effect is 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 our second hypothesis:

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

Several research activities addressed performance effects of comprehensive or strategic performance measurement systems (e.g., Burney and Widener, 2007; Ittner et al., 2003; Van der Stede et al., 2006). Foremost in scope of this research have been the diversity of performance measures as well as the alignment between the performance measurement systems and strategy. The results basically support the positive association of those two aspects and performance. This finding can also be transferred to our 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 others controls as well as with strategy. Thus, aligned incentive systems should also positively affect performance.

A similar conclusion can be made based on anecdotal evidence reported by Siegel and Sorensen (1999). The authors argue that management accountants possessing enlarged responsibilities and occupying wider roles do contribute stronger to the organization and support the enhancement of better decision making processes (Siegel and Sorensen, 1999: 6). Transferred to our research setting, we can assume 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: 347) confirmed in their study that incentives help to attract and retain in particular 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 (Bonner and Sprinkle, 2002: 310). Nevertheless, performance has a complex and multilayer character (Lenz, 1981) and its concept is strongly associated with confounding factors and time lags within its dimensions. Against this background and to cope for potential difficulties in the analysis, we transfer the idea that incentives indirectly improve performance to our research setting. Thus, we do not propose a direct link between the effects of incentive compensation and a single measure of performance. Instead, we suggest an initially positive effect of incentive compensation on managerial decision making. Beyond this link, we propose that those enhanced decision making processes should in turn increase internal efficiency and subsequently firm performance from a market perspective. In the following, we derive three specific hypotheses capturing the links between effort effects of incentive compensation, managerial decision making, internal efficiency, and market performance.

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 (Kelly, 2010: 45-48). Incentives might create a basis for cooperation between involved team members which is a requirement for effective strategic decisions (Amason, 1996: 125). Based on these considerations and keeping in mind that the ultimate goal of control systems is "to improve managerial decision making" (Lipe and Salterio, 2002: 531) we specify the third hypothesis:

H3: The stronger the effort effect 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 (e.g., Burney and Widener (2007): 44). 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 decision making process (Steiner, 1972: 35). Thus, good decision making process enable enhanced decisions that should be followed by enhanced performance (e.g., Amason, 1996). More specifically, the argumentation considers that increased quality of decisions initially leads to enhanced implementation processes which are reflected in situations distinguished by, for instance, better allocated resources and improved internal processes. We state the fourth hypothesis as follows:

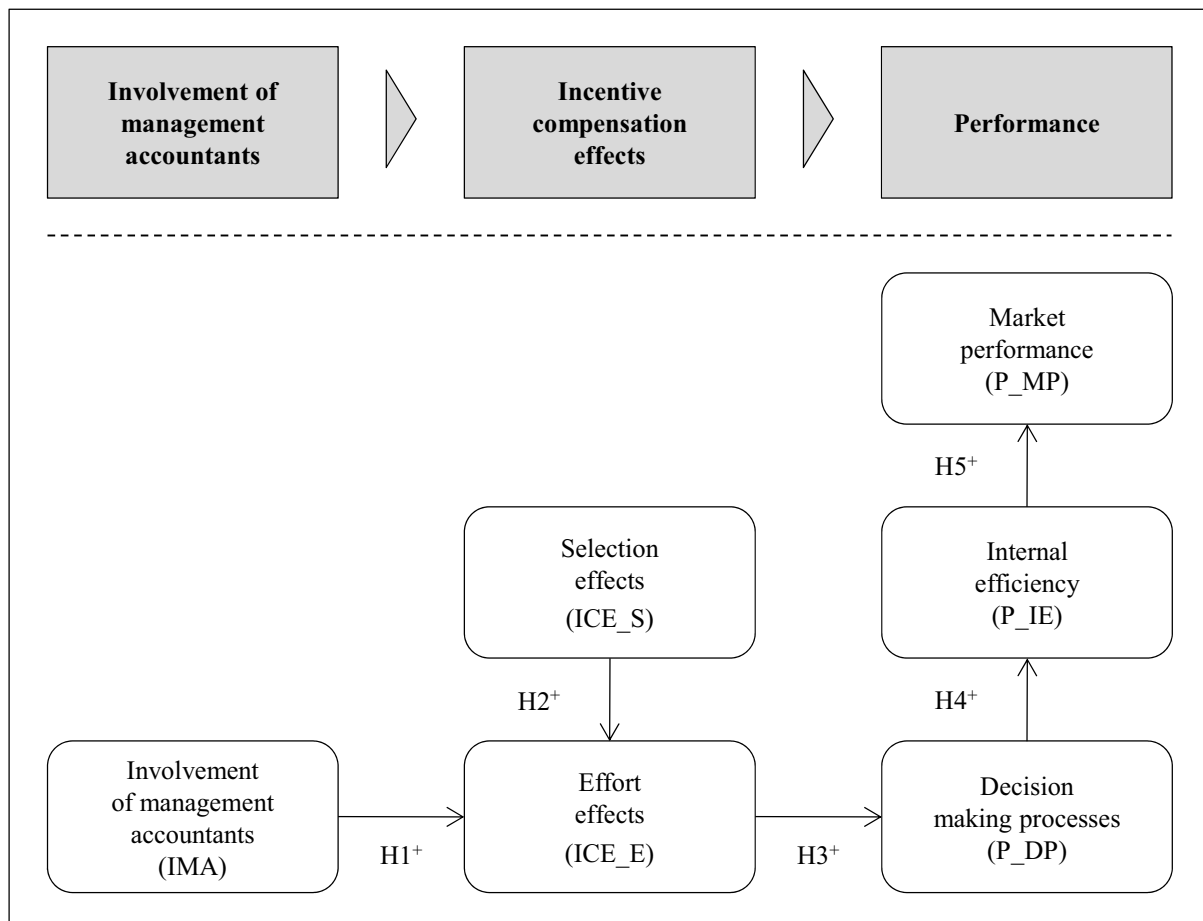
H4: The better the decision making processes, the better the internal efficiency.

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, we postulate the fifth hypothesis as follows:

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

Furthermore, the argumentation of hypotheses 3 to 5 is basically also in line with the reasoning in Callen et al. (2008). The authors explicitly addressed the linkage of incentives, actions (i.e., in their terminology breadth and intensity of just-in-time (JIT) practices), and performance. They report that incentives have an impact on the decision to adopt JIT practices, i.e., incentives influence managerial actions. Furthermore, they reveal an association between actions and performance. But, although they posited a direct link between incentives and performance, they could not confirm this association.

In summary, extended roles and tasks of management accountants are deemed to be beneficial for organizations. We consider that this does also apply 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. We do also argue, in line with economic theory, that incentives serve a selection function and that selection effects also have a positive effect on effort effects. At last, we expect that effort effects of incentive compensation enhance performance; we postulate links between effort effects, decision making processes, internal efficiency, and market performance. This theoretical argumentation as well as the hypotheses can be summarized in the research model depicted in Figure 1.



**Figure 1:** Research model

Our previous reasoning dealt with the increasing breadth of management accountants' tasks and roles. In spite of this thought management accountants typically are exposed to role conflicts and one of their roles dominates their activities (Maas and Matějka, 2009: 1234-6). Following the ideas of Mouritsen (1996: 297) we accordingly propose that the role with the highest priority for the management accountant has an impact on the involvement in incentive compensation. E.g., management accountants placing a higher weight on advisory tasks will supposedly be more involved in incentive compensation compared to management accountants emphasizing information providing tasks. To obtain more insights in the meaning of role types or possible dominant role types we propose sub-group analyses. Thus, we can possibly validate the robustness of our research model and reinforce the hypothesis tests.

### **3 Research method**

After presenting related literature and our hypotheses, Section 3 embraces details on the research method of our project and is split into four parts. The data collection procedures are described in the first part of this section. In the second part we present the results of the data collection procedures and describe our sample. The third part provides details on the constructs we employed in our study. The fourth part covers explanations on the statistical techniques we used for data analysis.

#### **3.1 Survey design and administration**

Data for this study were gathered by means of a questionnaire-based survey in the period of March to May 2009. Starting point of our data collection was a database that included contact details of German firms covering all industries. We excluded financial institutions due to their specific business models and regulatory requirements, ranked the list of companies with regard to revenue, and selected the top 1,500 companies as our baseline. Furthermore, we discarded another 281 companies for various reasons (e.g., lack of dedicated management accounting department, double counts due to legal form constructions, or ceased operations). Thus, 1,219 companies remained as our target population.

In most cases, data gathering procedures in survey research apply single informant-designs, i.e., one respondent per company answers relevant questions and assesses constructs. 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 participants, i.e., key informants, is normally 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 (Bagozzi and Yi, 1988: 423-5). Furthermore, selection of respondents and the research design might create a common method bias. Such effect potentially results from research designs in which independent and dependent variables are assessed by the same person. Possible explanations are for instance consistency motifs, implicit theories, social desirability, or affectivity of respondents (Podsakoff and Organ, 1986; Podsakoff et al., 2003: 881-3).

To cope with those two potential biases we carefully selected the respondents and implemented a multi informant-design. Taking required competencies with regard to



functional and hierarchical position into account we decided to approach the heads of management accounting departments to evaluate questions related to role models and the construct of involvement of management accountants in incentive compensation. And, we surveyed the constructs related to the effects of incentive compensation and performance with general managers of the companies, as we consider them as the most adequate respondents for those aspects. The result of this choice of respondents was the multi informant-design of our study. Hence, we were able to use dyadic data sets to analyze the research model. As consequence, this should also reduce the risk of a potential common method bias. In addition, we also conducted the single-factor-test of Harman (1967) to check for a possible signal of such a bias. Results of the exploratory factor analysis did not reveal a single or common factor indicating no risk of a common method bias. For additional validation purposes, we discussed and confirmed our selection of key informants during the pre-test procedures and did also send abbreviated questionnaires to HR managers on a later stage of our project for validation purposes. Summarizing our activities in this context, our research approach should alleviate possible key informant or common method biases.

For data collection we applied a three-step implementation strategy. First, we contacted each firm by phone to check data accuracy, asked for the latest contact details, and introduced the study. Second, we sent a cover letter and the questionnaires by e-mail to the heads of the management accounting departments. (In a few cases, participants requested for sending the instruments by fax or mail). We asked for two things: (i) to fill out the functionally customized questionnaires for management accountants and (ii) to forward a survey package to a general manager (i.e., a member of the upper or upper middle management like the CEO, managing director, or division manager). Third, we sent out two reminder e-mails, two respectively four weeks after the initial mailing. To enhance the chance of participation we personalized all correspondence and offered a research report covering the main findings of our study to all participants.

### **3.2 Sample description**

A total of 280 persons (management accountants: 165; general managers: 115) participated in our study and sent back the questionnaires. Six questionnaires (management accountants: 4; general managers: 2) had to be discarded due to a large number of missing data. Due to the intended dyadic research design we need matched pairs of the questionnaires. Reflecting this aspect, we could rely on answers of 113 dyadic sets of completed questionnaires giving a return rate of 9.27%. The response rate of our study is lower than anticipated and below

average in typical empirical management accounting studies (Van der Stede et al., 2005: 671-2). Possible reasons for this low response rate and messages from non-participating firms embrace other priorities of executives during the ongoing economical downturn in spring 2009, the growing number of firms with a policy of not participating in survey research due to the increasing number of requests, and the special complexity of our research project to obtain dyadic data. The low response rate raises a potential limitation of our study. But for all that the sample is large enough to process planned statistical techniques for analyzing the hypotheses.

Non-response bias is one inherent limitation of survey research. The potential especially arises in studies with low response rates. To test for any bias we split the data set into two groups according to the number of days from initial mailing until receipt of the returned instrument and searched for possible divergent answers. The underlying rationale is that respondents who participate later are expected to answer more similar to non-respondents (Armstrong and Overton, 1977: 397). In order to assess the answers we employed Mann-Whitney U-tests for every item of the questionnaire. We only found little significant differences ( $p < 0.05$ ) between early and late respondents for two items (P\_DP\_1 and P\_IE\_3). However, we are confident that this relatively low number does not cause serious problems for the interpretation of our results.

Tables 1 and 2 provide information regarding the organizations' size in terms of revenue and number of employees. Taking into account that departments of management accountants and incentive compensation as formal controls are primarily in place in medium/large-sized companies, descriptive statistics indicate that the firms were large enough to ensure that relevant constructs apply.

Revenue (Million EUR)	Frequency	Percentage
0 – 500	32	28.57%
501 – 1,000	39	34.82%
1,001 – 5,000	27	24.11%
5,001 – 10,000	4	3.57%
10,001 – 20,000	3	2.68%
> 20,000	7	6.25%
Mean		3,657
Standard deviation		8,357
Lower quartile		500
Median		800
Upper quartile		2,209
N *		112

*Notes:*

\* Not all companies did provide details on revenue

**Table 1:** Surveyed firms by revenue

Employees	Frequency	Percentage
0 – 500	6	5.31%
501 – 1,000	14	12.39%
1,001 – 5,000	55	48.67%
5,001 – 10,000	13	11.50%
10,001 – 20,000	13	11.50%
> 20,000	12	10.62%
Mean		12,777
Standard deviation		45,358
Lower quartile		1,400
Median		3,300
Upper quartile		7,500
N		113

**Table 2:** Surveyed firms by number of employees

We only excluded financial institutions in our research project. Hence, our sample is cross-sectional and the predominant industries are wholesale/retail, chemicals/health care, and utilities. Table 3 offers more details on industry composition of our sample.

Industry	Frequency	Percentage
Wholesale and retail	15	13.27%
Chemicals and health care	13	11.50%
Utilities	13	11.50%
Automotive	11	9.73%
Industrial goods	10	8.85%
Consumer goods	8	7.08%
Manufacturing	7	6.19%
Information technology	6	5.31%
Construction	5	4.42%
Transport and logistics	4	3.54%
Media and communication	4	3.54%
Real estate	4	3.54%
Services	3	2.65%
Telecommunication	2	1.77%
Tourism	2	1.77%
Others	6	5.31%
N		113

**Table 3:** Distribution of respondents by industry

### 3.3 Description and measurement of constructs

The research model in Figure 1 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 and ICE\_S), and three constructs addressing the dimensions of performance (P\_DP, P\_IE, and P\_MP). Those theoretical constructs of our model are measured as latent variables which comprise multiple indicators, e.g., survey items, for an indirect measurement. If possible, we drew upon existing instruments which have been used for empirical research in the past and have shown sufficient reliability and validity. In another case, we adjusted an existing scale in a way that it better fits to our research design, or we employed newly generated scales drawn from the relevant literature. We applied a six-point rating scale with “do not agree at all” and “totally agree” as anchors for all measures (deviations are indicated below).

Survey instruments were pilot-tested by five executives from business practice and six academic researchers to ensure reliable and valid measurements in our study. Some of the survey items have been slightly adjusted afterwards. As this research project was conducted in

Germany, we applied German language for the questionnaires. Thus, if existing scales were in English, we searched for German translations in the literature or translated them carefully.

Operationalization of constructs is either possible by reflective or by formative measurement (Bisbe et al., 2007: 799ff.; Bollen and Lennox, 1991: 305-6; Edwards and Bagozzi, 2000). For reflective measurement models, indicators of the construct, i.e., single items or questions in the questionnaire, are reflections of the construct. Indicators are interpreted as interchangeable and changes in the construct 'cause' changes of the indicators. Following a formative measurement, the indicators affect and constitute the construct. Consequently, changes of the indicators lead to or 'cause' changes of the latent variable. Reflecting the suggestions of Jarvis et al. (2003: 202f.), we only apply reflective measures in this paper.

After discussing those basic principles, we proceed with explanations and the operationalization of our variables. Full details of the instruments are provided in the Appendix.

The first variable of the research model is "Involvement of management accountants (IMA)". In our 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, we applied a self-developed instrument. Basically, we followed the thoughts of Zoni and 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). We amended and narrowed the ideas for our 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 (IMA\_1), aligned control and compensation systems as well as consistently applied performance measures (IMA\_2 and IMA\_3), management accountants' duties as information provider (IMA\_5), and collaboration and information exchange between involved parties (IMA\_4, IMA\_6, and IMA\_7). Although Zoni and Merchant (2007) split their variable into two areas, i.e., operating and strategic decisions, they treated the variable as uni-dimensional. We do also assume that the construct is uni-dimensional and processed an exploratory factor analysis for verification. Results of these procedures confirmed our assumption of the uni-dimensional measurement.

The instruments to measure the effects of incentive compensation were also partly developed for this study. As the conceptualization follows two dimensions, the construct will be operationalized accordingly.

First, the variable “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 (Bonner and Sprinkle, 2002: 306-7). Our carefully self-developed scale comprises seven items. More specifically, the instrument covers facets of intentions and directions during decision making processes (ICE\_E\_1 and ICE\_E\_2), sustained and goal orientated behavior (ICE\_E\_3, ICE\_E\_4, and ICE\_E\_5), and the overall attention managers devote to activities and the possible connected impact on their incentive compensation (ICE\_E\_6 and ICE\_E\_7).

Second, the “Selection effects (ICE\_S)” variable is also related to incentive compensation effects. It addresses the impact of incentive compensation on attracting and retaining employees and managers. We apply and enhance a three item instrument from Bouwens and van Lent (2006: 63) for our study. We added two items in order to achieve a more comprehensive measure. In addition to the items from Bouwens and van Lent (2006), which, for instance, embrace market attractiveness of the company (ICE\_S\_1) or ‘fit’ of recruited managers (ICE\_S\_4), we included one item related to market orientation of the compensation (ICE\_S\_2) and one associated to the retention goal of incentives (ICE\_S\_5).

A fundamental challenge for researchers in management accounting or other business disciplines is the selection of constructs to measure success or performance of companies (Van der Stede et al., 2005: 675; March and Sutton, 1997; Wall et al., 2004). One of the pivotal points in this discussion is whether the mode of assessment should be objective or rather subjective. In our study, we follow a subjective or perceptual approach. One underlying reason is for instance that a major part of our population consists of companies that do not have to and typically do not disclose their financial reports or financial information. Furthermore, as performance is always of context-specific nature, there is actually no single performance measure that is appropriate to measure performance in all different industries or companies (Malagueño, 2009: 7).

Reflecting the complex and multilayer character of performance (e.g., Lenz, 1981) we follow our conceptualization as well as our hypotheses and distinguish three levels of performance and specify three constructs. These constructs cover facets of the quality of decision making processes, organizational or internal effectiveness, and aspects of market performance (Venkatraman and Ramanujam, 1986: 803-4). 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 (e.g., Degraeve and Roodhooft, 1999; Vandenbosch, 1999: 81).

The variable “Decision making processes (P\_DP)” covers aspects of managerial decision making and the company’s management cycle (Weber and Schäffer, 2008: 62-4). It comprises the phases planning (P\_DP\_1, P\_DP\_2, and P\_DP\_3), implementation (P\_DP\_4), and finally monitoring of decisions (P\_DP\_5). The variable reflects 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: 165) and comprises five indicators.

“Internal efficiency (P\_IE)” is measured with a four item scale from Homburg et al. (2008), which was adopted by Mahmood and Soon (1991). The items, which measure the construct relative to the competitors of the company in the last three years, cover aspects of cost efficiency (P\_IE\_1 and P\_IE\_3), resource allocation (P\_IE\_2), and internal processes (P\_IE\_4). We applied for this and the following variable reflecting market performance a different rating scale with “much worse” and “much better” as anchors.

To measure “Market performance (P\_MP)” we adhere to the underlying work of Buzzell and Gale (1987) and employ the instrument from Deshpandé and Farley. 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.

In order to further validate our model and to gain more insights into the roles of management accountants in incentive compensation we include specific role models in our analysis. To obtain data we basically followed the ideas of Newman et al. (1989: 131) and asked management accountants to distribute their workload (percentage) among three roles. Apart from the role as advisor to management we 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. We denoted those two roles as “Provider of advanced management accounting information” and as “Provider of information for financial reporting purposes” (Angelkort et al., 2008: 16). Against the background that literature and our presumptions suggest that the role model with the highest priority for the respective management accountants might have an impact on the results of our research model we try to derive in addition a dominant role type for every respondent (Henri, 2006: 80). This role type is obtained by selecting the role type with the highest allocated workload. We are 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 in those three

roles. Although this marks a limitation we are confident that the data is suitable at least for validation purposes.

### **3.4 Techniques for data analysis**

To test the hypotheses of our research model we adopt the partial least squares (PLS) approach, which is a variance-based structural equation modeling (SEM) technique. Specifically, we employ the software SmartPLS (Ringle et al., 2005). This approach allows the examination of constructs (measurement model) and theories (structural model): The measurement model estimates the relations between the indicators and the constructs that they represent; the structural model specifies, in turn, relations among the constructs (Anderson and Gerbing, 1988). Analysis and interpretation follow a two-stage approach: first, assessment of reliability and validity of measurement models; second, assessment of structural model (Hulland, 1999: 198).

In general, SEM approaches can cope with limitations of more traditional statistical techniques and constitute the motivation to call for more research in management accounting using SEM (e.g., Chenhall, 2003: 155; Shields and Shields, 1998: 67; Smith and Langfield-Smith, 2004: 49). To accentuate this need, the number of studies using SEM in management accounting research is relatively small compared to other fields of business research such as marketing or organizational science (Smith and Langfield-Smith, 2004: 61). Smith and Langfield-Smith (2004), for instance, find in their review (research period: 1980 to 2001) across ten leading (management) accounting journals that only 20 published management accounting papers used SEM.

SEM analyses are either possible applying the predominant covariance-based or less employed variance-based techniques (Fornell and Cha, 1994: 52; Chin, 1998: 295; Chin and Newsted, 1999: 307-8 and 314). However, variance-based PLS approaches offer dedicated advantages over covariance-based techniques like LISREL or AMOS. Particularly, PLS allows (i) the application in more exploratory research contexts with scarce theoretical and empirical knowledge, (ii) the analysis of smaller data sets due to less restrictive sample size requirements, (iii) higher complexity in research models, (iv) the neglect of the multivariate normality distribution requirement of underlying data, and (v) the less limited application of reflective and formative measurement models (Chin, 1998; Chin and Newsted, 1999; Henseler et al., 2009: 282-3; Wold, 1980: 51). Reflecting the arguments mentioned above – especially the first and the second aspect – we found PLS more appropriate for our purposes. In addition it should be mentioned that there is a growing number of studies using the PLS



approach in recent literature indicating appropriateness in principle (e.g., Chapman and Kihn, 2009; Homburg and Stebel, 2009; Naranjo-Gil and Hartmann, 2007).

In order to validate our model we process sub-group analyses based on the dominant role types of management accountants. We follow the procedures of conducting PLS-based group comparisons suggested by Henseler et al. (2009: 309). The approach assesses the observed distribution of the outcome of the bootstrapping procedures. The following equation allows testing hypotheses to verify the probability of differences in parameters between two sub-groups:

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

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

## 4 Results

We present our results in the following section which comprises three parts. The first part provides descriptive statistics on the involvement of management accountants in incentive compensation and role types of management accountants. The second part addresses the results of the measurement models and the third part the results of the structural models of our research project. In this section we distinguish between a main research model and alternative models. The distinctive feature is the data set: whereas the main research model is based on our full dyadic data set, the alternative models are only based on fragments according to the dominant role types of management accountants.

### 4.1 Descriptive statistics

Our first research question addresses the involvement of management accountants in incentive compensation. To answer this research question we rely on the data embracing the answers of management accountants. Table 4 presents descriptive statistics of the seven items of the IMA variable indicating that management accountants participate in design and operation of incentive compensation systems. Overall, data show that involvement is relatively high. Especially items IMA\_2, IMA\_5, and IMA\_6 reveal high mean values. The two latter ones represent tasks related to the core responsibilities of management accountants as provider of required information. IMA\_5 addresses the aspect that management accountants provide

relevant information needed for incentive compensation systems. IMA\_6 asks, if management accountants are approached for advice in case of queries related to performance measures and corresponding influencing factors. In turn, IMA\_2 indicates one positive outcome, i.e., aligned systems, of the involvement. Cooperation between management accountants and HR managers (IMA\_7) discloses the lowest mean score.

Item	Mean	Std. dev.	Relative frequency distribution (%)					
			1	2	3	4	5	6
IMA_1	3.876	1.675	12.39%	16.81%	6.19%	15.04%	34.51%	15.04%
IMA_2	5.150	0.918	0.00%	1.77%	6.19%	6.19%	46.90%	38.94%
IMA_3	4.088	1.485	5.31%	15.04%	12.39%	15.93%	35.40%	15.93%
IMA_4	3.965	1.581	9.73%	13.27%	9.73%	23.01%	26.55%	17.70%
IMA_5	5.186	1.023	0.88%	3.54%	0.88%	11.50%	37.17%	46.02%
IMA_6	5.009	1.122	1.77%	5.31%	1.77%	7.08%	49.56%	34.51%
IMA_7	3.726	1.611	13.27%	15.04%	10.62%	18.58%	31.86%	10.62%

*Notes:*

N = 113

6-point rating scale, anchors: 1 - do not agree at all; 6 - totally agree

**Table 4:** Descriptive statistics of involvement of management accountants

As pointed out, tasks of management accountants are typically linked with three roles. Results of respondents' answers are presented in Table 5 and provide evidence that all three roles are existent. Reflecting the mean scores, the respondents spent the largest fraction of their working time with advisory tasks to management (42.34%). The roles as information provider to management (35.07%) and for financial reporting purposes (22.59%) are of lower importance. Despite the fact that our research setting and the results do not reveal any intertemporal effects we conclude that those results are consistent with recent literature. The results suggest a focus of management accountants on advisory tasks which can be assumed to be strongly connected to a higher business orientation of management accountants which is requested from general managers.

Role of management accountant	Mean	Std. dev.	Min	Max
Advisor to management	42.34%	20.460	0.00%	80.00%
Provider of advanced management accounting information	35.07%	17.417	10.00%	80.00%
Provider of information for financial reporting purposes	22.59%	15.023	0.00%	70.00%

*Notes:*

N = 113

**Table 5:** Descriptive statistics of management accountants' roles

Dominant role types are derived to validate our results. We could allocate 96 management accountants to a certain dominant type. The answers of 17 respondents have been excluded since a distinct allocation to one of the roles was not possible. Data in Table 6 indicate that most management accountants (49) basically understand themselves as an advisor to management. This is consistent with the results previously described that management accountants spend – on average – 42.34% of their working time on consulting activities. 34 of the respondents allocated most of their working time to their role as provider of advanced management accounting information. Finally, 13 of the respondents could be allocated to the third dominant type, management accountants as a provider of information for financial reporting purposes.

To immerse our analysis regarding the degree of involvement of management accountants in incentive compensation, we analyze the results reflecting the dominant role types. First, we derive a mean score based on the seven items for every respondent. Second, we group those scores by the dominant role types and derive a mean for the three dominant roles. Results indicate that management accountants which deem themselves more as an advisor to management tend to be stronger involved in incentive compensation than the other two groups. Corresponding results are presented in Table 6.

Role of management accountant	N	Involvement of MAs			
		Mean	Std. dev.	Min	Max
<i>Dominant role type</i>					
Advisor to management	49	4.685	0.948	2.143	6.000
Provider of advanced management accounting information	34	4.126	1.264	1.714	6.000
Provider of information for financial reporting purposes	13	4.198	1.121	2.000	5.857

*Notes:*

N = 113

MA - Management accountant

**Table 6:** Involvement of management accountants according to dominant role types

## 4.2 Results of measurement models

The next two sections are devoted to provide answers to the second research question whether an involvement of management accountants has a positive impact of the effects of incentive compensation and subsequently performance. We employ our dyadic data covering both responses from management accountants and general managers to answer this research question. In this section, the measurement models of the research model are evaluated. The results of the structural model and especially the tests of the hypotheses are presented in the subsequent section.

Sufficient reliability and validity of the measurement models are a prerequisite to analyze structural models. For assessing the measures of our study we employ a two step approach. First, we examine item reliability, convergent validity, and discriminant validity of the constructs of our main research model (Hulland, 1999: 198-201; Henseler et al., 2009: 298-300). We discuss applied procedures below and present corresponding full details in Tables 7-9). Second, we further validate the constructs related to the involvement of management accountants in incentive compensation and related to incentive compensation effects as well as reveal the results of our construct analysis with data for the alternative models.

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 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 (Hulland, 1999: 198; Bagozzi and Baumgartner, 1994: 402). As shown in Tables 7-9, only three items of our study load marginally below 0.7 (i.e., ICE\_E\_1: 0.678, ICE\_S\_4: 0.691, and P\_IE\_4: 0.664) which deemed acceptable since they partly belong to newly developed scales and other loadings are well above the threshold.

Convergent validity (also referred to as composite reliability) evaluates the comprehensive constructs which is even more important than the analysis of individual indicators (Bagozzi and Baumgartner, 1994: 402). Convergent validity is indicated when each item strongly correlates with its own construct and can be assessed with Cronbach's alpha (CA), the composite reliability (CR) measure, and average variance extracted (AVE) statistics. Proposed minimum requirements are 0.7 for CA, 0.6 for CR, and 0.5 for AVE (Bagozzi and Yi, 1988: 80; Fornell and Larcker, 1981: 45-6; Nunnally and Bernstein, 1994: 264-5). We conclude to possess an acceptable level of convergent validity since all constructs

meet the three mentioned criteria ( $CA = 0.928 - 0.776 > 0.7$ ;  $CR = 0.928 - 0.856 > 0.6$ ;  $AVE = 0.671 - 0.545 > 0.5$ ) as displayed in Tables 7-9.

Item	Mean	Std. dev.	Factor loading	Relative frequency distribution (%)					
				1	2	3	4	5	6
IMA_1	3.876	1.675	0.744	12.39%	16.81%	6.19%	15.04%	34.51%	15.04%
IMA_2	5.150	0.918	0.818	0.00%	1.77%	6.19%	6.19%	46.90%	38.94%
IMA_3	4.088	1.485	0.834	5.31%	15.04%	12.39%	15.93%	35.40%	15.93%
IMA_4	3.965	1.581	0.821	9.73%	13.27%	9.73%	23.01%	26.55%	17.70%
IMA_5	5.186	1.023	0.784	0.88%	3.54%	0.88%	11.50%	37.17%	46.02%
IMA_6	5.009	1.122	0.808	1.77%	5.31%	1.77%	7.08%	49.56%	34.51%
IMA_7	3.726	1.611	0.823	13.27%	15.04%	10.62%	18.58%	31.86%	10.62%
CA	0.911								
CR	0.928								
AVE	0.648								

*Notes:*

N = 113

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 7:** Variable assessment – “Involvement of management accountants (IMA)”

Item	Mean	Std. dev.	Factor loading	Relative frequency distribution (%)					
				1	2	3	4	5	6
<i>ICE_E - Incentive compensation effects_Effort effect</i>									
ICE_E_1	2.982	1.172	0.678	7.96%	32.74%	23.89%	24.78%	9.73%	0.88%
ICE_E_2	3.823	1.189	0.794	5.31%	9.73%	15.93%	38.94%	26.55%	3.54%
ICE_E_3	4.230	1.052	0.722	1.77%	5.31%	11.50%	38.94%	34.51%	7.96%
ICE_E_4	3.779	1.178	0.700	3.54%	15.04%	15.04%	33.63%	31.86%	0.88%
ICE_E_5	4.248	1.090	0.846	2.65%	5.31%	9.73%	37.17%	37.17%	7.96%
ICE_E_6	4.221	1.171	0.816	3.54%	4.42%	15.93%	27.43%	39.82%	8.85%
ICE_E_7	4.248	1.169	0.872	2.65%	7.08%	11.50%	30.09%	38.94%	9.73%
CA	0.890								
CR	0.914								
AVE	0.606								
<i>ICE_S - Incentive compensation effects_Selection effect</i>									
ICE_S_1	4.814	0.840	0.785	0.00%	0.88%	7.08%	19.47%	54.87%	17.70%
ICE_S_2	4.690	0.780	0.713	0.00%	0.88%	4.42%	31.86%	50.44%	12.39%
ICE_S_3	4.142	1.141	0.754	0.88%	11.50%	11.50%	31.86%	37.17%	7.08%
ICE_S_4	4.549	0.866	0.691	0.00%	0.88%	11.50%	30.09%	46.90%	10.62%
ICE_S_5	4.690	0.856	0.745	0.00%	2.65%	6.19%	22.12%	57.52%	11.50%
CA	0.794								
CR	0.857								
AVE	0.545								

Notes:

N = 113

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 8:** Variable assessment – “Incentive compensation effects (ICE)”

Item	Mean	Std. dev.	Factor loading	Relative frequency distribution (%)					
				1	2	3	4	5	6
<i>P_DP - Performance_Decision making processes</i>									
P_DP_1	4.133	0.921	0.782	0.00%	6.19%	15.04%	40.71%	35.40%	2.65%
P_DP_2	4.009	0.931	0.847	0.00%	7.96%	17.70%	40.71%	32.74%	0.88%
P_DP_3	4.248	0.882	0.874	0.88%	1.77%	15.04%	39.82%	38.94%	3.54%
P_DP_4	4.080	0.825	0.791	0.00%	3.54%	17.70%	47.79%	29.20%	1.77%
P_DP_5	4.000	0.896	0.796	0.88%	2.65%	25.66%	38.05%	31.86%	0.88%
CA	0.877								
CR	0.910								
AVE	0.671								
<i>P_IE - Performance_Internal efficiency</i>									
P_IE_1	4.381	0.900	0.813	0.88%	0.88%	11.50%	41.59%	36.28%	8.85%
P_IE_2	4.345	0.961	0.837	0.00%	3.54%	16.81%	28.32%	44.25%	7.08%
P_IE_3	4.487	0.946	0.775	0.00%	0.88%	14.16%	35.40%	34.51%	15.04%
P_IE_4	4.212	0.901	0.664	0.00%	3.54%	15.04%	44.25%	30.97%	6.19%
CA	0.776								
CR	0.856								
AVE	0.600								
<i>P_MP - Performance_Market performance</i>									
P_MP_1	4.345	1.075	0.836	0.00%	5.31%	15.93%	31.86%	32.74%	14.16%
P_MP_2	4.150	1.167	0.816	0.88%	8.85%	15.93%	36.28%	24.78%	13.27%
P_MP_3	4.195	1.117	0.765	1.77%	4.42%	19.47%	31.86%	31.86%	10.62%
P_MP_4	4.177	1.204	0.750	1.77%	8.85%	12.39%	38.94%	23.01%	15.04%
CA	0.811								
CR	0.872								
AVE	0.630								

Notes:

N = 113

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 competitor)

CA - Cronbach's alpha; CR - composite reliability; AVE - average variance extracted

**Table 9:** Variable assessment – “Performance (P)”

Discriminant validity exhibits that the operationalization of two constructs diverges from each other. It implies that indicators underlying one construct correlate weakly with the indicators of other constructs; i.e., it describes the extent to which the measures differ from each other. To assess this aspect we employ the Fornell/Larcker-Criterion which checks whether the square roots of AVE of each construct exceed the correlations between the two

constructs (Fornell and Larcker, 1981: 46). Table 10 shows the correlation matrix and the square roots of AVE statistics and reveals that all construct pairs fulfill this criterion.

Variable	1	2	3	4	5	6
1 IMA	0.805					
2 ICE_E	0.302	0.779				
3 ICE_S	0.172	0.570	0.738			
4 P_DP	0.152	0.351	0.619	0.819		
5 P_IE	0.114	0.192	0.417	0.501	0.775	
6 P_MP	0.099	0.100	0.403	0.416	0.485	0.793

*Notes:*

Diagonal elements are the square root of AVE statistics. Off-diagonal elements are the correlation between latent variables

AVE: average variance extracted

Variables: 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 10:** Discriminant validity check

Constructs related to involvement of management accountants and to incentive compensation effects have been derived for our study. In order to further validate those instruments we sent questionnaires to HR managers of firms which have been participated in our research project. We selected HR managers due to their co-responsibility of remuneration systems. The resulting validation sample comprises 40 firms which should be a satisfactory amount. We embraced selected constructs in the questionnaire, especially the IMA construct that is assessed by management accountants in our study and the ICE constructs to validate the answers of general managers. For evaluating potential interrater biases we employed Mann-Whitney U-tests for every item of the selected constructs. Except for two items (ICE\_S\_1 and ICE\_E\_6) results of the tests did not indicate significant differences ( $p > 0.05$ ) between the assessments of HR managers and the evaluations of management accountants/general managers.

Finally, we also analyzed the constructs with those dyadic data sets we used to validate our research model. 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”. We did



not set up a third data set since only 13 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. Thus, we analyzed the constructs with the two alternative data sets. Results in Table 11 suggest that reliability and validity of the instruments is also satisfactory and we can use the alternative data sets to assess the alternative structural models.

Overall, results of our variable evaluation procedures exhibit sound operationalization of the measurement models and indicate no limitations for further analyses.

Variable	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  
 Variables: 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 11:** Assessment of variables – Alternative models

### 4.3 Results of structural models

For assessing the structural model and to test the hypotheses we rely on multiple squared correlations ( $R^2$ ), standardized  $\beta$ -statistics used as path coefficients, significances of path coefficients, effect sizes ( $f^2$ ), and predictive relevance ( $Q^2$ ). Measures to evaluate the overall model fit are not available for PLS and mark a disadvantage compared to covariance-based SEM approaches. Procedures and results of our analysis are described below and are also depicted including selected details in Figure 2. This figure also points out our dyadic research design in which the construct on the involvement of management accountants in incentive compensation is assessed by management accountants and the constructs on controls as well as on performance is assessed by general managers.

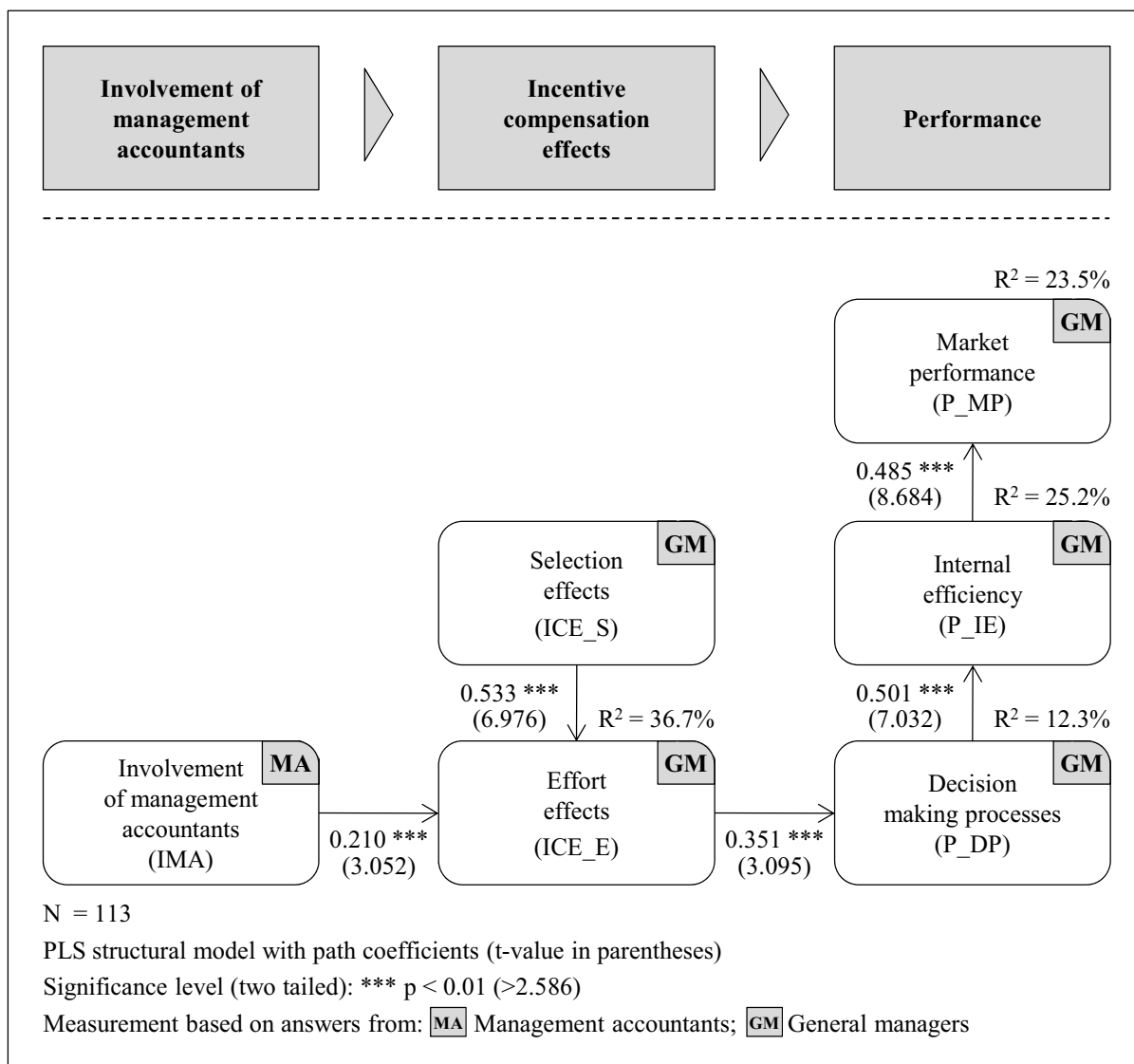
Maximization of variance is one of the key purposes of the PLS approach. For assessing this aspect multiple squared correlations, i.e., the  $R^2$  value of a dependent variable, are utilized. There is basically no 'good' or 'bad'  $R^2$  value since research question and design can influence this amount (Jain, 1994: 168). Despite this thought, we follow Chin (1998: 323) who labels a value of 67% as 'substantial', a value of 33% as 'moderate', and one of 19% as 'weak'.  $R^2$  statistics of our model are between 12.30% and 36.74%. We consider those amounts as satisfactory reflecting our research design and comparing them with results of other recent management accounting studies (e.g., Bouwens and van Lent, 2007; Homburg and Stebel, 2009; Naranjo-Gil and Hartmann, 2007).

For hypotheses testing we evaluate the path coefficients, which should be at least  $> 0.1$  (Lohmöller, 1989: 60), and their significance. The significance of the path coefficients is determined by respective t-values which are derived from non-parametric resampling procedures. We employed bootstrapping using 500 samples with replacement. Each of the samples consisted of the same number of cases as our original data set, i.e.,  $N = 113$ , for our main research model. Our first hypothesis predicted that when 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:  $\beta = 0.210$ ;  $t = 3.052$ ;  $p < 0.01$ ) 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. We predicted that there is a positive association between the selection and the effort effect. Our obtained empirical data lead us to corroborate the hypothesis (H2:  $\beta = 0.533$ ;  $t = 6.976$ ;  $p < 0.01$ ). As presumed, the results of this hypothesis are stronger than the results of our first hypothesis underpinning the importance of managerial competencies. Our third hypothesis connects the incentive compensation effects elements with the performance dimension. Initially, we predicted a positive association between the ICE\_E construct and the decision making processes. Empirical results show that the proposed relation is supported (H3:  $\beta = 0.351$ ;  $t = 3.095$ ;  $p < 0.01$ ). The subsequent hypothesis on the performance path links decision making processes with internal efficiency. Reflecting the results we could also corroborate the fourth hypothesis (H4:  $\beta = 0.501$ ;  $t = 7.032$ ;  $p < 0.01$ ). Finally, the last hypothesis of our research model proposes an association between internal efficiency and market performance. Empirical data suggest to confirm this hypothesis as well

(H5:  $\beta = 0.485$ ;  $t = 8.684$ ;  $p < 0.01$ ). Overall, results are satisfactory since they are consistent with our expectations and all hypotheses of our main research model are corroborated.

After analyzing the path coefficients and corresponding significances we proceed with effect sizes as next element of our research agenda. The effect size ( $f^2$ ) is calculated to determine which of independent variables has a substantial impact on the dependent variable. It is only applicable, if there is more than one independent variable connected with the dependent variable. Effect sizes of 0.02, 0.15, and 0.35 can be regarded as small, medium, and large effects (Chin, 1998: 316-17). Hence, we calculated effect sizes for the relations between IMA and ICE\_E and between ICE\_S and ICE\_E. Results indicate a small effect for the former relation ( $f^2 = 0.065$ ) and a strong effect ( $f^2 = 0.429$ ) for the latter one. This result is generally consistent with our expectations. We 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, we are aware that effects which emanate from the ICE\_S construct have presumably a stronger impact on ICE\_E since 'good' managerial actions and decisions initially depend on the abilities of the managers whereas management accountants 'only' potentially enhance the controls.

The predictive relevance of each construct can be evaluated by the Stone-Geisser test criterion redundancy  $Q^2$ . This criterion provides information to what extent the data set can be reconstructed by the structural model and the parameters. Redundancy  $Q^2$  values, which can be derived by the application of blindfolding procedures, larger than zero confirm predictive relevance (Chin, 1998: 317-18; Fornell and Cha, 1994: 71-3). All redundancy  $Q^2$  amounts of our research model meet this criterion as they are all above zero (ICE\_E: 0.217, P\_MP: 0.086, P\_IE: 0.157, and P\_MP: 0.124).



**Figure 2:** Results of structural model analysis (main research model)

To validate the results we considered dominant role types of management accountants for our analysis. Since the assessment of measurement models based on the alternative data sets indicates sufficient results we are able to estimate two alternative structural models. Against this background, we conducted sub-group analyses suggested by Henseler et al. (2009: 309) and compared R<sup>2</sup> statistics. Details on the evaluation of the three structural models are provided in Table 12 and Figure 3.

Variable	Main research model		Alternative model A		Alternative model B	
	Path coef.	t-value	Path coef.	t-value	Path coef.	t-value
<i>Description of path</i>						
IMA → ICE_E	0.210 ***	3.052	0.405 ***	5.634	0.118 -	0.499
ICE_S → ICE_E	0.533 ***	6.976	0.487 ***	4.720	0.508 ***	2.522
ICE_E → P_DP	0.351 ***	3.095	0.526 ***	3.848	0.392 **	1.999
P_DP → P_IE	0.501 ***	7.032	0.594 ***	6.597	0.469 ***	3.546
P_IE → P_MP	0.485 ***	8.684	0.454 ***	4.493	0.600 ***	8.471
<i>R<sup>2</sup></i>						
ICE_E	36.74%		55.30%		27.41%	
P_DP	12.30%		27.65%		15.40%	
P_IE	25.15%		35.33%		22.02%	
P_MP	23.53%		20.57%		36.04%	
N	113		49		34	

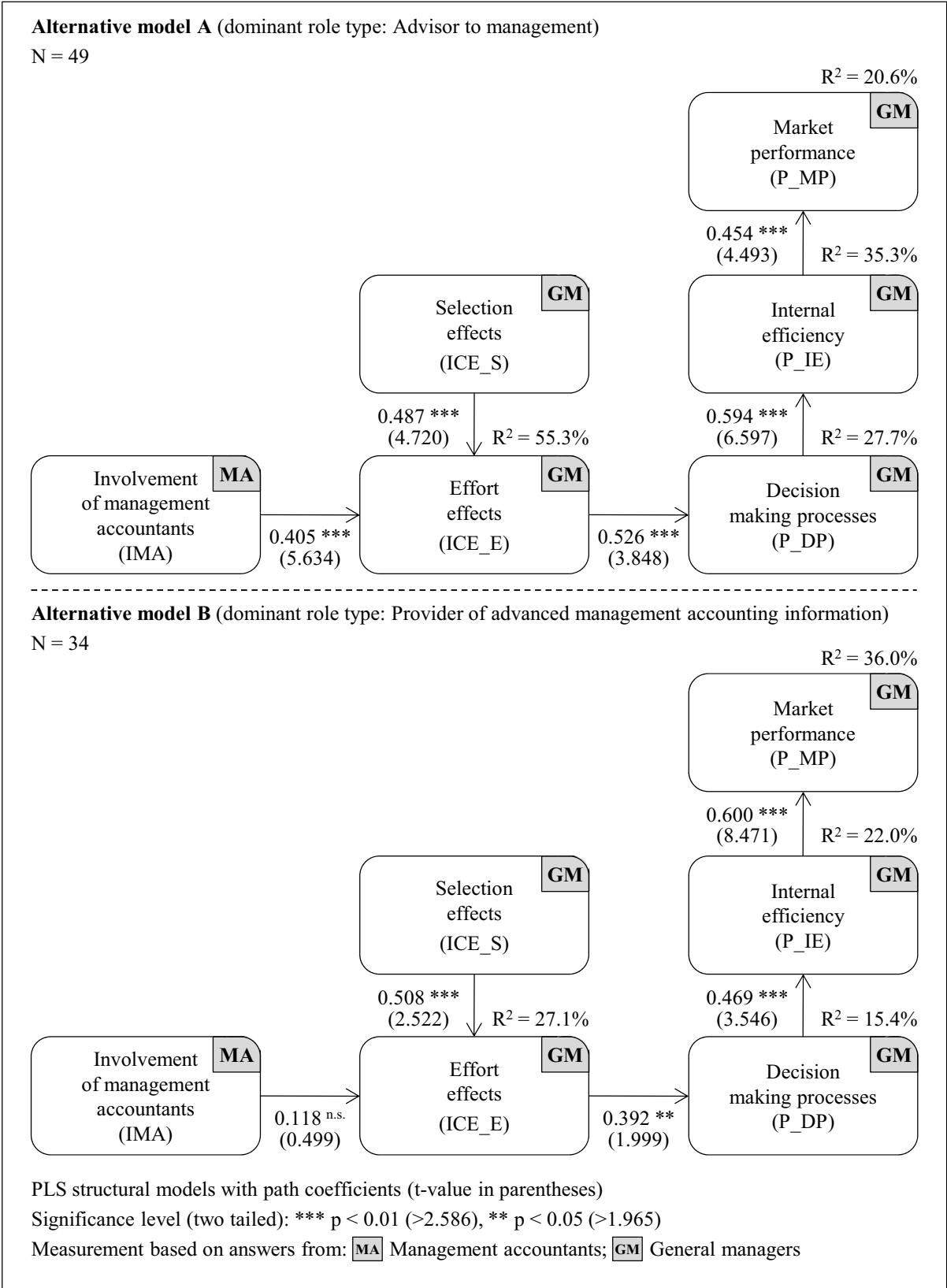
*Notes:*

Variables: 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 (two tailed): \*\*\*  $p < 0.01$  ( $>2.586$ ); \*\*  $p < 0.05$  ( $>1.965$ ); \*  $p < 0.10$  ( $>1.648$ )

**Table 12:** 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 construct. We conducted especially three comparisons: (i) the main research model with alternative model A, (ii) the main research model with alternative model B, and (iii) the two alternative models. Ad (i): 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 our sub-group analysis reveal a probability of 96.96% that the path coefficient of the alternative model A is larger than the path coefficient of our main research model. Ad (ii): Analyzing alternative model B, especially two aspects are of interest: First, there is no significant path for the relation between the involvement of management accountants and the effort effects of incentive compensation. Second, the comparison of this alternative model with our 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. Ad (iii): Comparing the results of the two alternative models reveal different path coefficients and a probability that the path



**Figure 3:** Results of structural model analysis (alternative models)

coefficient of alternative model A is larger than the one of alternative model B of 89.49%. To complete those three comparisons it must noted that only the first comparison between the

alternative model A and our main research model indicate a significant difference ( $p < 0.05$ ); the other two comparisons do not show significant results of the sub-group analyses.

Furthermore, the  $R^2$  values of the effort effect construct do also support this 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, those observations and results lead to the conclusion that management accountants who predominantly act as an advisor to management obviously have a stronger impact on the effort effects of incentive compensation compared to management accountants which spend most of their time with providing information.

The results of our main research models as well as the alternative ones provide adequate support and indicate robustness of our hypotheses and expectations. The involvement of management accountants in incentive compensation enhances the effort effects of the incentive schemes and subsequently firm performance. Simultaneously, the selection effect has a stronger impact on the effort effect than the consequences resulting from an involvement of management accountants. Furthermore, the dominant role type of management accountants impacts the results. E.g., management accountants with the dominant role type as an advisor to management tend to be stronger involved and the structural model reveals stronger effects.

## **5 Conclusion**

We conclude our study by revisiting and discussing our research questions, possible contributions, managerial implications, inherent limitations, and possible avenues for future research.

The aim of our study was to gain further insights and evidence of the postulated wider tasks of management accountants in the context of incentive compensation. Our research questions addressed two aspects: (i) to what extent are management accountants involved in design and operation of incentive compensation systems; and (ii) what is the impact of this involvement on effects of incentive compensation and subsequently firm performance? Our results allow us to provide answers to our research questions as well as to reaffirm the importance of management accountants' roles in organizations. In particular, the findings indicate that management accountants are indeed involved in incentive compensation. Furthermore, we are able to provide indications of a possible positive impact of an involvement of management accountants on incentive compensation effects and firm performance. Management accountants provide adequate performance measures and participate in further activities concerning incentive compensation. Accordingly, their

involvement might reduce the risk of problems with not aligned incentive compensation systems. Our findings do also reveal that a dominant role type of management accountants might influence the results. For instance, management accountants who deem themselves more as an advisor to management and prioritize consulting activities might be more involved in extended activities and may contribute more to the achievement of corporate objectives.

Our research activities may contribute to management accounting literature in several ways. The results provide further evidence on the changing and expanding roles of management accountants by showing that their task bundle does also embrace responsibilities which lie beyond their core activities as information provider. Furthermore, our findings illustrate that management accountants may contribute to organizational objectives and, in particular, that such an involvement is positively associated with the effects of controls as well as firm performance. In addition, we may contribute to literature with the expansion of existing research instruments and the development of new instruments to measure the involvement of management accountants in incentive compensation or the effects of control mechanisms. Reliability and validity statistics of those instruments revealed satisfactory results and may serve as basis for future research activities. Finally, whereas other research in this field had to rely on smaller sample sizes we have been able to use a quite large dyadic data set.

The results of our study might also have implications for business practice. They encourage management accountants to contribute to their organization in broader areas and play a part in responsibilities beyond their core tasks. Management accountants should propose and signal to general management that they have the aptitudes as well as the resources for additional activities. If the general managers' perception of the competencies of management accountants improves, general managers might allocate wider tasks to management accountants. But, such an involvement requires adequate competencies of the respective job holders and their departmental co-workers. Whereas some management accountants might exhibit relevant expertise, there might also be management accountants requiring proper training. Beside individual training programs, corporations should amend their HR development curriculum accordingly and include, for instance, programs on effective communication and business skills in the specific schedules for management accountants.

Our study is also subject to potential limitations which go beyond those typically related to the application of questionnaire-based surveys (e.g., reduced flexibility, limited possibility to answer queries from respondents). First, we 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, e.g., reduced objectivity due to a higher involvement in managerial decision making, this aspect might reduce the validity of our results. Second, even if our survey instruments exhibit sound reliability and validity statistics, we are aware that newly developed scales are subject to potential limitations and should be validated in future research initiatives. The instruments should be further discussed and developed in order to demonstrate appropriateness and to ensure that they capture the relevant subjects. Third, we derive the dominant role types of management accountants by allocating their working time to the specific roles. This possibly naïve approach of deducting the dominant roles might be an origin for a possible limitation and should be replaced by a more sophisticated approach in future research activities. Fourth, our response rate is lower than desired. Nevertheless, it is deemed acceptable reflecting the complex research design and the growing number of firms with a policy not to participate in survey research. Referring to those possible limitations, any generalizations must be made with caution. But, in spite of those caveats, we still believe that our results may contribute to management accounting literature and may serve as one exhibit for management accounting on its way to regain and assure relevance.

Several insights and findings on roles and tasks of management accountants in the context of incentive compensation emerge from our study. But, our results do also leave room for future scholarly activities. Whereas other studies analyzed the involvement of management accountants in management in general our study addresses the particular aspect of incentive compensation. Future research activities to reaffirm extended tasks and responsibilities of management accountants could analyze an involvement of management accountants in other areas which do also not belong to the core activities of management accountants. Those could, for instance, embrace corporate functions like marketing or procurement to which management accountants could contribute. Moreover, additional research is required to better understand the causality of activities of management accountants, effects of control mechanisms, and performance. Since survey data obtained from cross-sectional studies do not provide clear evidence on this link it would be beneficial to conduct longitudinal studies in this context. Those studies might embrace survey or in-depth case-based research initiatives analyzing aspects like the role and the long-term effects of an involvement of management accountants during re-design or new implementation of incentive systems in organizations. Furthermore, our research design only focused on one country. It might be illuminating to administer a research project across different countries to

gain further insights into possible country-specific characteristics. This would also be in line with research conducted in different countries on changing roles of management accountants (e.g., Sathe, 1982; Byrne and Pierce, 2007; Zoni and Merchant, 2007; Granlund and Lukka, 1998) or national differences in compensation practices (e.g., Jansen et al., 2009). Finally, future research could also validate and further develop the instruments we applied in our project. This should foremost be beneficial for the instrument to capture the dominant role type of management accountants. A more sophisticated instrument could for instance also embrace determinants of the dominant roles like personal characteristics and skills of the management accountants which could be linked to the extent of the involvement of management accountants in incentive compensation.

## Appendix

The appendix contains detailed item descriptions of the employed variables.

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Label	Item
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

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*Notes:*

6-point rating scale, anchors: 1 - do not agree at all; 6 - totally agree

**Table 13:** Item description – “Involvement of management accountants (IMA)”

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Label	Item
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*ICE\_E - Incentive compensation effects\_Effort effect*

ICE\_E\_1 Different decisions would often be taken without the incentive compensation

ICE\_E\_2 Incentive compensation causes decisions in line with our companies 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 Managers consider possible effects in their incentive compensation during decisions

ICE\_E\_7 Overall, the application of incentive compensation implies a control effect

*ICE\_S - Incentive compensation effects\_Selection effect*

ICE\_S\_1 Our company is an attractive employer at the market

ICE\_S\_2 Compensation of our managers is market orientated

ICE\_S\_3 Changes in our annual wage expense are in a proper relation to changes in our performance

ICE\_S\_4 Manager recruited in the last two to three years 'fit' our company

ICE\_S\_5 Good managers remain with our company and do not leave toward to our competitors

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*Notes:*

6-point rating scale, anchors: 1 - do not agree at all; 6 - totally agree

**Table 14:** Item description – “Incentive compensation effectiveness (ICE)”

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Label	Item
<i>P_DP - Performance_Decision making processes</i>	
	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
<i>P_IE - Performance_Internal efficiency</i>	
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
<i>P_MP - Performance_Market performance</i>	
P_MP_1	Profitability
P_MP_2	Market share
P_MP_3	Growth
P_MP_4	Size

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*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 competitor)

**Table 15:** Item description – “Performance (P)”

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