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Examining the collaboration of management accountants in project management

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Examining the collaboration of management accountants in project management

ABSTRACT

This study examines the effects of the collaboration of management accountants in project management teams. Using a case study and survey data from 58 Swiss and German corporations that ran large mechanical engineering and IT projects, we find higher levels of collaboration of accountants in project teams not to be directly associated with project success. Results suggest that management accounting role is effective to project success by means of enhanced quality of project management planning and reporting.

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1. Introduction

Inter-departmental collaboration has long been recognised as organisational success factor. Particularly, such collaborations seem to be crucial for certain knowledge intensive organizational settings such as the ones observed in project management or/and new product development (Cuijpers et al., 2011; Lovelace, et al, 2001). Previous research has suggested that the inter-departmental collaboration encourages information sharing, creativity, and enhance the utilization of organizational resources (Milliken and Martins, 1996, Troy et al., 2008). Consequently, most empirical evidence indicates interdepartmental collaboration positively contributes to project performance (Kahn, 1996; Garcia et al., 2008).

Management literature has extensively studied interdepartmental (also referred as inter-functional, or cross-functional) collaborations in project management involving, R&D, marketing, and manufacturing departments (Kahn 1996). However, scarcely is known about the potential impact of management accountants' collaborating in project management contexts. Although accounting function occupy in most organizations an acknowledged important status as an activity that supports organizational coordination and control and managerial decision making, the potential impact of the collaboration of management accountant professionals in certain task-driven, highly uncertain, flexible and dynamic organizational settings are still nearly unexplored (Chenhall, 2008).

Empirical and anecdotal evidence indicates management accounting tools and techniques are responsible to generate information needed to evaluate and control project performance (van der Veeken and Wouters, 2002, Ylinena and Gullkvist, 2011). By forecasting key variables, recognising uncertainties, evaluating actual performance, managing allocation of resources and evaluating trade-offs, accounting through its systems (e.g. budgets, project appraisal, and project management systems) contribute to project success (Bisbe and Malagueño, 2009). Among the empirical literature in accounting that have investigated the relationship between accounting and the project management are the studies that: examine the effects of accounting information in project development (Jönsson and Grönlund, 1988; van der Veeken and Wouters, 2002; Davila, 2000; Ditillo, 2004), investigate the elements for adoption of project management system (PMS) as a component of the control package (Bisbe and Malagueno, 2010), and explore the effects of the implementation of projects such as

enterprise resource planning systems on the management accounting change (Scapens and Jazayeri, 2003) and control (Quattrone and Hopper, 2005).

In spite of this body of knowledge that addresses the features of management accounting techniques in supporting activities in projects and knowledge intensive contexts (Ditillo, 2004), it is still not clear whether and how management accountants could contribute to support project management activities (Chenhall, 2008: 1208). Such managerial practice involves structuring around projects that are directed by a project manager, who lead cross-functional teams and ensure integration of activities and communication of the workflow that takes place horizontally across different departments. Hitherto, management and accounting literatures have devoted scant attention to the consequences of collaboration of management accountants in project management. For instance, it is not clear what (if any) is the role of management accountants in project management. Would a collaboration of accountants in project teams be beneficial? How would management accountants as participants of project management teams contribute to project success?

On one hand, traditional behavioural and economic theories of the firm could indicate collaboration of management accountants in project management teams is constantly beneficial to project success rate. Those theories recognise organizational members are individuals with limited attention and bounded rationality (e.g. Cyert and March, 1963, Jensen and Mecking, 1976) and consequently the decision making process is restricted to the information and knowledge that can be absorbed and processed by the organizational members. Information processing capability is enhanced when socially construct institutions engage in various partnerships, collaborations and/or recruitment of individuals whose diverse expertise's contribute to expand and process the vast depositories of information available (Galbraith, 1973). On the other hand, anecdotal and empirical evidence would suggest the presence of accountants in project management bring a rationalistic discourse (Baldvinsdottir et al., 2009; Weber and Schaeffer, 1999) that could easily be associated with the creation of rigidities that rather than positively contribute to the project, reduce its success rate.

This research draws on contingency approach and more specifically on the organizational information-processing theory (Daft and Lengel, 1986; Galbraith, 1973;

Tushman and Nadler, 1978), to test hypotheses regarding the potential effectiveness of the collaboration[1] of management accountants in the project management.

In order to better understand the collaboration of management accountants in project management and its effects on project success rate we have relied on mixed method approach. First, we conduct a case study in the German subsidiary of a multinational postal distribution facility in which a project for software development was taking place. Second, we gather quantitative data through a structured survey administered during interviews (Van der Stede et al., 2007) among project managers of 59 Swiss and German corporations in which management accountants are involved to certain extant in teams managing large mechanical engineering and IT projects.

This research contributes to OIPT theory, management and accounting literature by analysing the costs and benefits associated with the collaboration of accountants in highly uncertainty organizational contexts. More precisely, we aim to contribute in at least four respects. Firstly, we map and identify the role, contributions and effects of the collaboration of management accountants in the projects among German speaking firms. Secondly, we examine potential gains of management accountants' collaboration in project teams in terms of higher internal coordination represented through project teams' reliance on KPIs. Thirdly, we analyse the potential costs in terms of reduced flexibility of projects. Fourth, we investigate specific organizational configurations that may explain project management success rates. As a set, the results of this study extend our understanding of the role of accountants in horizontal organizations and more specifically in project management teams, its contributions for augmenting the organizational information-processing capability, and its specific links with project success.

The remainder of the paper is structured as follows. Firstly, we provide the theoretical background of our study. Section 3 presents the collaboration of management accounting in project management through the description of a representative case study. Section 4 introduces a series of testable hypotheses based on the theory as well as case findings. This is followed by two sections that present the research method and results. A final section discusses the main findings and presents conclusions.

[1] Following previous literature in this research collaboration is defined as "as an affective, volitional, mutual/shared process where two or more departments work together, have mutual understanding, have a common vision, share resources, and achieve collective goals" (Kahn 1996, p. 136).

2. Theory development

2.1. Management Accountant Role

Traditionally, management accountants have been recognized as objective assessors of the organisational and departmental financial performance (Burns and Baldvinsdottir, 2005). Their role, usually regarded as independent and isolated from other operational areas, involved activities such as scorekeeping, standard costing, budgets preparation, variance and routine performance measurement reporting (Byrne and Pierce, 2007). In a daily basis, management accountants would collate data, produce reports and analyse calculations that would aim to support decision-making and control. Their interaction with other organisational functions was reduced to a monthly discussion of accounting figures with business managers (Burns and Baldvinsdottir, 2005).

This long-established role of management accountants does no longer suffice. Recent literature argues that, triggered by changes in the environment (e.g. the advent of new management practices, different organisational structures, more competitive markets and advances in information technology) (Burns and Scapens, 2000)), management accountants are moving from their traditional role in the organisation as the 'number cruncher,' into a less routine, wider, more proactive and strategic, internal business-consultancy role (Burns and Vaivio, 2003; Caglio, 2003; Scapens and Jazayeri, 2003; Pierce, 2001). Burns et al. (2004) suggest that management accountants are now expected to participate in the development of strategic plans and to proactively collaborate in cross-functional management groups. This changing process has contributed to the emergence of a 'hybrid accountant', who combines their accounting knowledge and a profound understanding of the business process (Burns & Baldvinsdottir, 2005). However, the adoption of hybrid accountants as 'business partners' is still ambiguous and uncertain (Byrne and Pierce, 2007).

Particularly in German-speaking countries the role of management accountants (also referred as *Controllers*), is suggested to be deeply associated with management activities as the *Controlling* function is more strongly separated from financial accounting than management accounting tends to be in other cultures (Becker and Messner, 2007). However, even in this context, the notion of a unique function of management accountants, which is ensuring rational management, is still embedded in

the educational system and diffused among researchers and practitioners (Weber and Schaeffer, 1999; Becker and Messner, 2007).

2.2. Project Management

A project is a temporary endeavour to build a unique progressively elaborated product or service (PMBOK, 2008) and, accordingly, differs from the regular on-going operations of the firm. Project management involves managerial activities associated with structuring around a project. These managerial activities necessitate the identification of a project manager responsible for the coordination, integration and communication of the human and material resources workflow that takes place horizontally across different departments (Chenhall, 2008).

Each project is typically broken down into multiple sequentially-ordered phases in order to cope with the high level of uncertainty generated by the project uniqueness and to make connections with the regular on-going operations of the firm. Each phase is discernible by provision of one or more tangible verifiable work product, designed to be tightly controlled (i.e., progress measure, variance analysis, and corrective actions) and commonly shares the same stage-closing process of a performance review and decision-making to continue or abandon the project.

In a product development setting, Davila (2000) describes an iterative process including five phases: planning, concept design, product design, testing, and production start-up. In the planning phase, the objectives and the consequent courses of action are broadly formulated in terms of project scope, time, cost, quality, human resources (i.e., roles & responsibilities planning, staff acquisition, team development), communication (i.e., information identification, collection, and distribution), risk (i.e., identification, analysis, and potential response), and material procurement (i.e., sellers identification, solicitation, selection, administration, and closeout). Then, the details of product specification and requirement (e.g., functionality, quality, price, release dates) are examined in the concept design phase. The last three phases focus respectively on the actual execution of the tangible product, the initial objectives review, and release preparation.

2.3. Theoretical Framework

The organizational information processing theory (OIPT) views organizations as information processing systems facing uncertainty. OIPT places particular attention to the internal structure of organizations and provides a theoretical basis to explain information processing and decision making in ill-structured problems and complex contexts (Ungson et al, 1981). Overall, the theory argues that organizations must build internal structures (i.e. information-processing capabilities) that are based on the collection and transformation of data into logical and usable information, and on the storage, retrieval, and communication of such information within the organization (Galbraith, 1973; West, 2000).[2] According to OIPT, an organization achieves 'fit' when their information-processing capabilities meet the demands of a given task and/or environmental uncertainties (Tushman and Nadler, 1978; West, 2000). Hence, more uncertainty requires higher flexible internal structures because it is expected flexible structures allow processing more information which contributes to reduce uncertainty. As the complexity of tasks and projects increase and technical variables multiply, different types of expertise become necessary and more diverse types of experts must be engaged (West, 2000). Therefore, cross-functional and interdepartmental collaborations are expected to provide the multiple expertises' that would assist the teams and organizations to cope with highly complex and ill-structured problems and projects. Although this theoretical background has been mostly used in previous literature to evaluate optimal structures or structural mechanisms that facilitate effective coordination among different subunits of an organization (Tushman and Nadler, 1978), recent research have shown OIPT to be a useful framework for studying inter-departmental relations in a knowledge intensive and highly uncertainty context (Cuijpers et al., 2011). In this research we build on OIPT to study the role of management accountants and the effects of their collaboration in a highly uncertainty context, by examining not only the predicting effects of this collaboration but also attempting to explain the mechanisms, benefits and costs associated with these effects.

In order to better understand how management accountants could potentially contribute to the provision and processing of organizational information in project management, we first developed a case study as followed explained.

[2] West (2000) argues this path involves centralization of information, standardization of a common language and higher levels of internal coordination.

3. Case study

During a period of 24 months (from 2007 to 2009) one of the authors of this research paper developed a case study[3] with a German organization running large IT projects. The researcher was granted full access to the organisation and during this period, data was gathered through multiple sources, such as, interviews with members of the organisation (and more specifically with members of project teams), internal documents/archival data[4] and participant observation.[5]

3.1. Organizational and Project Characteristics

The examined organization was the German subsidiary of a multinational corporation specialised in the development and implementation of postal logistics systems, which are ordered by parcel, courier and other postal services. Since the provision of services was mainly in the design and construction of post-distribution systems, project work was a fundamental part of the daily operations. Around 80% of the resources of the investigated subsidiary were absorbed by customer projects, with the remaining 20% absorbed by R&D development projects. Customer projects were characterised by very different sizes and an IT projects took on average about 1000 worker/days. The typical project duration was between 12 and 18 months. The punctuality played an important role in this organization because high penalties for delayed delivery had been agreed at the contract. The costs associated with deadline compliance were very important because many contracts were fixed and cost overruns harm project profitability. This organization handled in parallel a variety of jobs with different maturities and sizes. This, on the one hand, resulted in a competitive situation with respect to critical human resources, on the other hand there were repeated and typical project processes, which led to a certain routine in project implementation, often to an existing (partial) solutions was used. The similarity of projects and the existence of partial solutions for many of the running tasks brought certain degree of confidence among project members. Consequently, the degree of dynamic complexity was

[3] Organization and project specifications have been anonymised to preserve company identity.
[4] Analysis of internal documents of the investigated units was carried out to obtain a more comprehensive picture of their formal structures and processes in the field of project management and controlling.
[5] The risk of observer bias was minimised through numerous discussions with company experts. These discussions also contributed to clarify misunderstandings produced by the very large amount of detailed information in the three cases.

relatively low. Additionally, the contractually agreed specifications rarely led the space for uncertainties regarding the overall project objectives. Due to rigid, contractually agreed delivery dates it was common to project teams to be under great time pressure. As a result, the structural complexity of the examined IT projects can be considered moderate. The interfaces of IT project team with other departments were established due to numerous similar completed projects, the collaboration was an experienced and well-rehearsed practice.

3.2. Project Management Control

The organization exercised tight formal control of its projects by using a variety of documents, manuals and guidelines. For example the organisation possessed eleven different "Operational Guidelines" that were relevant for the project management and control. These written procedures were particularly of great importance in the process of setting customer contracts. In this phase, the number of potential project risks was often very large. Before “contracts” were prepared, the subsidiary run sensitivity analysis using uniform and mandatory criteria. Furthermore, before services were agreed a detailed examination of the submitted documents had to be done by independent bodies.[6] The requirements for the scope and quality of the written documents to be submitted were regulated.

Every major IT project, had to go through the nine stages of the project as shown below. The individual phases were terminated either by so-called "great gates" or "quality gates". The classification and designation of "toll gates" was standardized across the group. The selection that took place at "quality gates" followed group recommendations.

Insert Figure 1 about here

Each "toll gate" corresponded to a report and decision point. At each checkpoint previously specified documents are presented to the project Steering Committee with the document size and scope depending on the categorization of a project. The project category in turn was the result of an advanced project risk analysis and its classification.

[6] The independent consultants were usually members of the organization based on other territories. The examination of documents was done often via checklists.

The result of the classification and the current project status also determined the frequency of the Steering Committee meetings.

A few milestones were defined as critical for success in the "quality gates". Participants of the steering committee assessed the project status on the basis of a list of criteria and critical targets. It was crucial in the "quality gates" that all participants of the steering committee decided unanimously that all criteria were met for the project to enter into the next phase. A veto voice was enough already to refer to the project back into the respective project phase. The project team was then forced to correct the identified deficiencies, before the project could proceed. So to prevent that significant problems in the project are trafficked. The above-described process-oriented features of the organisation represented a pillar of a risk-based project management. To minimize project risks, quality of project specification processes were regarded as crucial. This risk management effort was largely determined by the requirements of a central corporate entity.[7] Due to the great importance of project management, numerous measures and initiatives were coordinated across the Group in order to professionalize the project management and control.

As part of the professionalization of project management, a group-wide governance model was implemented. Group-wide important concepts and components of the project management methodology were also standardized. Central guidelines defined the design and scope of project management and control for all subsidiaries. For the individual divisions, these were further specified and adapted to the specific characteristics of typical projects of divisions. The standard models of project management have been continuously developed on the basis of best practice experiences. The standardization also applies to elements of the project reporting, where similar instruments such as project management milestone trend analysis examined project status of various divisions.

The project management rules of the group have been declared obligatory by the Executive Committee. Standard processes in the project management and control must be respected by every employee.

[7]The objective of risk avoidance is referred to in several internal documents (i.e. project management standards) of the examined organization. For instance, it is noted on a document describing the project life cycle model and the quality gates. This includes the following objectives of quality gates are: "(1) all significant project risks are identified early, (2) a thorough evaluation of projects is ensured by experts, (3) the management shall establish a consistent decision, and (4) appropriate measures are defined to track and correct deficits"(source: internal document).

In order to aligned the objectives of the organisation with the project objectives and to measure the degree of achievement of established objectives at project level, the organisation mainly relied on three management accounting systems, namely the Balanced Scorecard, standard cost accounting systems and earned value-based cost control. The project scorecard formed the backbone of reporting within the organization. It was supplemented by a detailed project cost accounting, which is based on the earned value method. This was characterized by the difference between actual costs, plan costs (planned value) and target costs (earned value). The target costs provided information about planned (expected) costs for the current stage of completion of a project.

The earned value approach places high demands on design/planning reports and change management projects. It required a full and detailed project planning. In addition, changes in plan documents are mapped promptly, in order to derive current benchmarks of project performance. At an early stage of the project the presence of two factors contributed to the development of a detailed planning. First, the essential requirements for the finished product were depicted in writing as parts of the contract. Thus, no great uncertainty reigned on the concrete objectives of the project. Second, the organization had rich experience in the planning and execution of IT projects due to a large number of similar projects, which were dealt with in the past. Without these prerequisites on the planning side the earned would have can be realized value-based cost control in the presented form. Another important requirement of the earned value approach was the timely detection of the actual cost, which places high demands on the costing system. To meet these demands, the cost accounting system should map the value flows of projects.

Project management and control in this organization had already reached a high level of maturity, so that the operational and technical requirements were met for the application of the earned value approach. The information systems and value flows in the studied organization were focused on the figure of project processes.

Using simple forecasting methods allowed the organisation to determine an outcome path for total project costs, which was the basis of the earned value approach. This was used at an early stage to assess performance variations and, if necessary, corrective measures were initiated. Such critical discussions on the financial performance of the project have been possible at an early stage, thereby providing a basis for discussion on the active and continuous control of the project.

The financial success of the organization was generally perceived as highly influenced by the reliance on and adherence to the project cost plans. This was significantly supported by the earned value-based cost control. The meaningful project cost control led to a reduction of management and formed the basis for a management via "Management by Exception" (as long as the schedule variance and the variance of cost were low, was no immediate need for the management).

3.3. Governance model and Management Accounting Collaboration

The governance model employed by the organisation played a very important role in the way information flowed and projects were conducted. A clear distribution of tasks between the top-management team (Chief Executive Officer (CEO), divisional, departmental, project manager) and controlling oriented bodies (Chief Financial Officer (CFO), controlling department, and project controller) ruled over all hierarchy levels throughout the organisation. This was described in the internal guidelines.

Insert Figure 2 about here

The project controller (i.e. accountant) was not subordinated to the project manager, but their relationship was one of cooperation (represented by "dotted line"). The project controller reported directly to the divisional CFO. The organisation had in place a four-eye principle, which required that a technical and an accounting employee led the project teams. There was a technical and controlling project manager who led the project team of each major project. The project manager could not raise and implement decisions against the approval of the project controller. Both parties had equal rights and held a veto over the decisions of their partner. Both direct (line-) supervisor of the project manager and project controller should act as coaches. As shown in Figure 2, the management accountants at all levels of the hierarchy were disciplinarily subordinated only to the CFO. Consequently, the project controllers saw themselves as delegates of the CFOs who should meet the project leaders on an equal footing.

This situation was unlike many other project organizations in which project controllers are subordinated to project managers and primarily assume task of reporting.

In this organisation the project controller was subordinated to the controlling/management accounting area. Therefore, the role of the project controller was similar to the role of a sparring partner for the project manager. A major advantage of the shared responsibility of project by project manager and controller was promoting a mutual understanding of the challenges from various perspectives. Therefore negative effects of "specialist blindness" (were often specialists are unaware of existing conditions) are reduced. It was the desire of the Executive Board of the studied organization to use their company-wide governance model "engineering spirit" and convey economic thinking at all levels of the hierarch and consequently at all levels of the project team. Project controllers were particular important in the planning phase in which contracts were prepared, in this phase various sensitivity analysis and forecasts were run in order to support the establishment of the contract specifications. The scope and quality of internal reports were also enforced by project controllers. The close involvement of management accountants in the daily operations contributed to that the economic and risk-specific aspects received more attention. This aspect was of great relevance for the operational project management. A major challenge in the project controlling represented the availability of project controllers, project managers could meet on the basis of their professional qualifications and personal maturity at an eye level. Their job profile requirements were very high, so that there was a shortage of these employees.

The important decisions in the context of major projects in this company were taken by the Project Steering Committee. The Project Steering Committee was comprised mainly by managers who were significantly affected by the project decisions. The four-eyes principle of project management also worked into the Steering Committee, as a result, both the project leader and the project controller reported separately and independently of each other on relevant aspects of project performance. In critical projects (such as risky large-scale projects), the CEO and the CFO of the Division usually belonged to the Steering Committee. Decisions that were essential for the project were addressed by the control committee chairman before the divisional management. The decision was then translated into the business unit level.

The main purpose of a close collaboration between management accountants and technicians was the reduction of knowledge gaps. Employees with very different profiles were encouraged to share their knowledge, completing each other, reducing uncertainty, and enriching the decisions making process. Important rules that govern the

collaboration between management accountants and technical/operational managers were formalized in the governance model of the organization. It is likely that the positive experiences that have been collected in the group over many years with this kind of jointly perceived control, have led to a company-wide governance model, which regulates the described elements of the control. Due to the large number of compulsory guidelines imposed and closed monitored by controlling personnel, and the constant need of mutual agreement for decision making between technicians and management accountants, the project management processes in some areas of the organisation were sometimes regarded as excessively bureaucratic and slow. These areas were usually the less experienced and mature in the field of project management.

3.1.4. Discussion of the case study

The case study presented above provides an understanding of different roles for management accountants in a project management setting. In discussions with various project participants, a deeply rooted consensus on cooperation in the project management and control was observed. A very close interaction between the project participants and management accountants was regulated not only in the governance model but in different conversations: the impression was that important principles of cooperation were also internalized and were exemplified by the executives.

Numerous guidelines define the categories of behaviour that are applicable in a particular phase of the project and what information must be submitted before a decision transition into the next phase of the project. First, there was a very detailed normative system that clearly regulated the project planning and concept design. Management accountant professionals collaborated with project participants to help them identify pre-set values for a set of diverse controllable measures. Based on management accountant's high degree of maturity in project management, the project managers had a good planning and information systems that support effective planning and timely performance measurement.

Secondly, in the actual execution of the project, rules and norms implemented and reinforced by management accountants served as systems for risk reduction. Also, phases of project implementation were constantly assessed and close monitored by the use of various reports. Those reports were mainly produced, standardized or controlled by management accountants. On the other hand, the involvement of management accountants in the project execution was perceived by some employees as generating some rigidity due to excessive reliance on KPI and hence restricted the project flexibility.

4. Development of the research hypotheses

In order to examine the potential effects of the collaboration of accountants in project management, and given the complexities that are associated with projects; we opted to distinguish the project management process in two phases, namely, concept & planning and execution. This over-simplification allows us to concentrate on the distinguishable components and effects that are comprised in this relationship. Figure 3 depicts the theoretical model tested in this research.

Insert Figure 3 about here

4.1. Management accountants and project management planning

The role of management accountants as providers of information for investment appraisal and consequent project selection is well documented (Bartolomeu et al., 2000; Drury and Tayles, 1997). Accountants support selection of projects in its concept and planning by gathering, computing, analysing, and interpreting information for use in organizational decision-making. Nevertheless empirical evidence on the role of accountants in supporting project in its initial phase is still scarce.

On one hand Van der Veeken and Wouters (2002) suggest management accounting information is particularly important to projects planning phase. Higher and lower level non-accounting managers use detailed cost information when planning a project developed expected project costs, forecasts and budgets, to identify financial risk, and to plan the execution of the project. This cost information is also used for determine project budgets. Frequently, the accounting information is used by senior level managers who traditionally provide a top-down cost estimate defining how much there is to allocate to a given project (Doloi, 2011). On the other hand, although accounting information enables more accurate planning and abstract analysis of data, this becomes less useful in the context of uncertainty in projects. In this vein, the use of the accounting information in most cases does not contribute to improve quality of the project planning phase as the projected calculations, such as cost estimation techniques are inaccurate as estimators have limited practical and operational knowledge and insufficient time for cost estimating (Akintoye and Fitzgerald, 2000).

Either top-down or bottom-up use of accounting information for estimations in the planning phase could benefit the planning process if the planning team collaborate with management accountants. A closer collaboration of management accountants to the planning process could bring additional analytical and interpretative skills (Yazdifar and Tsamenyi, 2005) to the project, ultimately increasing the information processing capabilities of the project team (Galbraith, 1973). This potentially beneficial collaboration was also documented in our case, in which management accountants were regarded/recognized as an relevant source of information for planning activities.

Consequently, collaboration of management accountants in project planning could indirectly contribute to project performance. While examining new product development activities, Davila (2000) found that better cost and design information was positively associated with project success rate. A better planned and more structured and reliable planning should increase the chances of a project to succeed. Therefore, we posit the following hypothesis:

H1: Collaboration of management accountants in project management has a positive effect on quality of project management planning, which in turn has a positive effect on project performance

4.3. Management accountants, report quality and risk management effort

The case study presented above reveals an association between collaboration of management accountants in projects and the reduction of uncertainties. In this research we predict that this attempt to reduce uncertainties in project execution occurs through a better quality of reporting and a higher level of risk management effort.

Traditional accounting research views management accountants as containers of financial and past information. Internal reporting is one of the key roles of management accountants (Byrne and Pierce, 2007). Management accountants facilitate the effective collection, processing and distribution of information. Whereas the production of information for reporting has decreased in importance as a management accountant task given the advances in technology and ERPs (Entreprise Resourse Planning), the monitoring and control of those reports still rests under the responsibility of management accountants. Therefore, management accountants are responsible to guarantee accuracy and reliability of the reports, as well as communicate and interpret

the information, supporting managers and people of the line (Caglio, 2003). Accordingly, Lambert and Pezet (2010) show how management accountants play a central role in the organization, and create an organizational identity as knowing subjects and organisational truth tellers.

In a project setting, and most particularly in the execution phase of the project, as observed in our case study, one of the main activities of the management accountants is associated with reporting. In the context of projects, information as gathered and processed will include elements such as plans, work standards, budgets, cost reports, feed-back on performance, inventory levels, external technical and market conditions (Tushman and Nadler, 1978). Consequently, we would expect that a closer and more intense collaboration of management accountants in projects would be positively associated with a better reporting quality.

By examining more than 500 IS projects, Thompson et al. (2007) suggests that reporting quality is positively associated to project and organizational outcomes. Therefore, based on previous evidence, we could predict there is an indirect relationship of collaboration of management accountants in project management and project performance mediated by reporting quality. Hence,

H2a: Collaboration of management accountants in project management has a positive effect on project management reporting quality, which in turn has a positive effect on project performance

Activities that have a low level of uncertainty and are well understood can be managed through preplanning (Galbraith, 1973). However, when activities are poorly understood during the actual execution of activities new information is acquired and preplanning is less efficient. During the execution phase of projects changes are made in terms of "resource allocations, schedules, working methods, priorities, etc. As the number of exceptions compared to plan increases, uncertainties have to be resolved during execution." (Van der Veeken and Wouters, 2002: 349)

The increasing uncertainties (e.g. not well defined products, contractors changing specifications, suppliers and subcontractors being late) in the execution phase of projects require a greater managerial effort to administer the risks. The need for project risk management has been widely recognized. This entails the identification and assessment of environmental uncertainty which is critical to project success. The risk

management effort do not aimed at eliminating all risk, but "the purpose of risk analysis and risk quantification is always to provide input to an underlying decision problem which involves not just risks but also other forms of costs and benefits" (Kaplan and Garrick, 1984). Williams (1995) refers to risk management as the process that identifies a project's uncertainties, estimates their impact on the overall project and organisation, analyses their interactions and controls them within a risk-management structure.

As producers and observers of the diversity of managerial information management accountants have a holistic and integrative vision that is sometimes missing in project management teams. Indirectly, management accounting experience reduces uncertainties by mitigating vague decision. For instance, Victoravich (2010) argues management accounting experience mitigates the effect of vague opportunity costs in project completion stage. She suggested that management accounting experience mitigates this dysfunctional tendency to overlook opportunity costs as documented by prior studies and the attention to opportunity costs acts as mediator and this in turn reduces the tendency to continue an existing project. Particularly, management accountants, bring the necessary monitoring profile, the methodology and forward looking knowledge that is pivotal for successful risk management efforts. As argued by Chapman and Ward (2002) a greater risk management effort is positively associated with project success rate. Following from the above arguments, it is hypothesized that:

H2b: Collaboration of management accountants in project management has a positive effect on risk management effort, which in turn has a positive effect on project performance

4.4. Costs associated with the collaboration of management accountants in project management

As observed in the case study presented above, collaboration of management accountants in project management, while beneficial in terms of improving planning and reducing uncertainties, is not always refereed as favourable. On one hand as observed OIPT the benefits of information processing that are associated with inter-departmental collaboration absorbs much time and resources (i.e. effort and energy) because it requires project managers to integrate different forms of expertise and

problem-solving approaches (see West, 2000, Cuijpers et al., 2011). On the other hand the presence of management accountants is constantly associated with objectivity, emotional detachment, soberness and attention to fine detail (Baldvinsdottir et al, 2009) as well as, governed by data and not flexible enough (Byrne and Pierce, 2007) which would explain why in our case we found operational project members associating the presence of management accountants with bureaucracy or the creation rigidities.

Management accountants develop a central role in providing and monitoring financial (e.g. costing) and non financial information in the form of metrics or key performance indicators (KPIs). The structured and objective thinking that is characteristic among accountants (Ahrens and Chapman, 2000) is based on metrics. Accountants tend to view knowledge mainly in terms of financial information and a range of non-financial performance metrics (CIMA, 2005). However the combination of uncertainty with complexity poses special difficulties for the development and reliance on pre-established metrics, because under this conditions organisations are pushed in two opposed directions. While complexity requires a close control of detailed and accurate measures, uncertainty asks for novel and flexible solutions that at times are outside the scope of formal calculations. By relying exclusively on metrics and KPIs the collection, classification, and interpretation of information are conducted inside a frame which might be narrow and constituted by irrelevant elements.

The accountant stereotype in which accountants are number-fluent, interpersonally and socially inept, obsessed with details, inflexible, defensive, and lack creativity and imagination" (Bougen 1994; Holland et al. 1994; Carnegie and Napier 2010) seems to contradict with the argument that the collaboration of accountants in project management could be beneficial for project success. Actually, previous research indicates that accountancy education and work may attract or reward entrants with less than desirable levels of creativity (Bryant et al., 2011). Anecdotal evidence shows many believe that creativity is unneeded in, or even detrimental to, professional accountancy work. In spite of the potential benefits that the presence of accountants could bring in terms of increasing the information capacity of the project team, it seems the presence of accountants in project management will be perceived by organisational operational managers as negatively associated with the desired flexibility that projects require. Following from the above arguments, it is hypothesised that:

H3a: Collaboration of management accountants in project management has a positive effect on project management reliance on KPIs, which in turn has a negative effect on project performance

H3b: Collaboration of management accountants in project management has a negative effect on project management flexibility, which in turn has a positive effect on project performance

4.5. Collaboration of management accountants in project management and project performance

From a purely OIPT perspective cross-functional collaborations would frequently lead to better and more successful projects. Overall, the theory argues that organizations must build information-processing capabilities that are based on the collection and transformation of data into logical and usable information, and on the storage, retrieval, and communication of such information within the organization (Galbraith, 1973; West, 2000).Consequently, collaborations among professionals or departments with different backgrounds are expected to provide the multiple expertises that supportproject management teams to cope with highly complex and ill-structured problems and projects.

In the case study described above this seems to be the case and management accountants are believed to provide a structure, organisation, and knowledge which are suggested to positive contribution of management accountants in project performance.

Although in this research we are particularly interested in investigating the indirect paths that could explain the positive effects of the collaboration of management accountants on project success rate, we acknowledge that some of this variation is explained for other than the variables examined later in this study. Hence, based on the potential aptitude of management accountants to be agents contributing to increase the organisation information-processing capacities, and in the recognition that other than the tested variables included in this study are expected to affect indirectly affect project success rate we hypothesised a direct relationship between collaboration of management accountants and project performance. Thus,

H4: Collaboration of management accountants in project management is positively associated with project performance

5. Research and survey design

5.1. Sample selection and data collection

The second part of this research relies on empirical data collected via structured surveys administered during interviews to a sample of project managers (Van der Stede et al., 2007) of 58 Swiss and German corporations that were running large mechanical engineering and IT projects. Before interview and survey implementation, the questionnaire was pre-tested among academics for unambiguity and face validity. Questionnaires were administered and collected during interview process. Harman's one-factor test indicated the absence of common method effects in our survey data.

5.2. Variable Measurement

The extent to which *management accountants collaborate* in projects was measured using seven items. The respondent was asked to rate on a five-point Likert-type scale, two-point anchored, the extent to which in their organisations (a) management accountants are informed about projects, (b) management accountants are participating in projects, (c) management accountant participate in the project decision making process, (d) management accountants participate in project meetings, (e) management accountant receives project information on regular basis, (f) there is a very close collaboration of management accountants in project management, and the (g) veto power of management accountants in the context of project. Factor analysis results indicate that the six items loaded on a single factor. A remaining item that loaded on a second factor was excluded from the final construct. A Cronbach α of 0.889 indicated high internal consistency of the construct.

The *quality of project planning* was measured in terms of the quality of (a) internal cost planning in concept phase, (b) external cost planning in concept phase, (c) resource planning in concept phase, (d) planning of financial project benefits in concept phase, and (d) risk planning in concept phase. A Cronbach α of 0.604 indicated low but acceptable internal consistency of the construct.

According to Hallikas et al. (2002) a typical risk management process consists of risk identification, risk assessment, decision and implementation of risk management actions, and risk monitoring. Drawing from this literature, in this paper we measure *risk management effort* with five indicators that measure the regularity of risk assessment during the implementation phase, how rapidly are risks identified, the quick response to identified risks, the extent to which, risks are quantified and the risk reviews are carried out (Cronbach $\alpha = 0.773$).

Project rate of success was measured in terms of project efficiency (Atkinson, 1999). Williams (1995) argues that success in a project can be regarded as provision on time, on budget, of a required performance or achievement. Following the instrument developed by Shenhar and Dvir. (1996) we measure the success rate in terms of completion of designed goal. This included the percentage of projects finalized, the percentage of projects meeting specifications, the percentage of projects without time delays and the percentage of projects within cost budget (Cronbach $\alpha = 0.782$).

Reporting Quality (reverse) was adapted from Mohr and Spekman's measure. The constructs considers timeliness, accuracy, adequacy of the reports. It was measured in a six-point Likert-type scale, two-point anchored (Cronbach $\alpha = 0.619$).

Project flexibility measures the changes of: a) project priorities/targets after go-decision, b) general project timeline after go-decision, c) project cost budget after go-decision and project work packages / modules after go-decision (Cronbach $\alpha = 0.695$).

Reliance on KPIs measures the extent to which the project managers' perceive KPIs as important for managing their project teams. This instrument asked respondents about seven items, each of which referred to a particular KPI (i.e. time and progress, cost, resource, quality, risk, employee, process) the importance they attribute to each group of indicators in a six-point Likert-type scale, two-point anchored. The importance or reliance on KPIs was measured as the composite resulting from the sum of the scores of these items.

Finally, we included *structural complexity* and *project experience* as control variables. The former was measured as by two questions about the amount of internal and external units involved in the average project. The latter measures the extent to which planning is performed by experienced employees and the extent to which there are established communities of practice for project management. Table 1 presents an abbreviated version of the questionnaire as well as the descriptive statistics of the

questionnaire items. The Pearson correlation coefficients for zero-order relationships among the variables are displayed in Table 2.

Insert Tables 1 and 2 about here
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6. Results

SPSS macro for mediation provided by Preacher and Hayes, 2004, which incorporates a causal steps and a bootstrapping procedure was used for hypothesis testing. The causal steps procedure tests the significance of three paths: the total effect of an antecedent variable on a criterion variable (path c); the effects of the antecedent on the mediator (path a); and the effect of the mediator on the criterion (path b). If all three paths are found to be significant, then the criteria for partial mediation are considered to be fulfilled (Baron and Kenny, 1986; Mathieu and Taylor, 2006; Preacher and Hayes, 2004). The Preacher and Hayes procedure further bases the mediation analysis on nonparametric bootstrapping procedures to overcome potential shortcomings related to low statistical power and to provide a formal direct test of the mediation hypotheses (Hayes, 2009).

Table 3 displays the results of the causal steps procedure. Two models are presented. These two models are distinct in the way they assess the potential costs to project flexibility that are associated with the collaboration of management accountants in project management. Therefore, Model (1) depicts a model that tests the effects of collaboration of management accountants on project performance via planning quality, risk management effort, reporting quality and reliance on KPIs. Secondly, Model (2) tests the effects of collaboration of management accountants on project performance via planning quality, risk management effort, reporting quality and project flexibility.

Panel A in Table 3 shows that the collaboration of management accountants in projects has a positive effect on the quality of project planning (β=0.280, $p < 0.05$), which in turn, has a positive effect on project performance (β=0.248, $p < 0.05$ and β=0.288, $p < 0.01$). Overall, these results suggest that, as predicted by H1, the collaboration of management accountants in project management is positively associated with the project management and that this associated is mediated by better quality of project management planning. As predicted, results depicted in Panel A Table

3, shows a positive effect of the collaboration of management accountants in project management has a positive effect on risk management effort (β=0.242, $p < 0.05$), which in turn has a positive effect on project performance (β=0.241, $p < 0.05$ and β=0.259, $p < 0.05$). These results support H2a. However the collaboration of management accountants in project management are not significantly associated with the reporting quality (β=-0.032, $p > 0.10$). Accordingly, the effects of reporting quality on project performance are not significant. Hence, H2b is not supported.

Further, we test whether there are costs of collaboration in terms of dysfunctional reliance on KPIs or reduced project flexibility. As predicted, results depicted in Panel A Table 3, shows the collaboration of management accountants in project management has a positive effect on reliance on KPIs (β=1.352, $p < 0.05$) and a negative effect on project flexibility (β=-0.207, $p < 0.05$).However results do not show that any of these variables is significantly associated with project performance (β=0.026, $p > 0.10$ and β=-0.039, $p > 0.10$).Hence, H3a and H3b are only partially supported.

Finally, we test the direct positive effect of the collaboration of management accountants in project management on project performance. The results show collaboration of management accountants is not directly associated to project performance (β=0.102, $p > 0.10$ and β=0.112, $p> 0.10$). The results do not support a pattern of partial mediation (Mathieu and Taylor, 2006).

We further tested the presence of mediation by using 5000 bootstrap samples of the indirect effect (i.e. the product of the two mediated paths) and estimating the percentile-based 95% confidence intervals (Panel B in Table 3). As reported in Table 3 Panel C the bootstrapped 95% confidence intervals around the indirect effects of *quality planning* and *risk management effort* did not contain zero. Therefore results presented in Panel A Table 3 are confirmed and H1 and H2a are supported. Whereas H3a and H3b are only partially support.

Insert Table 3 about here

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7. Preliminary Conclusion

The objective of this study was to explore how management accountants contribute to the project management activities and how the project performance was affected by their contributions. Based on the findings of a comprehensive case study and the information processing capability theory (Galbraith, 1973) a theoretical model has been developed and tested with survey data. The results suggest that better project performance is driven by the collaboration of management accountants through the enhanced quality of project management planning and reporting. This finding contrasts with prior studies assuming that the interactions with management accountants were purposefully limited to business managers and suggested that their roles are is only marginally relevant to project management.

This study suffers from limitations. First, the results are based on survey data and, therefore, undergo survey-related limitations (Van der Stede et al., 2005). For example, due to the use of a cross-sectional survey, no causality has been proofed. Even though theoretical arguments describe causal relationships, this study only argues that results are consistent with these theoretical arguments. Another survey-related concern is about the reliability and validity of measurement instruments. Some cautions have been undertaken before the mailing of the questionnaire (e.g., pre-test of instrument, pilot study) and some verifications a posteriori have been operated (e.g., construct validity). Even though there is no obvious evidence of reliability and validity problems, these steps do not fully prevent possibilities of noise in measures (Tomaskovic-Devey et al., 1994). Second, the generalization of results to small projects should be taken with caution since it may contain specificities that were overlooked.

REFERENCES

Ahrens T, and Chapman C, (2000) Occupational identity of management accountants in Britain and Germany, European Accounting Review, 9, 477-498.

Akintoye, A., Fitzgerald, E., 2000. A survey of current cost estimating practices in the UK. Construction Management and Economics 18, 161–172.

Baldvinsdottir, G., Burns, J., Nørreklit, H., and Scapens, R. W. (2009) The image of accountants: from bean counters to extreme accountants, Accounting, Auditing & Accountability Journal, 22(6), pp. 858 – 882.

Baron, R.M., Kenny, D.A., 1986. The moderator–mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. Journal of Personality and Social Psychology 51, 1173–1182.

Bartolomeo, M.; Bennett, M.; Bouma, J. J.; Heydkamp, P.; James, P. And Wolters, T. (2000) Environmental management accounting in Europe: current practice and future potential, European Accounting Review, 9(1), 31-52.

Becker, A. and Messner, M. (2005). After the scandals : A German-speaking perspective on management accounting research and education. European Accounting Review, 14, 417-427.

Bisbe, J. and Malagueño, R. (2009) The Choice of Interactive Control Systems under Different Innovation Management Modes, European Accounting Review, 18(2), pp. 371-405.

Bougen, P.D. (1994) Joking apart: the serious side to the accountant stereotype, Accounting, Organizations and Society, Vol. 19 No. 3, pp. 319-35.

Bryant, S. M.; Stone, D. and Wier, B. (2011) An Exploration of Accountants, Accounting Work, and Creativity, Behavioral Research in Accounting, 23 (1), pp. 45-64.

Burns, J. and Baldvinsdottir, G. (2005) An institutional perspective of accountants' new roles – the interplay of contradictions and praxis, European Accounting Review, 14(4), pp. 725–757.

Burns, J. and Scapens, R.W. (2000). Conceptualizing management accounting change: an institutional framework, Management Accounting Research, 11, pp. 3-25.

Burns, J. and Vaivio, J. 2001. Management Accounting Change, Management Accounting Research, 12, pp. 389-402.

Burns, J. Hopper, T. and Yazdifar, H. 2004. Management accounting education and training: putting management in and taking accounting out, Qualitative Research in Accounting and Management, 1(1), pp. 1-29.

Byrne, S. and Pierce, B. (2007). Towards a More Comprehensive Understanding of the Roles of Management Accountants, European Accounting Review, 16(3), pp. 469-498.

Caglio, A. (2003) Enterprise resource planning systems and accountants: towards hybridization?, European Accounting Review, 12(1), pp. 123–153.

Carnegie, G. D. and C. J. Napier. (2010). Traditional accountants and business professionals: Portraying the accounting profession after Enron. Accounting, Organizations and Society, 35(3): 360–376.

Chapman, C. and Ward, S. (2002) Managing Project Risk and Uncertainty: a constructively simple approach to decision making, John Wiley & Sons.

Chenhall, R. (2008) 'Accounting for the Horizontal Organization', in C. S. Chapman, A. G. Hopwood, and M. D. Shields (Eds.), Handbook of management accounting research, pp. 1207-1233 (Oxford: Elsevier).

CIMA (2005) Research Report: Knowledge Management and Its Impact on the Management Accountant.

Cuijpers, M., Guenter, H. and Hussinger, K. (2011) Costs and benefits of inter-departmental innovation collaboration, Research Policy 40, 565–575.

Cyert, R. M., J. G. March.(1963/1992.) A Behavioral Theory of the Firm . 2 nd ed. Prentice Hall, Englewood Cliffs, NJ.

Daft, R.L., Lengel, R.H., 1986. Organizational information requirements, media richness and structural design. Management Science 32, 554–571.

Davila, A. (2000) An empirical study on the drivers of management control systems design in new product development, Accounting, Organizations and Society, 25(4-5), pp. 383-410.

Ditillo, A. (2004) Dealing with uncertainty in knowledge-intensive firms: the role of management control systems as knowledge integration mechanisms, Accounting, Organizations and Society, 29(3–4), pp. 401–421.

Doloi, H. K. (2011) Understanding stakeholders' perspective of cost estimation in project management, International Journal of Project Management 29, 622–636.

Drury, C. And Tayles, M. (1997) The misapplication of capital investment appraisal techniques, Management Decision, Vol. 35 Iss: 2, pp.86 – 93.

Galbraith, J. R. (1973). *Designing Complex Organizations*. Boston: Addison-Wesley Longman Publishing.

Galbraith, J.R., 1973. Organization Design. Addision-Wesley, Reading, MA.

Garcıa, N., Sanzo, M. J., and Trespalacios, J. A. (2008) New product internal performance and market performance: Evidence from Spanish firms regarding the role of trust, interfunctional integration, and innovation type, Technovation, 28, 713–725.

Hallikas, J.,Virolainen, V-M and Tuominen, M.(2002) Risk analysis and assessment in network environments: A dyadic case study, International Journal of Production Economics, 78(1), 45-55.

Hayes, A.F., 2009. Beyond Baron and Kenny: statistical mediation analysis in the new millennium. Communication Monographs 76 (4), 408–420.

Holland, J., Power, P. and Fritzsche, B. (1994). The Self-Directed Search (SDS) Professional User's Guide. Odessa, FL: Psychological Assessment Resources, Inc.

Jensen, M.C. and W.H. Meckling. (1976), 'Theory of the Firm: Managerial Behaviour, Agency Costs and Ownership Structure', Journal of Financial Economics 3(4), 305-360.

Jönsson, S. and Grönlund, A., 1988. Life with a sub-contractor: new technology and management accounting, Accounting, Organizations and Society, 13 (5), 512–532.

Kahn, K. B. (1996) Interdepartmental integration: A definition with implications for product development performance, *Journal of Product Innovation Management*, 13(2),137–151).

Kaplan, S., and Garrick, B.J. (1984), On the quantitative definition of risk, Risk Analysis 1, 11-28.

Lambert, C. and Pezet, E. (2011) The Making of the Management Accountant - Becoming the Producer of Truthful Knowledge, Accounting Organizations and Society , 36(1), pp. 10-30.

Lovelace, K., Shapiro, D. L. and Weingart, L. R. (2001) Maximizing Cross-Functional New Product Teams' Innovativeness And Constraint Adherence: A Conflict Communications Perspective, Academy of Management Journal, 44(4), 779-793.

Mathieu, J.E., Taylor, S.R., 2006. Clarifying conditions and decision points for mediational type inferences in Organizational Behavior. Journal of Organizational Behavior 27, 1031–1056.

Milliken, F.J., Martins, L.L., (1996). Searching for Common Threads: Understanding the Multiple Effects of Diversity in Organisational Groups., Academy of Management Review, 21(2), pp. 402–433.

Mohr, J. and R. Spekman (1994) Characteristics of partnership success: partnership attributes, communication behavior, and conflict resolution techniques, Strategic Management Journal 15 (2), 1994, pp. 135–152.

Pierce, B. 2001. Management Accounting Without Accountants?, Accountancy Ireland, 33(3), pp.10-12.

PMBOK, (2008). A guide to the Project Management Body of Knowledge. 2008 edition. Project Management Institute. http://www.pmi.org/.

Preacher, K.J., Hayes, A.F., 2004. SPSS and SAS procedures for estimating indirect effects in simple mediation models. Behavioral Research Methods 36, 717–731.

Quattrone, P., Hopper, T. (2005). A 'Time-Space Odyssey': Management Control Systems in Multinational Organisations, Accounting, Organizations and Society, 30, 7-8: 735-764.

Scapens, R. W. and Jazayeri, M. (2003) ERP systems and management accounting change: opportunities or impacts? A research note, European Accounting Review, 12(1), pp. 201–233.

Shenhar, A. J. and Dvir, D. (1996) Towards a typological theory of project management, Research Policy, 25, 607-632

Thompson, R. L., Smith, H. J. and Iacovou, C. L. (2007) The linkage between reporting quality and performance in IS projects, Information & Management, 44(2), pp. 196–205.

Troy, L.C.; Hirunyawipada, T. and Paswan, A.K. (2008)Cross-functional integration and new product success: an empirical investigation of the findings, Journal of Marketing, 72, pp. 132–146.

Tushman, M.L., Nadler, D.A., 1978. Information processing as an integrating concept in organizational design. Academy of Management Review 3, 613–624.

Ungson, G. R. , D.N. Braunstein, & P.D. Hall (1981). Managerial information processing: A research review. Administrative Science Quarterly, 26:1, 116-134.

Van der Stede, W. A., Young, M. A., & Chen, C. X. (2007) Doing management accounting survey research. In C. S. Chapman, A. G. Hopwood and M. D. Shields (Eds.), Handbook of Management Accounting Research (pp. 445–478). Oxford: Elsevier.

Van der Veeken, H. and Wouters M. (2002). Using accounting information systems by operations managers in a project company. Management Accounting Research, 13 (3), 345-370.

Weber, J. and Scha¨ffer, U. (1999) Sicherstellung der Rationalita¨t von Fu¨hrung als Funktion des Controlling [Ensuring rationality of management as function of management accounting], Die Betriebswirtschaft, 59(6), pp. 731–746.

West, J., 2000. Institutions, information processing, and organization structure in research and development: evidence from the semiconductor industry. Research Policy 29, 349–373.

Williams, T. (1995) A classified bibliography of recent research relating to project risk management, European Journal of Operational Research 85, 18-38

Yazdifar, H. and Tsamenyi, M. 2005. Management accounting change and the changing roles of management accountants: a comparative analysis between dependent and independent organisations, Journal of Accounting and Organizational Change, 1(2), pp. 180-198.

Ylinen, M. and Gullkvist, B. (2012) The Effects of Tolerance for Ambiguity and Task Uncertainty on the Balanced and Combined Use of Project Controls, European Accounting Review, 21(2).

Figures & Tables

Figure 1: Model of the case study phase of the project organization

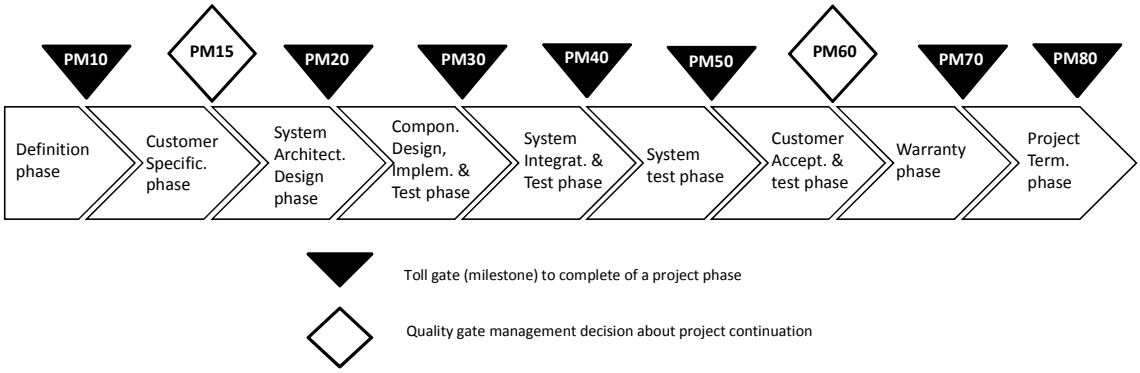

Figure 2: Control panels and reporting lines

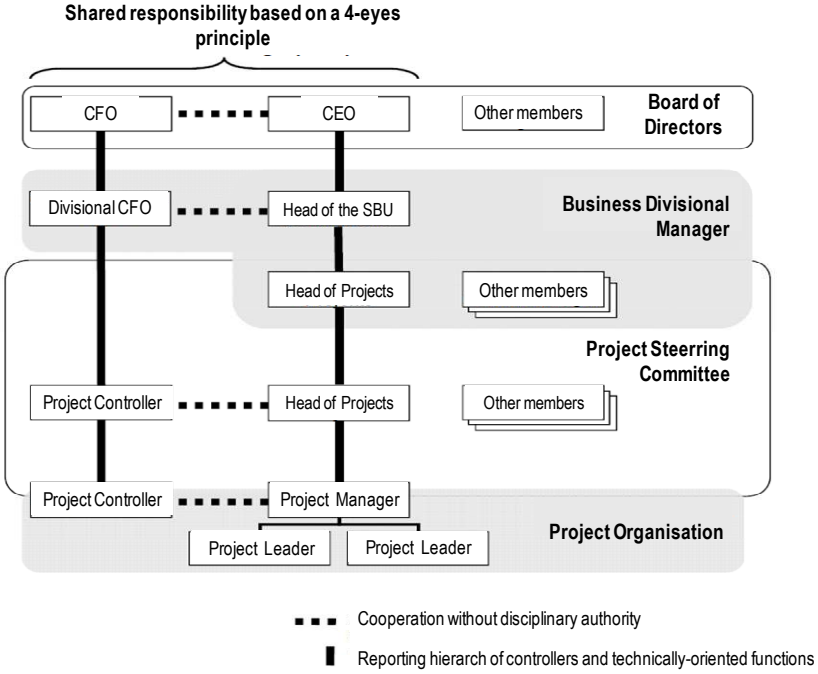

Figure 3: Theoretical model

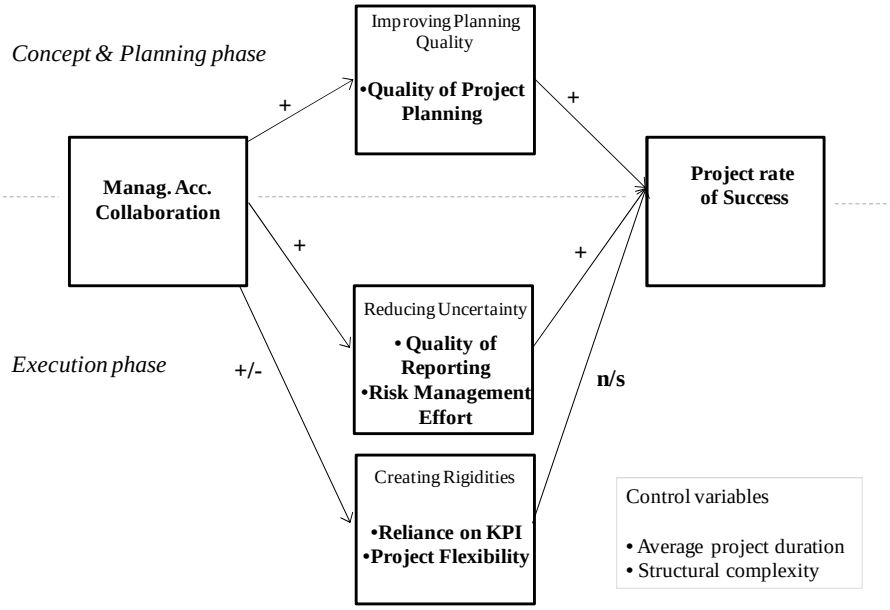

Table 1: Descriptive statistics, related questionnaire items and principal factor analysis

	Min	Max	Mean	Std. dev.	Loading on first factor	Cronbachα
Management Accountant Collaboration						
Management accountants informed about projects (Q231)	1	5	1.53	0.86	0.078	0.889
Management accountants participating in projects (Q232)	1	6	2.86	1.59	0.860	
Participation of management accounting function in the project decision making process (Q233)	1	6	2.90	1.65	0.838	
Veto power of management accounting function in the context of projects (Q234)	1	6	3.36	1.81	0.773	
Very close collaboration of management accounting function in project management (Q241)	1	6	4.00	1.61	0.766	
Management accounting function is participating in project meetings (Q243)	1	6	2.90	1.53	0.795	
Management accountant receives project information on regular basis (Q244)	1	6	1.96	1.26	0.710	
Planning Quality						
Quality of internal cost planning in concept phase (Q113)	1	6	2.81	1.26	0.738	0.604
Quality of external cost planning in concept phase (Q114)	1	6	2.31	0.87	0.617	
Quality of resource planning in concept phase (Q115)	1	5	3.14	1.02	0.747	
Quality of planning of financial project benefits in concept phase (Q116)	1	6	2.61	1.37	0.591	
Quality of risk planning in concept phase (Q119)	1	6	2.84	1.06	0.139	
Risk Management Effort						
Regular risk assessment during implementation phase (Q211)	1	5	2.38	1.28	0.579	0.773
Rapid identification of risks (Q212)	1	5	2.49	1.23	0.769	
Quick response to identified risks (Q213)	1	6	3.25	1.31	0.788	
Risks are quantified (Q221)	1	6	2.92	1.50	0.761	
Risk reviews are carried out (Q222)	1	6	2.97	1.31	0.721	
Reporting Quality (reverse)						
Delays in project reporting regarded as weakness (Q191)	2	7	4.61	1.44	0.665	0.619
Quality of project reporting data regarded as weakness (Q192)	2	7	4.93	1.37	0.791	
Allocation of project costs within project reporting regarded as weakness (Q193)	2	7	4.54	1.44	0.801	
Project Performance						
Percentage of projects finalized (Q71)	1	6	2.34	1.35	0.721	0.782
Percentage of projects meeting specifications(Q72)	1	6	3.10	1.16	0.858	
Percentage of projects without time delays (Q73)	1	6	4.03	1.54	0.830	
Percentage of projects within cost budget (Q74)	1	5	4.35	1.23	0.712	
Structural Complexity						
Amount of internal units involved (Q51)	1	6	2.16	1.27	0.685	0.632
Amount of external units involved (Q56)	1	6	3.66	1.90	0.973	
Project Flexibility						
Changes of project priorities/targets after go-decision (Q181)	0	5	1.83	1.47	0.528	0.695
Changes of general project timeline after go-decision (Q182)	0	5	3.37	1.41	0.733	
Changes of project cost budget after go-decision (Q183)	0	5	2.62	1.52	0.778	
Changes of project work packages / modules after go-decision (Q184)	0	5	2.92	1.57	0.646	
Reliance on KPIs						
Importance of time / progress-related KPIs for effective project control(Q141)	1	4	1.75	0.84		
Importance of cost-related KPIs for effective project control (Q142)	1	5	1.74	1.02		
Importance of resource-related KPIs for effective project control (Q143)	1	5	2.07	1.01		
Importance of quality-related KPIs for effective project control (Q144)	1	6	2.53	1.17		
Importance of risk-related KPIs for effective project control (Q145)	1	6	2.35	1.12		
Importance of employee-related KPIs for effective project control (Q146)	1	6	3.67	1.37		
Importance of process-related KPIs for effective project control (Q147)	1	6	3.82	1.44		
Structure Complexity						
Amount of internal units involved (Q51)	1	6	2.16	1.27	0.685	0.667
Amount of external units involved (Q56)	1	6	3.66	1.90	0.973	
Project Experience						
Planning is performed by experienced employees. (Q121)	1	6	2.53	1.14	0.759	0.686
Established communities of practice within our org. (Q125)	1.5	6	3.63	1.48	0.951	
Size						
Number of employees (Q1)	55	7,000	8,010.53	1,5729.45		

Note: Items with loadings below 0.579 were excluded from the analyses and not used for Cronbachα.

Table 2: Correlation Matrix

	1	2	3	4	5	6	7	8
1. Manag. Acc. Collaboration								
2. Planning Quality	0.324*							
3. Risk Manag. Effort	0.362**	0.218						
4. Reporting Quality	0.041	0.242	0.247					
5. Reliance on KPIs	0.225	0.282*	0.100	-0.264*				
6. Project Flexibility	-0.201	-0.093	-0.150	0.061	-0.134			
7. Project Performance	0.363**	0.452**	0.488**	0.264*	0.175	-0.117		
8. Structure Complexity	0.125	0.106	0.184	0.156	-0.084	-0.306*	0.186	
9. Project Experience	0.258	0.239	0.508**	0.261*	-0.148	0.034	0.455**	0.314*

n = 58; *, ** Significant levels at 5% and 1%, respectively (two-tailed tests).

Table 3: Summary of results for mediation

		(1)		(2)	
Panel A. Effects	Predicted sign	Coeff.	t-stat.	Coeff.	t-stat.
Project performance regressed on collaboration (c path)	+	0.262	(2.173)**	0.262	(2.173)**
Quality planning regressed on collaboration	+	0.280	(2.131)**	0.280	(2.131)**
Risk management effort regressed on collaboration	+	0.242	(2.117)**	0.242	(2.117)**
Reporting quality regressed on collaboration	+	-0.032	(-0.234)	-0.032	(-0.234)
Reliance on KPI regressed on collaboration	+	1.352	(2.122)**		
Flexibility regressed on collaboration	-			-0.207	(-1.606)**
Project performance regressed on quality planning, controlling for collaboration	+	0.248	(1.978)**	0.288	(2.425)***
Project performance regressed on risk management effort, controlling for collaboration	+	0.241	(1.759)**	0.259	(1.892)**
Project performance regressed on reporting quality, controlling for collaboration	+	0.110	(0.902)	0.074	(0.634)
Project performance regressed on reliance on KPI, controlling for collaboration	+	0.026	(0.984)		
Project performance regressed on flexibility, controlling for collaboration	+			-0.039	(-0.323)
Project performance regressed on collaboration, controlling for planning quality, risk management effort,reporting quality and reliance on KPIs (c' path)		0.102	(0.838)		
Project performance regressed on collaboration, controlling for planning quality, risk management effort,reporting quality and flexibility (c' path)				0.112	(0.913)
Partial effect of control variable structural complexity on project performance		0.232	(1.709)	0.006	(0.053)
Partial effect of control variable project experience on project performance		0.025	(0.216)	0.208	(1.533)
Panel B. Bootstrap (5000) results		M	SE	M	SE
Quality planning		0.069	0.049	0.081	0.052
Risk management effort		0.058	0.047	0.063	0.046
Reporting quality		-0.004	0.022	-0.002	0.019
Reliance on KPI		0.035	0.041		
Project flexibility				0.081	0.029
Panel C. Coefficient intervals (95%)		Lower limit	Upper limit	Lower limit	Upper Limit
Quality planning		0.002	0.209	0.005	0.225
Risk management effort		0.043	0.197	0.003	0.200
Reporting quality		-0.077	0.025	-0.073	0.020
Reliance on KPI		-0.037	0.129		
Project flexibility				-0.033	0.095