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Empirical research on management control

Kürschner, Sandro

Abstract: Studies on the management control system have evolved since its first work published. Management control is the process by which managers influence other members of the organization to implement the organization's strategies. The guiding framework for this research is an instrument-oriented framework developed by Malmi and Brown, which represents the most intuitive and recent framework by synthesizing nearly four decades of research. To date, only one publication has used this management control system framework. This dissertation tackles different sections of the "MCS as a package" framework. Using quantitative meta-analysis, "Design parameters of the strategic planning process and organizational performance" examines empirical studies on the relationship between organizational performance and design parameters of the strategic planning process. Existing research on the effect of the top management team (TMT) in a firm on management control systems is scarce. "CEO Duality, TMT Composition, and Management Control in Low- and High-risk-taking Firms" clarifies the relationship between the composition of TMTs and the configuration of management control systems. Paper 3, "Management Control, Entrepreneurial Orientation, and Moderating Influence of Participation," studies the relationship between entrepreneurial orientation and management control systems. Management control systems, as a package, are an increasingly important topic in management accounting research. This dissertation strives to provide a strong contribution to this research stream. Studien zu Managementkontrollsystemen haben sich entwickelt seitdem die ersten Arbeiten veröffentlicht wurden. Managementkontrolle ist der Prozess, durch welchen Manager andere Mitglieder einer Organisation beeinflussen, um die Strategie der Organisation zu implementieren. Das leitende Framework für diese Arbeit ist ein instrumentenorientiertes Framework entwickelt von Malmi und Brown, welches das intuitivste und aktuellste Framework darstellt und 40 Jahre Forschung zusammenfasst. Zur Zeit gibt es nur eine weitere Veröffentlichung, welche explizit dieses Framework nutzt. Diese Dissertation spricht verschiedene Abschnitte des „MKS als Paket“- Framework an. Mithilfe quantitativer Metaanalyse untersucht „Design parameters of the strategic planning process and organizational performance“ empirische Studien zum Zusammenhang zwischen organisationalem Erfolg und Gestaltungsparametern des strategischen Planungsprozesses. Forschungsarbeiten zum Effekt des Top Management Teams (TMT) einer Unternehmung auf die Managementkontrolle sind rar. "CEO Duality, TMT Composition, and Management Control in Low- and High-risk-taking Firms" untersucht die Beziehung zwischen der Zusammensetzung des TMT und der Konfiguration der Managementkontrollsysteme. Studie 3, "Management Control, Entrepreneurial Orientation, and Moderating Influence of Participation," untersucht den Zusammenhang zwischen der unternehmerischen Orientierung und Managementkontrollsystemen. Managementkontrollsysteme „als Paket“ sind ein zunehmend wichtiges Thema in der Controllingforschung. Diese Dissertation leistet einen Beitrag zu dieser Forschungsrichtung.

Other titles: Empirische Forschung zu Managementkontrollsystemen

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The Faculty of Economics, Business Administration and Information Technology of the University of Zurich hereby authorizes the printing of this dissertation, without indicating an opinion of the views expressed in the work.

Zurich, 18.09.2013

Chairman of the Doctoral Board: Prof. Dr. Dieter Pfaff

My Family

PREFACE

This dissertation was developed during my time as research assistant at the Chair of Accounting, especially Managerial Accounting and Control at the University of Zurich held by Prof. Dr. Dieter Pfaff.

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Sandro Kürschner

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Note to the dissertation readers

This dissertation project consists of three papers. For convenience reasons, all papers are copied into one document with continued page numbering. However, the structure and table of contents should not be treated as a structure for monographic dissertations. The page number and table of contents are provided for reference purposes only. The layout for the papers follows the target journals' layouts, which is in all cases Springer layout.

Paper 1 has been published as:

Kürschner, S., & Günther, T. (2012). Design parameters of the strategic planning process and organizational performance. A quantitative analysis of empirical research. In: *Journal für Betriebswirtschaft*, 62(1), 5–44.

Paper 2 has been presented at the EAA conference 2013 and is currently under R&R for the *Journal of Management Control*:

Kürschner, S. (2013). CEO Duality, TMT Composition, and Management Control in Low- and High-risk-taking Firms, EAA 2013, Paris.

Paper 3 is currently in Working Paper status:

Kürschner, S. (2013). Management Control, Entrepreneurial Orientation, and Moderating Influence of Participation, unpublished Working Paper.

Empirical Research on Management Control

1 Introduction

Studies on the management control system have evolved since its first work published by Anthony (1965). Despite the adjustments to the definition of “management control,” the meaning has remained the same. According to Anthony and Govindarajan (2007), management control is the “process by which managers influence other members of the organization to implement the organization’s strategies.” Similarly, Merchant and van der Stede (2012) argue that the function of management control is “to influence behaviors in desirable ways” and note that the benefit of management control is “the increased probability that the organization’s objectives will be achieved.” What immediately becomes visible is the identical scope of both definitions: While Anthony (1965) speaks of “implement(ing)... strategies,” Merchant and van der Stede (2012) broadly discuss the achievement of “the organization’s objectives.” Both definitions exclude the strategic planning process, which usually results in setting new objectives. Other studies include the company’s vision and mission (Ferreira and Otley 2005; Ferreira and Otley 2009). Malmi and Brown (2008) consider elements of the strategic planning process as part of their management control system package framework.

Most control frameworks share an instrument-oriented view. They describe the tools that managers can use to control other managers. In these frameworks, any control or tool can be classified as one matching category. Profit centers, for example, are result controls in the Merchant and van der Stede framework. Other examples are return measures, classified as financial measures in the Malmi and Brown framework. One framework that does not allow such a simple classification is the “Levers of Control” framework by Simons (1995). Rather, this framework is built around the different ways in which management control systems may be used (Gond et al. 2012). Belief systems are controlled by explicit assumptions and given values—a set of organizational definitions. Boundary systems are defined by formal rules and sanctions. Diagnostic controls provide a feedback on organizational performance, forming the basis to realize and analyze gaps. Finally, interactive controls emphasize the strategic uncertainties by discussing the results provided by the diagnostic control system. With such a framework, performance measures can be used diagnostically, interactively, or may even serve boundary purposes. This framework is more usage-oriented. This framework further complicates empirical research as it requires companies to be studied in further detail to carefully assess the true use of the control studied.

Therefore, the guiding framework for this research is an instrument-oriented framework developed by Malmi and Brown (2008), which presents the most intuitive and recent framework by synthesizing nearly four decades of research. Other research includes Otley (1980) and Simons (1995). For reference purposes, this framework is depicted in Fig. 1. It essentially comprises three layers: administrative controls, (management) accounting controls, and cultural controls.

Administrative controls include governance structure, organizational structure, and policies and procedures. The governance structure describes how the top management’s structure

Cultural Controls						
Clans		Values			Symbols	
Planning		Cybernetic Controls				Reward and Compensation
Long range planning	Action planning	Budgets	Financial Measurement Systems	Non Financial Measurement Systems	Hybrid Measurement Systems	
Administrative Controls						
Governance Structure		Organisation Structure			Policies and Procedures	

Fig. 1 Management control systems as a package (Malmi and Brown 2008)

and the board of directors influence managerial decision making. Abernethy and Wai Fong Chua (1996) present a study in which a change in the board ultimately resolved long-standing informal relationships between board members and lower-level managers. These changes resulted in an adjustment in the divisional structure of the organization, ultimately resulting in better resource management. The organizational structure describes the lines of authority and accountability within the organization, as well as the power distribution (Otley and Berry 1980; Alvesson and Karreman 2004). Miller and Friesen (1982) describe how organizational structures influence the degree of entrepreneurship or conservatism. An important element in organizational structure includes whether decision-making authority is centralized (Miller 1983). Policies and procedures specify how tasks or behaviors are to be performed and include standard operating procedures or rules (Malmi and Brown 2008). This control is popular in the Merchant and van der Stede (2003, 2012) framework as action controls. The formalization control is a heavily studied aspect of the policies and procedures control set. Several scholars investigate the impact of formalized long-term planning on the overall organizational performance (Armstrong 1982; Miller and Cardinal 1994).

Accounting controls are sub-grouped into planning controls, cybernetic controls, and rewards and compensation. Planning is an ex ante form of control (Flamholtz, Das and Tsui 1985) that describes different control sets for long-term planning and action planning. Planning in terms of a planning horizon is divided into greater than or less than 12 months. The more long-term planning, or strategic planning, evolved in corporations, the more it became part of the management accountant's work. Generally, strategic research can be grouped into content and process research. The former solves the question as to which strategies are to be pursued, while the latter analyzes all aspects of the planning process. This is the domain of strategic management accounting researchers. Several studies, such as Günther (1991) and Cadez and Guilding (2008), have studied strategic management accounting tools. Operational planning refers to short-term planning processes that are completed in a year. Accounting supports these planning processes by providing forecasts. Kahneman and Lovallo (1993) highlight the importance of the awareness of the severe forecasting biases when forecast data are not rationalized with (further) external information.

Cybernetic controls inherit their name from the traditional management accounting understanding of the cybernetic process. Green and Welsh (1988) define cybernetic control as "a cybernetic, regulatory process that directs or constrains an iterative activity to some standard or purpose." They require each process described as a control

to have a feedback loop with standard sensors, discriminators, and effectors. Together with the measurement systems budgets, they should form such a feedback loop when the feedback from the measurement systems is utilized in the next budgeting period. Budgets have been extensively studied in terms of several dimensions: Fixed vs. flexible budgets (Sacco, Stalebrink and Posner 2011), slack (Kirby et al. 1991), participation (Brown, Evans III and Moser 2009), approaches used (Hansen 2011), and the resource being budgeted. Measurement systems may be designed to measure financial and non-financial indicators, or a combination thereof. Financial indicators include simple concepts for revenue or sales or more complex concepts such as the economic value added (Klumpes 2005). Non-financial indicators include all measurable aspects, such as process measures, human-resource measures, and customer-oriented measures (Amir and Lev 1996; Ittner and Larcker 1998a). Hybrid measurement systems combine both types of indicators. When derived from strategy, this type of measurement system is also known as a balanced scorecard (Kaplan and Norton 1992; Ittner and Larcker 1998b).

Controls included in the cybernetic control module influence people's behaviors by merely directing their intention, without further incentivizing organizational members. Reward and compensation, however, describe how incentives are used to influence employees' behavior (Ittner, Larcker and Rajan 1997; Widener 2006). Although formularized regulations on bonus and compensation seem to very objective evidence, subjectivity may inhibit the weighting of individual bonus components (Ittner, Larcker and Meyer 2003).

Finally, cultural controls can be categorized into clan controls, value controls, and symbol controls. Clan controls describe the informal social structures and "rely upon a relatively complete socialization process which effectively eliminates goal incongruence between individuals" (Ouchi 1979). Clan controls may be more effective than accounting or administrative controls, especially in teamwork environments (Kirsch, Ko and Haney 2010). To some extent, part of the clan concept of values impacts managerial behavior on three levels: deliberate recruitment of employees with matching values, socialization processes, and behavioral change to meet organizational expectations. The Levers of Control framework by Simons (1995) describes values as belief systems. Finally, symbols may be used to direct employee behavior by setting corporate identity or utilizing communication-oriented workplace design (Malmi and Brown 2008).

2 Thesis Papers

To date, only one publication has used the management control system framework developed by Malmi and Brown (2008). Petroulas, Brown and Sundin (2010) analyze how individual employee traits influence their preferences for specific control characteristics. Their paper only considers the accounting layer.

This study tackles different sections of the "MCS as a package" framework. After 50 years of research in strategic management, the strategic planning process design is still on the agenda for scholarly research. Using quantitative meta-analysis, "Design parameters of the strategic planning process and organizational performance" examines empirical studies on the relationship between organizational performance and design parameters of the strategic planning process. Design parameters refer to influence factors that can be controlled by a firm. Whereas existing literatures focus on the effect of strategic planning on performance, this meta-analysis considers the role of location

and participants in the strategic planning process, the distinct properties of strategic planners, and the intensity of the planning method used. Therefore, this paper incorporates elements of the cultural, accounting, and administrative layers of the “MCS as a package” framework. The cultural layer is invoked with the study of strategists’ consensus and risk preferences, which can be considered as clan and value controls. The planning method is an element of long-term planning controls contained in the accounting layer. Finally, structural elements are considered within the framework’s administrative layer. The effect sizes of existing primary studies are harmonized for better comparison and aggregated for total effect. The total effects are tested for significance and checked for homogeneity. This paper finds both significant and non-significant results across all layers.

Existing research on the effect of the top management team (TMT) in a firm on management control systems is scarce. Both the upper echelons and attention-based theories promise to facilitate theory building in this stream of research. “CEO Duality, TMT Composition, and Management Control in Low- and High-risk-taking Firms” clarifies the relationship between the composition of TMTs and the configuration of management control systems. Within the “MCS as a package” framework, the paper considers planning and cybernetic controls—especially budgetary controls. It also considers the power-structure-biasing effect of CEO duality. Survey data from 97 companies as well as publicly available data are used to empirically clarify whether CEO duality and TMT composition affect the setup of management control systems. The results show that dual CEOs use their power to limit the rational approach of forecasting and budgeting and instead facilitate efficient management control orientation. Certain TMT compositions also support this efficiency orientation; however, these TMT compositions positively influence the rational approach of forecasting and budgeting. Therefore, nearly all relationships identified are moderated by firms’ risk-taking orientation. Therefore, including risk taking as a moderating variable is recommended.

Most literature on content research in long-term planning (strategic planning) provides advice on specific strategies. However, on a more abstract level, it is useful to know how to achieve continued corporate entrepreneurship, without overly emphasizing recommended strategies. Paper 3, “Management Control, Entrepreneurial Orientation, and Moderating Influence of Participation,” studies the relationship between entrepreneurial orientation and management control systems. Although the performance relevance of entrepreneurial orientation is undisputed, few studies have examined how management control systems are related to this orientation. The concepts of control or entrepreneurial orientation vary significantly among these studies. This paper adapts the “management control as a package” framework and considers individual sub-dimensions of entrepreneurial orientation. The effect of management controls depends on the effectiveness of employee motivation to respond to these controls. In addition, this paper shows how control effects can be increased by allowing the participation of lower-level managers in the resource allocation process and contributes to the ongoing research on the organizational slack. Empirical data from 178 companies were used to answer these research questions.

3 Conclusion

In addition to the new framework developed with the “Management control systems as a package” framework, the main point put forth in Malmi and Brown (2008) was the

study of management control systems as a package. All papers included in this thesis consider more than one control. The second and third papers allow for a comparison of the impact of the different controls with each other. Moreover, these papers incorporate each other's control as a moderator or lever to be considered simultaneously with all other controls. The second paper presents the risk-taking propensity, considered as a corporate value, if explicitly encouraged, or an element of clan controls, if it is the result of a socialization process. The third paper more evidently presents budgetary participation as a control that may be considered as an element of the cybernetic section of the accounting layer in the Malmi and Brown (2008) framework.

The first paper contributes to the existing literature on strategic planning and summarizes findings on important design parameters that influence organizational performance. It therefore may help practitioners to identify relevant design parameters as well as researchers to identify linkages that are worth more in-depth study. The second paper contributes to the research on both management control systems and top management teams. For management control researchers, it demonstrates antecedents to management controls that were previously understudied and which are important to consider when comparing different companies. For top-management researchers, it presents more examples on how top managers use their power and information needs to influence organizational processes. The third paper contributes to both the management-control and the entrepreneurship-research communities. For management control researchers, the most relevant conclusion is that the effect of some individual control is leveraged by combining it with another control, in this case budgetary participation. Management control researchers should also take keen interest in the potential outcomes of the use of certain controls. The business community benefits from learning how to set up organizational processes to achieve entrepreneurial orientation. Finally, this information may also be useful to practitioners. In their meta-analysis, Rauch et al. (2009) show an overall effect of .242 on organizational performance for entrepreneurially oriented companies. This clearly demonstrates the importance of this type of orientation.

Management control systems, as a package, are an increasingly important topic in management accounting research. With the papers contained in the appendix, this thesis strives to provide a strong contribution to this research stream.

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Design parameters of the strategic planning process and organizational performance – A quantitative analysis of empirical research

Sandro Kürschner / Thomas Günther

Zusammenfassung Die Gestaltung strategischer Planungsprozesse wird auch fast 50 Jahre nach dem Entstehen des strategischen Managements immer noch in der Forschung diskutiert. Mittels einer quantitativen Metaanalyse werden in diesem Beitrag empirische Studien zum Zusammenhang von Unternehmenserfolg zu einzelnen Parametern des strategischen Planungsprozesses untersucht, die vom Unternehmen beeinflussbar sind. Während das Schrifttum sich in primär narrativen Literaturüberblicken nur mit dem Effekt der Existenz einer strategischen Planung beschäftigt hat, betrachtet die Metaanalyse auch den Ort und die Beteiligten des strategischen Planungsprozesses, einzelne Eigenschaften strategischer Planer als auch die Intensität der Planungsmethodik. Effektstärken vorliegender Primärstudien werden zur besseren Vergleichbarkeit vereinheitlicht und zu einem Gesamteffekt aggregiert, der auf statistische Signifikanz und Homogenität der Ergebnisse überprüft wird.

Schlüsselwörter Strategische Planung · Metaanalyse · Planungsprozess · Effektstärke · Erfolg · Literaturüberblick

Abstract After 50 years of research in strategic management, the design of strategic planning processes is still on the agenda for scholarly research. Using a quantitative meta-analysis, we examine empirical studies on the relationship between organizational performance and the design parameters of the strategic planning process that can be controlled by a firm. Whereas existing literature reviews focus on the effect of strategic planning on performance, this meta-analysis also considers the role of the location and participants in the strategic planning process, the distinct properties of strategic planners and the intensity of the planning method used. The effect sizes of existing primary studies are harmonized for better comparison and aggregated for a total effect. The total effect is tested for significance and checked for homogeneity.

Keywords Strategic planning · Meta-analysis · Planning process · Effect size · Performance · Literature review

S. Kürschner
Universität Zürich, IBW – Institut für Betriebswirtschaftslehre
Plattenstrasse 14, 8032 Zürich, Schweiz, E-Mail: sandro.kuerschner@business.uzh.ch

T. Günther (✉)
TU Dresden, Fakultät Wirtschaftswissenschaften
Mommensenstrasse 13, 01062 Dresden, Deutschland, E-Mail: thomas.guenther@tu-dresden.de

1 Underlying problem

1.1 Strategic management and strategic planning process

Strategic management is a consistently topical research stream, as evidenced by recent publications on the financial crisis (e.g., Wilson and Eilertsen 2010). Strategic management research can be distinguished into research on critical success factors and research on the strategy process (Huff and Reger 1987). The first stream of research attempts to generate knowledge on the content of strategies. In contrast, strategy-process research, which is the focus of this paper, is dedicated to efficiently searching for a strategy. Models of the strategic planning process can emerge from either a prescriptive or a descriptive perspective. Prescriptive models construct planning processes based on formal models of decision theory (e.g., Gilmore and Brandenburg 1962; Learned et al. 1969; Ansoff 1965; Cohen and Cyert 1973; in the German-language literature e.g., Schreyögg 1984 and Günther 1991), whereas descriptive models address a more unconscious and gradual development of strategies (e.g., Bower 1970; Mintzberg 1977; Quinn 1978; Burgelman 1983). Strategic planning processes are discussed in both strategic management literature (e.g., Huff and Reger 1987, Hutzschenreuter and Kleindienst 2006) and management accounting research (e.g., Malmi and Brown 2008). In the German-language literature, this discussion is also part of the “strategic controlling” concept as an interface between the two research areas (e.g., Baum et al. 2007). “Strategic controlling” attempts to plan and control strategies and their implementation in a cybernetic control cycle. “Strategic planning”, in the context of this paper, is synonymous with the strategic planning process of a firm, which includes the strategic control process as a feedback loop. In the management control literature, this is described as the “strategic controlling process” (Langguth 1994; Baum et al. 2007). However, the understandings and definitions of these research streams overlap.

Textbooks on strategic management (e.g., Müller-Stewens and Lechner 2001; Welge and Al-Laham 2007; Bea and Haas 2009; Hungenberg 2010) examine and recommend the application of diverse design parameters, which are derived from single studies. In the context of this paper, “antecedents” are understood as parameters that generally influence the nature of strategic planning processes. “Design parameters” are the parameters that can be determined by the firm, in contrast to external environmental factors, which are outside of the firm’s control.

Empirical studies exist for some, but not all, of the design parameters. Thus far, a comprehensive view of the results of the strategic process literature is missing. The question of the impact of various design parameters and of the benefits and drawbacks of alternative design parameters remains unanswered. This paper closes this gap by identifying the design parameters of strategic planning that have a positive effect on organizational performance. “Organizational performance” is defined as the operational, financial and formal objectives of the firm, such as net income and liquidity, and their determinants. Business objectives (e.g., the market share or quality targets of the firm or its product groups) and social objectives (e.g., employee satisfaction or corporate social performance) are not regarded as “organizational performance” in the context of this paper (for a discussion of various objectives, cf. Baum et al. 2007, p. 10f).

One prominent design parameter is the question of whether strategic planning is necessary. Several literature reviews have examined this topic (e.g., Boyd 1991; Schwenk and Shrader 1993; Miller and Cardinal 1994) and have identified significant and posi-

tive effects of strategic planning. As the following sections will demonstrate, the design parameters that have been identified and analyzed include the location of strategic planning within the organization, the structure, teamwork and risk-taking propensity of the planning team and the formalization, rationality and intensity of strategic planning.

1.2 Related research and structure of the paper

An overview of empirical studies of German-language management accounting research on planning processes is provided by Weißenberger and Löhr (2007). The stylized facts derived in this overview focus not only on strategic planning processes but also on firms' general planning processes. Thus, the authors consider operational and tactical planning processes as well as project planning. After grouping the results, they derive brief conclusions, but they do not present the quantitative effect sizes.

Hutzschenreuter and Kleindienst (2006) present a comprehensive literature review of existing studies in strategy-process research. Based on the results of the studies analyzed in their review, they derive a framework for content and process research and for the structure of the underlying studies. They provide a comprehensive overview of the state of the art of current research, but they do not report the effect sizes of the studies under review. Some literature reviews and meta-analyses have examined the intensity and rationality of the strategic planning process (e.g., Armstrong 1982; Shrader et al. 1984; Pearce II et al. 1987; Schwenk and Shrader 1993; Miller and Cardinal 1994). These studies are limited to the properties of the planning method and generally show a positive impact of a formal and rational strategic planning process on performance. The studies analyzed in the above reviews and meta-analyses as well as additional primary studies are discussed in section 4.3.1.

Of the broad range of empirical primary studies, we analyze only those that examine the interaction of design parameters and organizational performance and that analyze these interactions using statistical confirmatory methods. Only empirical cross-sectional studies were considered for this analysis in an effort to derive valid and generalizable conclusions. This paper contributes to current research in the following ways:

- This paper is not focused on interactions between one single design parameter of the strategic planning process (e.g., the formalization) and organizational performance, but considers a set of parameters derived from a comprehensive framework.
- Primary qualitative literature reviews are expanded by a quantitative analysis of the effect sizes of the impact of design parameters on organizational performance. To improve the comparison, the from study to study different interaction measures are translated into uniform effect sizes.
- As far as possible so far isolated effect sizes of single primary studies are aggregated for a total effect and statistically tested for the significance and homogeneity of the total effect.

The paper is structured as follows. To systemize the multitude of single empirical effects, a common framework is needed to structure the design parameters of strategic planning processes. Because the literature offers various suggestions, we review the current literature in section 2 to derive a feasible framework for further analysis. The third section presents quantitative meta-analysis as a method and procedure to transform different statistical measures to comparable effect sizes. Section 4 analyzes and discusses the impact of design parameters on organizational performance, as demonstrated in the reviewed primary studies. The paper concludes with considerations of the limitations of our analysis and recommendations for future research.

2 Development of a framework and literature review

2.1 Classification of antecedents of the strategy process

The literature presents various views and classifications of antecedents of the design of strategic planning processes. Based on planning systems in general, Tochtermann (1990) derives design parameters of the strategic planning process. His analysis is based on previous work by Szyperski and Müller-Böling (1980) on planning organization, abbreviated PLORGA. He applies the seven dimensions, *planning system*, *planning bodies*, *planning tasks*, *planning team*, *planning technology*, *planning process* and *degree of formalization*, to strategic planning (Tochtermann 1990, p. 22 ff.). The PLORGA concept is, at first glance, quite general. However, the concept can easily be applied to strategic planning through the planning level of the dimension planning system. The other dimensions of planning are capable of thoroughly describing the strategic planning process.

Following their work in 1999 on the design parameters of strategic processes, in 2001, Lechner and Müller-Stewens (Lechner and Müller-Stewens 1999) suggested a framework of six dimensions (Müller-Stewens and Lechner 2001, p. 58 ff.). *Location* is the context of strategy development within the firm, including the responsibilities and directions in which influence is exerted. *Participants* comprise the persons involved, their capabilities and the mix of participants' different perspectives. For the *timing* the duration, the trigger and the planning horizon of strategic initiatives must be determined. The selection of resources and of applied methods affects the strategic planning process through the *resource* dimension. The *procedure* model is influenced by the working principles, the style of presentation and the degree of structurization. The last dimension is *teamwork*, which considers the planning teams and the intensity of conflicts within the team, the method of decision making and the transparency of the strategic planning process to outsiders.

In a structured literature analysis using stylized facts on the strategic and operational planning processes of 15 German-speaking management accounting research studies between 1990 and 2007, Weißenberger and Löhr (2007) identify the antecedents of the planning processes with impact on organizational performance as *rationality*, *intensity*, *openness*, *integration*, *duration*, *opportunism* and the *slope in competency*.

On the basis of meta-models of German-language planning research, Hamann and Günther (2009) develop a framework for future planning research. They differentiate five formal sub-systems: *planning and reporting systems*, *planning and control bodies*, *planning and control instruments*, *planning and control activities* and the *formalization system*. The authors suggest 31 indicators of how these sub-systems can be operationalized. The classification is similar to the PLORGA concept in that it is feasible for both operational and strategic planning, but it is particularly applicable to strategic planning processes.

All of the dimensions suggested by the above-mentioned authors are within the scope of the firm's control. However, a question arises regarding the existence of additional antecedents that originate in the environment of the firm.

This question was addressed very early by Hofer (1975), who transferred contingency theory from organizational science to research on strategic management. The situative or contingency theory approach explains different organizational structures based on differences in the situational context, which may be internal or external and may be affected by multiple factors simultaneously (cf. Burns and Stalker 1961; Woodward 1965; Lawrence and Losch 1967). The contingency approach has been used

as a theoretical foundation manifoldly both in management accounting (e.g., Waterhouse and Tiessen 1978; Otley 1980; Chenhall 2003; Gerdin and Greve 2004) and strategic management (e.g., Hofer 1975; Pettigrew 1997; Hutzschenreuter and Kleindienst 2006). One of the objectives of this theory is to adjust the organizational structure to the environment as much as possible. Following structural contingency theory, this is called “selection fit” (Donaldson 2001; Vahs 2001, p. 38 ff.). Hofer identifies the environment and organizational structure as essential contingency factors for corporate strategy (Hofer 1975, p. 808). Ginsberg and Venkatraman (1985) add organizational performance as a contingency variable. Their model considers the content of the strategy itself an antecedent to organizational structure and organizational systems. In total, these authors identify four dimensions: *corporate environment*, *corporate organization*, *the development of firm value* and *selected strategy content* (Ginsberg and Venkatraman 1985, p. 423).

Although Ginsberg and Venkatraman’s (1985) antecedent dimensions were originally developed to analyze strategy content, these dimensions are well suited to analyze the strategy processes and had been used by other authors (Hutzschenreuter and Kleindienst 2006). Hutzschenreuter and Kleindienst divide the antecedent dimensions into antecedent factors and direct strategy process factors. Antecedent factors include *environmental context*, *strategic context* (defined as the current positions and moves of the firm), *static* and *dynamic organizational characteristics*, and *organizational performance*. The direct factors that affect the strategy process include the *strategist’s static characteristics*, the *strategist’s personal and cognitive context*, *issue characteristics*, *process characteristics*, and *process-outcome characteristics* (the speed and quality of decision making). Similarly, Kranz (2007) identifies as antecedents the *environmental conditions*, *organizational conditions*, the *content of the business strategy*, the *characteristics of the decision maker* and the *decision* itself, including the urgency and insecurity regarding a decision or the frequency of repetition.

Referring again to structural contingency theory (Donaldson 2001), in this paper, we consider the antecedents that have been analyzed for their impact on organizational performance. Therefore, we analyze the “interaction fit”, the optimal fit of environmental and design parameters for organizational performance. If several design parameters are analyzed at the same time, we look for the “system fit” or “the multiple fit”, following Donaldson (2001). Table 1 summarizes the different and partially non-congruent classifications of the antecedents of the strategy process.

2.2 Framework for further analysis

To identify a framework for further analysis, a compromise must be made between coverage of the broad diversity of all aspects and their aggregation into a feasible order for a framework. We identify similarities between the various authors and group their approaches (Table 1). The analysis shows that environmental and problem-related characteristics are not considered by some approaches, which therefore neglect contingency theory. Because this study examines the antecedents of the strategy process that are within the firm’s scope of control and design (design parameters), the environmental and problem-related characteristics are not further considered because they cannot be controlled by the firm. Of course, it could be argued that the environment and the strategic problem can be influenced by repositioning the firm. Nevertheless, this influence is a result of the strategy process and should not be regarded as part of the design parameters of the process.

As Table 1 shows, the design parameters of the strategic planning process can be classified into three groups: the “organizational properties” (where is the planning done?), the “strategist’s properties” (who does the planning?) and the “planning method’s properties” (how is the planning done?). This framework underlies the following quantitative literature review.

3 Methodology

3.1 Selection of literature for the analysis

To identify empirical studies, a multi-level procedure based on the common procedure for a systematic literature review was chosen (e.g., Hart 2001, Tranfield et al. 2003, Thomas 2004; the presentation of the selection process follows David and Han 2004, p. 42ff.).

1. In a first step, the existing literature was explored, and essential key words and search strings were identified.¹
2. Next, primary studies with key words in the titles and abstracts were searched.
3. Because the identified studies analyze the interaction between more than one design parameter and organizational performance, in a third step, each single interaction was identified and classified within the framework.
4. Finally, using additional key words, an sophisticated literature search for further studies on single design parameters was added by analyzing the reference lists and journals of collected primary studies.

Using the identified key words, the research was performed with the help of the Business Source Complete (via EBSCO Host) and ABI/Inform databases. Google Scholar was used to complete the collection of primary studies, but only previously published articles were included. This paper does not intend to provide an overview of all of the design parameters of strategic planning; this would not be possible due to the enormous amount of existing literature. Thus, in this paper, only primary studies with a statistical exploration of the interaction with organizational performance were included, similar to other literature reviews that have focused on the performance impact of strategic planning (e.g., Schwenk and Shrader 1993; Miller and Cardinal 1994). Thus, the following filters were defined for the literature search.

¹ The following key words were used for the search: corporate planning, policy mak*, strategist*, strategiz*, structur* chang*, strateg* action, strateg* chang*, strateg* choic*, strateg* craft*, strateg* deci*, strateg* form*, strateg* implement*, strateg* lead*, strateg* learn*, strateg* mak*, strateg* manag*, strateg* origin*, strateg* plan*, strateg* process*, strateg* renew*.

Table 1: Classification of antecedents of the strategic planning process in the literature (in chronological order)

Source	Range of control of the firm			Antecedents of the environment and the strategic problem
	Organizational properties (Where is the planning done?)	Strategist's properties (Who does the planning?)	Planning method's properties (How is the planning done?)	
Ginsberg and Venkatraman (1985)	Corporate organization			Corporate environment Development of firm value Strategy content
Tochtermann (1990)	Planning bodies	Planning team	Planning system Planning tasks Planning technology Planning process Degree of formalization	Not considered
Müller-Stewens and Lechner (2001)	Location	Participants Teamwork	Timing Resources Procedures	Not considered
Hutzschenreuter and Kleindienst (2006)	Static characteristics of the organization	Dynamic characteristics of the organization Static characteristics of the strategists Context of the strategist	Process characteristics Process-outcome characteristics	Environmental context Strategic context Organizational performance Issue characteristics
Kranz (2007)	Organizational conditions	Characteristics of decision makers	Characteristics of the decision	Environmental conditions Content of business strategy
Weißberger and Löhr (2007)	Planning integration Slope in competence	Planning openness Opportunism	Planning intensity Planning rationality Planning duration	Not considered
Hamann and Günther (2009)	Planning and control bodies	Planning and control bodies	Planning and reporting system Planning and control instruments Planning and control activities Formalization system	Not considered

- An included primary study had to offer the possibility of categorizing the investigated design parameters according to their impact on organizational performance. Studies that examined “only” design parameters or were related to other dependent variables were not considered. The criteria for organizational performance were broadly defined, as shown in Table 2.
- Primary studies had to recognize a relationship to strategic planning beyond merely mentioning key words such as “strategic”.
- Included studies had to be part of strategy-process research. Articles from the strategy-content research stream were excluded.
- The objective of the paper is to provide general recommendations for the design of strategic planning processes. Therefore, case studies with low sample sizes were not included in the analysis.
- Purely descriptive papers on the strategic planning process were not considered. In empirical studies, interactions had to be explored using statistical confirmatory methods to derive effect sizes.
- The empirical evidence had to be collected in field studies. Studies using laboratory designs were not included in the analysis.
- Relevant publication media included only reviewed journals or dissertations because both involve a review process and provide the expectation of higher publication quality.

Organizational performance can be measured directly as well as indirectly. For the direct measurement, most studies use financial accounting ratios or capital market ratios, as Table 2 shows. The indirect measurement uses general assessments of management collected in field studies. The latter method has the disadvantage of subjectivity and informant bias, which is resolved by adding an objective external measure of performance in most studies.

Table 2 Operationalizations of “organizational performance” in primary studies

Criteria	Objectively measured (Financial ratios or capital market data)	Subjectively measured (e.g., management survey)
Earnings	Earnings Past earnings	Earnings
Net sales	Sales Sales growth Past sales growth Sales growth relative to industry	Sales growth
Accounting return rates	Return on sales Return on equity Return on assets Return on working capital	Return on assets
Value-based measures	Market to book ratio Shareholder value growth	
Other	Aggregated ratios of different single ratios	Aggregated ratios of different single ratios General assessment of the firm

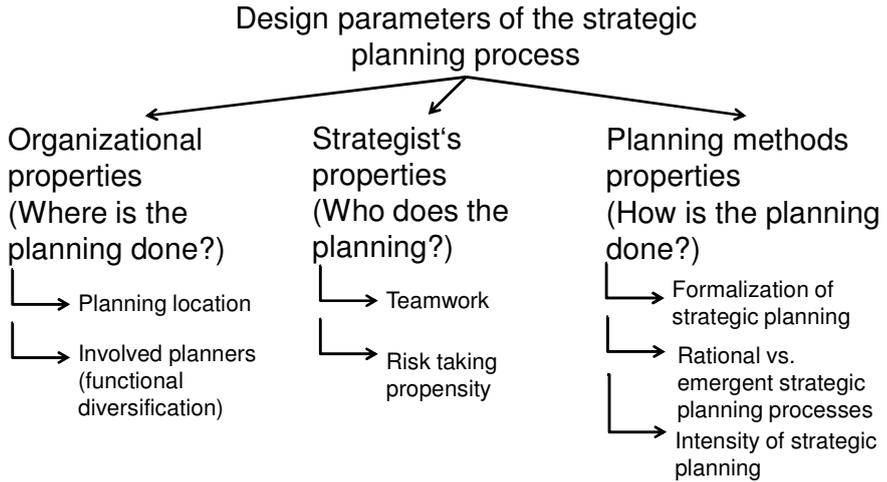


Fig. 1: Framework for research

As a result of the literature search, 70 primary studies containing a total of 88 analyzed interactions of design parameters and organizational performance were identified. Of these studies, 52 had not been included in previous literature reviews. When the studies are associated with the above framework (Table 1), we obtain a framework for research (Fig. 1). Fig. 1 shows that some potential fields of research in Table 1 have not been previously explored in empirical studies or did not meet the selection criteria for the meta-analysis. The last step of the systematic literature review, following Trenfield et al. (2003), is the extraction of the essential results of the primary studies and their analysis, which is described in section 4.

3.2 Meta-analysis as a means of quantitative analysis of empirical research

Narrative reviews and quantitative meta-analyses were used for the analysis of the literature. Narrative reviews comprehensively analyze the literature on a given research question. The dominant linguistic analysis carries the risk of subjective distortions of research results (Rustenbach 2003, Schulze 2004). By using a meta-analysis, the research results are integrated at the level of statistical measures. In general, this is accomplished by the measurement and aggregation of effect sizes for a specific interaction to produce a total effect (Bortz and Döring 2006, p. 672).

A narrative review is an appropriate research method for an overview of the design parameters of strategic planning because of the breadth of the potential parameters. To compensate for the disadvantage of the lack of transparency and potential subjectivity, a meta-analysis was performed. Within the groups in the framework, the effect sizes of the primary studies were harmonized and aggregated for a total effect. When interpreting the results, it must be considered that a low sample size and heterogeneity in primary studies can limit the conclusions drawn from the total effect. Thus, confidence intervals and statistical heterogeneity tests were added to assess the statistical significance of the total effect.

3.3 Combining effect sizes

3.3.1 The necessity of effect sizes

The results of empirical management studies are often analyzed with the sole question of whether they identified significant effects. The calculation of the significance level varies by the testing procedure. However, in addition to the size of the effect, the sample size is an integral part of the significance level. This may lead to situations in which an effect found in a large sample is significant despite its very small size, and vice versa. In a meta-analytic study, only the effect size is initially of interest, with no reference to the sample size. Sample size becomes relevant in a second step, when a sufficient number of studies can be obtained to usefully combine the single effect sizes. Sample size then takes the form of a weight for the effect size (Borenstein 2009, p. 223; Bortz and Döring 2006, p. 676).

Most meta-analyses combine effects based on bivariate product-moment correlations. Even if no correlations are published in primary studies, it is possible to transform the published effect size into a measure that is comparable to the product-moment correlation using the following methods. The determined effect is represented as Δ , following Bortz and Döring (2006).

3.3.2 Bivariate product-moment correlation

The product-moment correlations reported by a study can be directly used as the effect size. Correlations with one dichotomous variable return the point-biserial correlation coefficient r_{pbis} , which can be transformed into the biserial correlation coefficient r_{bis} by multiplying r_{pbis} by a correction factor (Hunter and Schmidt 2004, p. 210; Bortz and Döring 2006, p. 677):

$$\Delta = r_{bis} = r_{pbis} \cdot \frac{\sqrt{n_X \cdot n_Y}}{v \cdot n}$$

$$v = \phi \left(\Phi^{-1} \left(\frac{n_X}{n} \right) \right).$$

The variables n_X and n_Y represent the sample sizes; n is the total sample size, and v (upsilon) is the probability density over the z-value of the standard normal distribution, which determines the threshold between the two regions $p = \frac{n_X}{n}$ and $p = \frac{n_Y}{n}$.

3.3.3 Partial correlation

Correlations between two variables X and Y may be caused, to a certain degree, by common correlations with a third variable. Such spurious correlations can be controlled by partialing out the influence of the third variable. One disadvantage is the loss of context information (Bortz and Döring, p. 621). To decide which correlations should be used, the research objective must be consulted. If the research examines the simple relationship between two variables, bivariate (also simple or zero order) correlation coefficients should be used. However, if the research primarily aims to examine the direct influence of one variable on another *ceteris paribus*, it is more interesting to

partial out other influences and use the partial correlations instead (Greene 2000, p. 233; Amato and Gilbreth 1999, p. 563; Djankov and Murrell 2002, p. 752). Therefore, the partial correlation

$$r_{.U} = \frac{r_{XY} - r_{XU} \cdot r_{YU}}{\sqrt{(1 - r_{XU}^2) \cdot (1 - r_{YU}^2)}} \quad (\text{Rinne 2008, p. 91})$$

is the preferred effect size measure for the study. U represents the variable that must be eliminated (partialed out) in each iteration. Additionally, this study reports the simple correlations to allow the simple relationship to be identified.

Several studies (Miller and Friesen 1983; Keck 1997) that have attempted to calculate partial correlations have been unsuccessful or have resulted in non-valid numbers. In these cases, the reported correlation matrices did not fulfill the mathematical requirement of positive semidefiniteness (Rinne 2008, p. 88). To obtain a valid correlation matrix, variables must be removed and therefore cannot be partialed out. The variables chosen for removal must have the lowest possible correlation with the design parameters or performance criteria.

Some studies have used more than one measure for a specific interaction as either a dependent or independent variable. In such cases, correlations among these measures are not partialed out; otherwise, the combined effect using Hunter and Schmidt's (2004) method would be biased downwards. The following sections present methods to transform effect sizes other than correlations into a measure Δ comparable with product-moment correlations.

3.3.4 Other correlation coefficients

The rank correlation coefficient Spearman's ρ can be transformed with

$$\Delta = \frac{3}{\pi} \cdot 2 \arcsin\left(\frac{r_s}{2}\right)$$

in a measure equivalent to a product-moment correlation (Kraemer and Thiemann 1987; Gilpin 1993, pp. 87). The alternative Kendall's rank correlation coefficient τ is transformed into a comparable effect size using

$$\Delta = \sin\left(\frac{2}{\pi} \tau\right)$$

(Rupinski and Dunlap 1996, p. 420; Gilpin 1993, pp. 87). For a fourfold table with two dichotomous variables, a transformation is possible with

$$\Delta = r_{tet} = \cos \frac{180^\circ}{1 + \sqrt{\frac{ad}{bc}}}$$

(Bortz and Döring 2005, p. 230). In the more general case of a $J \times K$ contingency table, a transformation is possible if a chi-square test has been performed using Cramer's V :

$$\Delta = V_C = \sqrt{\frac{\chi^2}{N(\min(J;K)-1)}}$$

as the effect size (Hager 2004, p. 487).

3.3.5 *F-Value, t-value, significance level p*

If a study contains an F -value for an analysis of variance with only two groups, then this F -value can be transformed with

$$t = \sqrt{F}$$

into a t -value (Lipsey and Wilson 2001, p. 199). A t -value can also be obtained from a reported significance level using the distribution of t , with df as the degrees of freedom, usually $df = n - 2$ (Lipsey and Wilson, p. 199):

$$t = t^{-1}(p, df).$$

Rosenthal and Rubin (2003, p. 492) recommend calculating an effect size from p when sample sizes are very small. The t -value obtained in this way can then be transformed with

$$\Delta = r = \frac{t}{\sqrt{t^2 + df}}$$

into a meta-analytic useful effect size (Rosenthal 1984, p. 25; Bortz and Döring, 2006).

3.3.6 *Mean based effect sizes*

The probably most intuitive measure for an effect size is the difference between two means. The influence of different scales can be eliminated using standardization with the pooled standard deviation instead of a simple standard deviation (Kraemer and Thiemann 1987, p. 42; Lipsey and Wilson 2001, p. 198):

$$\delta = \frac{\bar{X} - \bar{Y}}{s_{pool}} \quad \text{with } s_{pool} = \sqrt{\frac{(n_X - 1)s_X^2 + (n_Y - 1)s_Y^2}{n_X + n_Y - 2}}.$$

The effect obtained in this way can be further transformed into a measure comparable to the product-moment correlation (Kraemer and Thiemann 1987, p. 42):

$$\Delta = \frac{\delta}{\sqrt{\delta^2 + \frac{n^2}{n_X n_Y}}}.$$

3.4 Analysis of homogeneity and combining the effect sizes

Before the effect sizes can be combined, it is recommended that the negatively or positively skewed product-moment correlations are transformed into a normally distributed variable. This transformation is also recommended when multiple performance measures within one study are to be combined. Fisher's Z -transformation (Hedges and Olkin 2002, pp. 227; Schulze 2004, pp. 20; Bortz and Döring 2006, p. 218) is used for the transformation:

$$Z = \frac{1}{2} \ln \left(\frac{1 + \Delta}{1 - \Delta} \right) = \operatorname{artanh} \Delta.$$

The transformation back to the product-moment correlation after aggregating the effects is performed by

$$r = \frac{e^{2Z} - 1}{e^{2Z} + 1} = \tanh Z.$$

The results may be of limited use if moderating influences exist. To test for moderating influences, it is possible to test the homogeneity of a combined effect (Shadish and Haddock 1994):

$$Q = \sum_{i=1}^k \frac{(z_i - \bar{Z})^2}{v_i}$$

with

$$\bar{Z} = \frac{\sum_{i=1}^k w_i z_i}{\sum_{i=1}^k w_i} \quad w_i = \frac{1}{v_i} \quad v_i = \frac{1}{(n_i - 3)}$$

The test statistic Q is χ^2 -distributed. If the null hypothesis that the variance of the single effect size does not deviate from a random sample, variance cannot be rejected, \bar{Z} is an acceptable estimate for the true effect (Bortz and Döring 2006, p. 681).

In this study, all effects were first combined under a fixed model, as noted previously (Hedges and Olkin 2002; for other methods, see Rosenthal and Rubin 1982; Hunter and Schmidt 2004). However, if the homogeneity test returns a significant result, the assumption of one constant population effect must be rejected, and a random effects model must be used (Fricke and Treinies 1985; Rustenbach, 2003). The calculation of confidence intervals is possible for both the fixed effects model and the random effects model. If the confidence intervals do not include zero, then the combined effect is significantly different from zero. Additionally, it is possible to explain the heterogeneity using extreme value-analysis ($k > 5$) or moderator analysis ($k > 15$) (Rustenbach 2003).

4 Effects of design parameters in empirical studies

Using the transformations above, comparable effect sizes for the following relationships were derived. The analyzed relationships between the design parameters of strategic planning and organizational performance are presented and discussed in Figure 1. Table 3 provides an overview of the symbols used.

Table 3 Symbols used in effect size tables

Symbol	Meaning/Effect size of primary study	Symbol	Meaning/Effect size of primary study
r	Correlation coefficient	χ^2	Chi-square value
r_{U}	Partial correlation coefficient	d	Standardized mean difference
ρ	Spearman's rank correlation coefficient	p	Effect significance level
τ	Kendall's tau	Δ	Effect size (partial correlation)
r_{tet}	Tetrachoric correlation coefficient	Δ_r	Effect size (simple correlation)
F	F-value	N	Sample size
t	t-value	M	Effect size measure of primary study

4.1 Organizational properties

4.1.1 Planning location

The first design parameter addresses the question of the centralization of the strategic planning process. According to Schwenk (1984), potential disadvantages of centralization include a limited search for alternatives due to time pressure, set routines and cost budgets. Cognitive biases may cause decision makers to defend specific solutions as the only possible solution. Even when more than one solution is found, the selection may be biased due to overly optimistic or pessimistic assumptions. Transferring the strategic planning process to the strategic business units and thus decentralizing the process has the potential to reduce the environmental complexity, which, in turn, exerts positive effects on the strategic planning process. The effect presents more strongly in turbulent environments.

Other authors argue that centralization may be desirable to minimize political conflicts or to prevent unwanted strategy disclosures from threatening the loss of competitive advantages (Wooldridge and Floyd 1990, p. 239). Centralization is also said to positively influence organizational performance by enhancing functional integration and long-term coordination (Andersen 2000, p. 184). Kranz (2007) suggests additional advantages of centralization, such as the realization of diversification advantages, the avoidance of planning redundancies and better integration with budgeting and resource allocation.

Although many studies have examined the centralization of strategic planning (e.g., Noy and Ellis 2003; Schäffer and Willauer 2003; Parnell 2005), relatively few studies have related centralization to organizational performance. The early studies of Gupta (1987) and Golden (1992) examine strategic business units. Gupta (1987) finds a positive effect of decentralization, whereas Golden (1992) finds a negative relationship. Although Golden (1992) allows the effect of the strategy content to be partialled out, this is not possible for Gupta's (1987) study, which did not measure strategy content. Thus, Gupta (1987) is excluded from the meta-analysis. Both studies measured performance with subjective scales.

Table 4 Empirical studies on the relationship between planning location / decentralization and organizational performance

Study		Interaction with organizational performance	Δ	Δ_r	M	N
Miller (1987)	TMT	Successful firms' planning is less centralized	0.18*	0.31*	$r_{.u}$	88
Wooldridge and Floyd (1990)	MM	Significant positive effect for alternatives generated by middle management	0.28	0.28	r	157
Floyd and Wooldridge (1992)	MM	Overall slightly negative effect depending on basic strategic orientation	-0.03	-0.02	$r_{.u}$	259
Golden (1992)	TMT	Negative effect when planning delegated to strategic business unit	-0.18	0.05	$r_{.u}$	384
Floyd and Wooldridge (1997)	MM	Overall slightly negative effect; positive effect for top-to-bottom influence	-0.04	-0.03	$r_{.u}$	259
Papadakis (1998)	TMT	Non-significant positive effect of decentralization	0.05	0.15	$r_{.u}$	70
Andersen (2000)	TMT	Positive effect for decentralized strategic decisions	0.09*	0.14*	$r_{.u}$	230
Baum and Wally (2003)	TMT	Positive effect for decentralized strategic planning	-0.09*	0.41	$r_{.u}$	318
Andersen (2004a)	TMT	Positive effect for decentralized strategic decisions	0.15*	0.23*	$r_{.u}$	112
Andersen (2004b)	TMT	Positive effect for decentralized strategic decisions	0.15*	0.18*	$r_{.u}$	185
Andersen and Nielsen (2009)	TMT	Positive effect for decentralized strategic decisions	0.07	0.12	$r_{.u}$	185
Boone and Hendriks (2009)	TMT	Decentralization of decision making negative, particularly when strong locus-of-control diversity	-0.18*	-0.31*	$r_{.u}$	33

* significant at a level of $\alpha = 5\%$ in primary study
MM = Middle Management; TMT = Top Management Team

Papadakis (1998) confirms the findings of Gupta (1987). For short-term performance measures, in particular, he confirms a strong positive relationship between decentralized strategic planning and organizational performance. Andersen's (2000, 2004a, 2004b) studies are the first to emphasize that a combination of formal strategic planning and emergent planning may positively influence organizational performance. He compares rational central strategic planning with decentralized planning and finds that in all three studied industries, the potential for decentralized decisions is positively related to organizational performance (Andersen 2000, p. 194). In a follow-up study, he shows that decentralization may be industry dependent and justifies his findings by the turbulence of the environment (Andersen 2004a, Andersen 2004b, Andersen and Nielsen 2009).

The results of Miller (1987) and Baum and Wally (2003) appear mixed. Whereas the former finds a significant positive relationship between decentralization and organizational performance, Baum and Wally (2003) find a positive effect of centralized strategic planning. They find that centralization enables rapid decisions, and they argue for decentralized operative planning only. For top management teams (TMTs) with high locus-of-control diversity, Boone and Hendriks (2009) show the advantages of centralized decision making. The locus of control refers to the extent to which people believe that they are in control of the events that affect them. However, even when the locus of control-effect is partialled out, a negative relationship is apparent between decentralization and organizational performance.

A strong significant and relevant contribution to organizational performance can be found in the delegation of decision making to middle management (Wooldridge and Floyd 1990). Floyd and Wooldridge's (1992) examination of the implementation phase of strategic planning also investigates the participation of middle management. Although the effect they identify is slightly negative, they note that the entrepreneurial orientation may influence this relationship. The similarly negative trend in Floyd and Wooldridge (1997) becomes positive when middle management is enabled to influence the lower levels of the hierarchy and is limited from influencing higher levels of the hierarchy.

For the calculation of a combined effect of all twelve primary studies, one study (Wooldridge and Floyd 1990) must be excluded because partial correlations cannot be calculated. The homogeneity test of the combined effect in the fixed effects model returns a significant Q value ($\alpha=5\%$) of $Q = 38.91$ ($Q_{\text{crit}} = 19.68$). Thus, it is not valid to assume a homogenous estimate of one effect size. Under a random effects model at an error probability of $\alpha=5\%$, the confidence interval for the combined effect with $-0.04 \leq \bar{\Delta} \leq 0.12$ includes zero. Considering the zero-order correlations, the homogeneity test with $Q = 63.06$ is also significant, which calls for a random effects model to combine the effect sizes. The random effects model returns a confidence interval for the simple correlations of $0.06 \leq \bar{\Delta} \leq 0.22$. Therefore, it may be concluded that even though a significant, positive, combined zero-order effect of 0.14 can be observed with decentralized strategic planning, the high number of studies analyzing partial correlations (eleven studies) allows us to conclude that this effect is only slightly caused by pure decentralization. Other variables moderate the relationship. These results reveal the need for further research, particularly regarding the influence of environmental uncertainty and the role of middle management.

4.1.2 Involved planners (Functional diversification)

Most studies of the functional diversification of planning teams, sometimes called the heterogeneity of the planning team, implicitly assume that strategic planning is conducted by the top management team. The research object of these studies is the diversity of functions within the top management team (Papadakis 1995, 1998; Talaulicar et al. 2005).

Another stream of research studies the participation of different planners outside the top management team. Kaissi and Begun (2008) assume that the agency costs of the principal-agent relation between the board and the top management team are lower when the board is also included in the planning process. Different functional areas also claim participation. A consideration of the comprehensive accounting literature makes the inclusion of the managerial accounting function intuitive (Langfield-Smith 2008). The inclusion of marketing in strategic planning is also understandable because marketing is an important environmental information deliverer (Pavia 1991; Morgan et al. 2000). However, marketing is included in the planning team in less than 50% of planning companies (Nath and Mahajan 2008).

Some empirical studies have examined the integration of different functional areas or external persons outside the TMT (Table 5a). In the context of strategic planning, Robinson Jr. (1982) analyzes the contribution of external consultants to organizational performance in small companies and finds a positive influence on sales volume, profit and return on sales, with the greatest benefit to profit and sales volume.

Within a particular company, strategic planning may be conducted by a planning department or delegated to the CEO or the TMT. Goldstein and Ward's (2004) survey of 75 hospitals finds that the integration of leading specialists positively influences organizational performance. These results hint at the potential for further research on organizations in specialized industries, such as consulting or capital goods, to study the integration of senior project managers or development engineers. Positive effects of including marketing in strategic planning are found by Morgan et al. (2000) and Weinzimmer et al. (2003). The latter emphasize that including marketing in planning explains more variance than does the functional diversification of the top management team.

Table 5a Empirical studies on the relationship between involved planners (other involved planners) and organizational performance

Study	Relationship with organizational performance	Δ	Δ_r	M	N
Robinson Jr. (1982)	External consultants exercise positive influence in small companies	0.16*	0.16*	d	202
Morgan et al. (2000)	Inclusion of marketing department into planning has positive effects	0.32*	0.32*	d	133
Weinzimmer et al. (2003)	Inclusion of marketing department into planning exhibits a more positive effect than simple functional diversification	0.11	0.13	r_u	173
Goldstein and Ward (2004)	Inclusion of leading specialists is positive	0.32*	0.32	F	70
Cadez and Guilding (2008)	Inclusion of strategic management accountants tends to be negative	-0.02*	0.29*	r_u	193

* significant at a level of $\alpha = 5\%$ in primary study

The path analysis by Cadez and Guilding (2008) offers another interesting perspective on the relationship between certain functional groups. The authors analyze the influence of strategic controllers on planning, and they construct the intensity of strategic management accounting as a causal mediator. Thus, the direct path to organizational performance is interrupted, and a direct influence of the inclusion of strategic management accountants cannot be identified. The partial correlation shows a slightly negative influence.

Due to the large heterogeneity of the studies on the involvement of other functional areas or external consultants (Table 5a), it is not useful to combine the single effect sizes.

Interesting results regarding the functional diversification of the top management team can be found in Papadakis et al. (1998). Overall, they find a positive effect on organizational performance of the highest possible functional diversification. It is interesting that the main effect can be differentiated into a rather high effect for subjective performance criteria and a rather weak effect for all objective performance criteria. Bantel (1993) mainly studies the relationship between functional diversification and the formality of strategic planning, and she finds a positive relationship between functional diversification and organizational performance. It is even more interesting that the effect size does not change considerably when all other influences are partialled out.

Table 5b Empirical studies on the relationship between involved planners (functional diversification of planning team) and organizational performance

Study	Relationship with organizational performance	Δ	Δ_r	M	N
Bantel (1993)	Positive relationship with organizational performance	0.26*	0.26*	$r_{.11}$	157
Simons (1995)	Negative relationship assumed to be caused by a lack of debate culture	-0.22	-0.24	$r_{.11}$	57
Keck (1997)	Effect depends on environment				
	• stable environment	-0.05	-0.05	$r_{.11}$	56
	• dynamic environment	-0.01	-0.02	$r_{.11}$	18
	• highly dynamic environment	0.05	0.07	$r_{.11}$	18
Papadakis et al. (1998)	Functional diversification of involved planners exhibits positive influence on organizational performance	0.10*	0.23*	$r_{.11}$	70
Weinzimmer et al. (2003)	Positive effect of functional diversification enhanced when marketing is included	0.12	0.14	$r_{.11}$	173
Goll et al. (2008)	Non-significant positive effect on functional diversification	0.24	0.12	$r_{.11}$	174
Boone and Hendriks (2009)	Effect of functional diversification even more useful when TMT enhances internal communication	0.52*	0.38*	$r_{.11}$	33

* significant at a level of $\alpha = 5\%$ in primary study

Goll et al. (2008) identify considerably stronger effects. Although the correlation between functional diversification and the performance criteria in their study is non-significant, the effect becomes larger after all other variables are partialled out. This finding points to the contrary effects of other influence factors. A possible explanation is given by Keck (1997), who shows that the relationship between functional diversification in the top management team and performance depends heavily upon the environmental dynamics. Another moderator is identified by Boone and Hendriks (2009) in the internal communication of the TMT. The strong positive influence of functional diversification can be further enhanced when information sharing is improved among the top managers. Simons (1995) argues that the negative relationship he identifies is caused by the lack of debate in the TMT.

In summary, it can be seen that the functional diversification of the planning team is the subject of nine studies, all of which analyze partial correlations. Under a fixed effects model, the homogeneity test for the combined effect reveals a significant ($\alpha=5\%$) $Q = 19.47$ ($Q_{\text{crit}} = 15.51$), which does not allow us to assume homogeneity. Under a random effects model, the confidence interval for the combined effect at a significance level of $\alpha=5\%$ is $0.004 \leq \bar{\Delta} \leq 0.25$, which is slightly significantly different from zero. This means that after controlling for the third variables, the combined effect size is 0.13. Considering only simple correlations, a fixed effects model with $Q = 15.27$ is sharply ($p \leq 0.054$) non-significant. The confidence interval for the combined effect with $KI = [0.06 \leq \bar{\Delta} \leq 0.21]$ does not include zero, which allows us to conclude that an effect size of $\bar{\Delta}=0.14$ may be assumed for an error level of $\alpha = 5\%$. Thus, increasing functional diversification in the TMT has a significant direct and positive influence on organizational performance.

4.2 Strategists' properties

4.2.1 Teamwork

Some studies have focused on the consensus or dissent of the strategic planning team, often distinguishing between consensus on goals and consensus on means. Bourgeois III (1980) notes that consensus or dissent in the TMT is linked to the different process models of strategic planning. Under the assumption of a rational process model, one could expect a certain degree of consensus in the planning team. In contrast, an emergent model with several small, incremental steps, as proposed by Quinn (1978), suggests a strategic process with diverging goals among the involved planners within the organization.

Grinyer and Norburn (1975) find only a weak, non-significant, positive correlation between consensus on goals and organizational performance. However, the size of the effect becomes stronger when the pursued organizational goals rather than the desired goals of some TMT members are considered. These authors find a much stronger but non-significant effect for consensus on the information processes used in strategic planning, in which information processes can be seen as means. Bourgeois III (1980) is one of the first to study these effects and concludes that consensus among top management on goals in addition to consensus on means positively influences firm value.

Table 6a Empirical studies on the relationship between the design of teamwork (consensus on goals) and organizational performance

Study	Relationship with organizational performance	Δ	Δ_r	M	N
Grinyer and Norburn (1975)	Positive effect for consensus on pursued goals	0.04	0.04	ρ	21
Bourgeois III (1980)	Positive effect for consensus on goals	0.51*	0.51*	F	12
Dess (1987)	Positive effect for consensus on goals	0.30	0.30	r_u	19
Simons (1995)	Dissent only positive for firm value when accompanied by open debate	-0.01	-0.02	r_u	57

* significant at a level of $\alpha = 5\%$ in primary study

Dess (1987) also finds positive effects for team consensus. However, he finds simple effects and does not identify an interaction effect between consensus on goals and consensus on means or dissent on goals and dissent on means. It is furthermore interesting to note that when combining performance measures, a positive influence can be found for the subjective performance measures for both consensus on goals and consensus on means, whereas the use of only objective performance measures reveals a positive influence for consensus on goals on organizational performance. Simons (1995) finds a positive influence of environmental perception on dissent, but the effect persists only when it is accompanied by open debate. Without considering this moderator, dissent shows a slightly negative relationship with sales growth, although it continues to show a slightly positive effect for all performance criteria combined. A slightly positive effect for dissent means a slightly negative effect for consensus. Lin, Fu and Liu (2009) study task conflicts and relationship conflicts in TMT. The effect they identify is related to the task conflict, but the authors note that in China, it is difficult to distinguish task conflicts from relationship conflicts. Furthermore, although other variables that correlate with organizational performance can be partialled out from task conflict, the result-

ing partial correlation is not very different from the zero-order correlation. This may be because task conflict directly influences organizational performance.

Ramos-Garza (2009) finds evidence for a moderating influence of the industry and suggests that it is advisable to strive for consensus on means in a complex environment, and it is more advisable to foster debate and dissent in less complex environments. Overall, however, Ramos-Garza (2009) finds a negative relationship between consensus on strategy and organizational performance.

Table 6b Empirical studies on the relationship between the design of teamwork (consensus on means) and organizational performance

Study	Relationship with organizational performance	Δ	Δ_r	M	N
Grinyer and Norburn (1975)	Consensus on information process to use in strategy making	0.27	0.27	ρ	21
Bourgeois III (1980)	Consensus on means	0.49*	0.49*	F	14
Dess (1987)	Consensus on means	0.14	0.16	$r_{.u}$	19
Simons (1995)	Dissent only positive if accompanied by open debate	-0.01	-0.02	$r_{.u}$	57
Liu, Fu and Liu (2009)	Task-related conflicts in TMT have negative effect	0.28*	0.27*	$r_{.u}$	123
Ramos-Garza (2009)	Negative relationship	-0.08	-0.08	$r_{.u}$	29

* significant at a level of $\alpha = 5\%$ in primary study

As has been shown, it is possible and necessary to distinguish between consensus on goals and consensus on means. For consensus on goals, a homogenous effect size cannot be assumed with partial correlations ($Q = 3.40$, $Q_{\text{crit}} = 7.81$, $\bar{\Delta} = 0.10$) or simple correlations ($Q = 3.42$, $Q_{\text{crit}} = 7.81$, $\bar{\Delta} = 0.10$). The combined effect under a random effects model would be $\bar{\Delta} = 0.12$. However, the confidence interval ($CI = [-0.10 \leq \bar{\Delta} \leq 0.34]$ identical for both types of correlation) includes zero, which does not allow us to identify a relationship between consensus on goals in TMT and organizational performance.

In contrast, for consensus on means, both the effect of partial correlations ($Q = 3.92$, $Q_{\text{crit}} = 9.49$, $\bar{\Delta} = 0.23$) and the combined effect of simple correlations ($Q = 3.71$, $Q_{\text{crit}} = 9.49$, $\bar{\Delta} = 0.23$) allow the assumption of a homogenous effect size. The confidence interval $CI = [0.09 \leq \bar{\Delta} \leq 0.37]$ for the partial correlations and the confidence interval $CI = [0.08 \leq \bar{\Delta} \leq 0.37]$ for the simple correlations show that the combined effect is significant.

4.2.2 Risk-taking propensity of TMT

A frequently studied property of strategic planners is risk-taking behavior. The attitude toward risk indicates whether an individual is willing to take risks or is risk averse. The risk-taking propensity is a property of strategists, suggesting that it may exhibit a stronger effect on strategy selection (Papadakis et al. 1998). Fiegenbaum (1997) links risk taking to organizational strategy formulation using the prospect theory of Kahneman and Tversky (1997).

Table 7 Empirical studies on the relationship between risk taking and organizational performance

Study	Relationship with organizational performance	Δ	Δ_r	M	N
Singh (1986)	Lower organizational performance is related to risk taking	-0.19	-0.20	r_{it}	64
Simsek (2007)	Lower organizational performance in previous period leads to risk taking	-0.23	-0.02	r_{it}	495
Miller (1987)	Risk taking associated with better organizational performance	0.04*	0.20*	r_{it}	88
Covin and Slevin (1998)	Risk taking leads to better performance only in less technologically challenging environments; otherwise, negative relationship	-0.09	0.05	r_{it}	330
Gilley et al. (2002)	Risk taking in relation to proactive introduction of new products and processes is positive	0.08*	0.31*	r_{it}	94
Simsek (2007)	Risk taking positively associated with current performance	0.37*	0.43*	r_{it}	495
Subramanian et al. (2009)	Slightly negative effect; small positive effect only in high competition environments	-0.03	-0.04	r_{it}	166

* significant at a level of $\alpha = 5\%$ in primary study

Some studies have examined the direct relationship between the risk-taking behavior of TMT members and organizational performance. Singh (1986) finds a negative relationship. According to his study, and consistent with prospect theory, low organizational performance increases risk-taking behavior, whereas TMTs in high-performing companies exhibit risk-averse behavior. Singh (1986) believes that organizational slack (Bourgeois III 1981) moderates the relationship. Organizational slack may be understood as the cushion of resources that allows additional projects. Higher slack goes hand in hand with higher risk taking (Singh 1986). In contrast, Miller (1987) finds evidence for better performance in risk-taking companies. However, Miller's (1987) results are non-significant (a significance of $p < 0.13$ can be calculated from his data) and measured by subjective indicators. A potential explanation can be found in an earlier study by Miller and Friesen (1983),² which suggests that an effect of risk taking on organizational performance may be identified only in dynamic and complex environments. Subramanian et al. (2009) also find a small positive effect in high-competition environments. Overall, however, they derive a small, non-significant negative effect for risk-taking TMTs. Similarly, Covin and Slevin (1998) do not identify a positive contribution of risk taking to organizational performance; partialing out all other variables results in a negative relationship. However, they show a positive relationship between risk taking and organizational performance in less technologically challenging environments, which contradicts Miller and Friesen (1983). Gilley et al. (2002) find a positive effect of risk taking on the proactive introduction of new products and processes. The opposite effect is produced in a dynamic environment. Simsek (2007) finds that a higher willingness to take risks results in higher organizational performance, especially with long-tenured CEOs.

Studies on the relationship between the risk-taking attitudes of the members of strategic planning teams and performance criteria also confirm the prospect theory of Kahneman and Tversky (1979). It is possible to distinguish two groups of studies. On

² Miller and Friesen (1983) published only the correlations between the independent variables for their successful and unsuccessful samples. They do not elaborate on the relationship between independent variables and the performance criteria, so an effect size cannot be determined. Therefore, the study is not included in Table 7.

the one hand, the studies of Simsek (2007) and Singh (1986) show that low organizational performance induces more risk taking. The calculation of a combined effect for these two studies with highly varying sample sizes does not appear useful.

On the other hand, the studies shown in Table 7 present evidence that, in three studies, a statistically significantly higher risk-taking propensity is related to higher organizational performance, thus confirming the assumed return on increasing risk taking when organizational performance is low. The homogeneity of the combined effect must be denied for partial correlations ($Q = 54.18$, $Q_{\text{crit}} = 9.49$, $\bar{\Delta} = 0.14$) and for simple correlations ($Q = 49.06$, $\bar{\Delta} = 0.24$). The confidence intervals in the consequently required random effects model include zero both for the combination of partial correlations ($CI = [-0.15 \leq \bar{\Delta} \leq 0.31]$) and of simple correlations ($CI = [-0.03 \leq \bar{\Delta} \leq 0.42]$); therefore, we cannot assume a relationship between risk taking in strategic planning and organizational performance.

4.3 Planning method properties

The design parameters of formalization, rationalization and intensity presume a planned approach, as proposed by the prescriptive conceptions of the strategic planning process. Studies that ask “Does strategic planning pay?” imply that companies require a rational, formal planning process to identify their strategy. In addition to this assumption, these primary studies automatically operationalize the strategic planning constructs of “formalization” and “intensity”. Emergent planning conceptions that assume that strategies may emerge out of the environment or the business without being deliberately planned are suppressed. Additionally, companies may act without either a formal strategic plan or an emergent strategy.

Although formalization and intensity are among the most frequently studied research subjects, a common understanding of these constructs is lacking. Quite often, the strategic planning concepts of “rationality” and “intensity” are used simultaneously and synonymously. Rational actions are understood as “orderly, clear and purposeful” (Lyles 1987, p. 267) or “behavior that is calculated or instrumental” (Dean and Sharfman 1993, p. 1070). In a rational strategic planning process, the individual steps necessary to solve the problem are described (Lindblom 1959; Fredrickson 1983). To solve the problems, operations research, decision theory or strategic management accounting methods are applied more or less intensively (Lindblom 1959, p. 80; Baum et al. 2007, pp. 5). Researchers generally presume a rational process when measuring the intensity of strategic planning. Thus, the rationality and intensity of planning are often subsumed under synoptic planning (Frederickson 1983; Kranz 2007). However, observations abstracted to that level may be the reason for contradictory research results. Fredrickson (1983) notes that companies may establish a rational planning process (a planning process consisting of single, distinguishable steps), but they may not utilize the process with the desired intensity due to cost limitations (Fredrickson 1983, p. 569). For a single individual, this phenomenon is known as bounded rationality. Personal goals and motives may influence the decision-making process which may be discontinued as soon as a satisfying alternative has been found (Fleming 1966, p. 52; Cyert and March 1963; Simon 1948).

Therefore, it is useful to distinguish between rationality and intensity to allow a better structuration. *Rationality* describes the existence of a structured strategic planning process. Rationality, in this respect, should not be understood as a single measure that may be optimized using operations research. It is easy to imagine quite complex structured planning processes, which are unlikely to be described as a clear, orderly se-

quence of steps. *Intensity* is the depth of the process in the single steps, such as the number of tools used to support a decision. A similar distinction is made by Weißenberger and Löhr (2007) for planning in general.

This rational or synoptic process in research is often called “formal strategic planning”, which should be distinguished from formalization in the narrower sense. *Formalization* is the extent to which formal guidelines and documents, decision criteria or the organization of the planning in formal rather than informal meetings support the strategic planning process (Cray et al. 1988; Tochtermann 1990; Papadakis et al. 1998; Szyperksy and Müller-Böling 1980).

Superficially, it initially appears that there is little reason to postulate a relationship between the formalization of the planning process and organizational performance. However, Papadakis (1995) presents evidence of a relationship between formalization and rational planning, although he does not provide suggestions regarding the causality of the interaction. To a certain degree, decision makers trust in their own basic assumptions. Such a high level of self-confidence, however, may lead to neglect the need for formal, written plans (Schwenk 1984, p. 121). Thus, the existence of formal plans may challenge the fundamental assumptions of the strategic planning process insofar as they are not only an exercise and are used to improve planning, resulting in higher organizational performance.

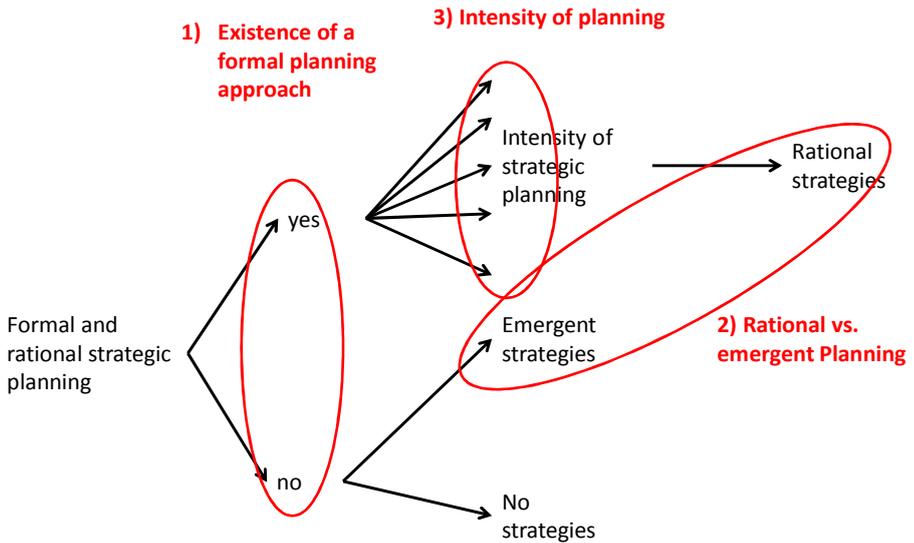
In contrast to a formal, rational strategic planning process of varying intensity, Mintzberg (1978) describes an emergent process of strategy formulation. These emergent processes exhibit some anomalies that require additional attention. Emergent strategies consist of an unconscious pattern of decisions (Mintzberg 1978, p. 947) or actions (Mintzberg and Waters 1985, p. 285), which is often only recognized in hindsight. Once recognized, these patterns are developed into a deliberate strategy. Mintzberg (1978) does not identify the location (central or decentral) of the genesis of the emergent strategy.

Bower (1970) notes that decentrality is an important facet of emergent strategies. New project ideas are often addressed to middle-level managers, who subsequently support these ideas. Quinn (1978) sees strategic planning as a developing process that may be consciously administered. However, he suggests that the planning and implementation of that process occurs in rather small, incremental steps. The practical implementation may be unknown until an opportunity for implementation is perceived.

Therefore, emerging processes are either not consciously perceived and subsequently formulated deliberately after the pattern is recognized, or they are acknowledged but do not take the form of planned, distinguishable, rational steps. Thus, emerging strategy processes contrast with the previously discussed constructs of “formalization”, “rationality” and “intensity”, whereas emergence is understood as the opposite pole of a rational strategic planning process.

In empirical studies, the distinction between the constructs of “formalization”, “rationality (vs. emergence)” and “intensity” is often not clearly visible. In early studies, the primary research interest was the existence of strategic planning as such, whereas newer and more complex studies have focused on single aspects, such as rationality vs. emergence or the intensity of strategic planning. For the remainder of this section, and following Figure 2, the influence of formal planning (the “formalization” construct) on organizational performance is reviewed, followed by the effects of rational vs. emergence strategies (the “rationality” construct). Finally, the relationships between different intensities of strategic planning (the “intensity” construct) and organizational performance are examined.

Figure 2: Taxonomy of the strategic planning constructs “formalization”, “rationality” and “intensity”



4.3.1 Formalization of strategic planning

The performance effect of strategic planning has been the subject of several literature reviews and meta-analyses. The primary studies in these reviews will be reviewed in this paper to derive effect sizes for a combined effect. A brief overview of the existing reviews is provided in Table 8.

Table 8 Literature reviews on performance effects of formal strategic planning

Study	Relationship with organizational performance
Armstrong (1982)	5 out of 15 studies show significant positive contribution
Shrader et al. (1984)	Positive contribution possible depending on contingency factors (31 studies)
Greenley (1986)	No clear relationship detectable (9 studies)
Pearce II et al. (1987)	Positive relationship in 10 out of 21 studies, one negative relationship
Boyd (1991)	Significant positive relationship for return on capital in 9 out of 21 studies
Schwenk and Shrader (1993)	Significant positive relationship for small companies (15 studies)
Miller and Cardinal (1994)	Significant positive relationship with growth, if industry effects are controlled. Significant positive relationship with profitability in turbulent environments (35 studies)

Some of these studies limit their scope to small companies, which produces some specific results. The cut-off criteria for small companies are taken from the primary studies. Companies with less than 500 or less than 50 employees are often classified as small in these studies. In two cases, the industry was used as a criterion. Robinson and Littlejohn (1981) point out that small companies do not understand “long term” the same way as larger companies do; rather, they consider a period of one to two years. According to their research, strategic planning in small firms focuses on goals for func-

tional areas instead of more general organizational goals, but it is nevertheless correlated positively with organizational performance. Ackelsberg's (1985) research on small companies also finds that planning firms perform better, but performance decreases when plans are administered in written form. In contrast, Bracker and Pearson (1986) find that small companies can benefit significantly from formal strategic planning compared with non-formal planning companies. Furthermore, they find that small young firms perform better than older small firms, but this difference vanishes with the existence of formal strategic planning. According to Gable and Topol (1987), small and medium retail firms benefit little from strategic planning. Similar to Ackelsberg's (1985) findings, few written plans exist.

Cragg and King (1988) conclude that written plans in small metal processing firms negatively influence organizational performance. For real estate companies, however, formal planning results in a positive, but non-significant, relationship with organizational performance. The effect size becomes stronger when it is related only to the sales figures (Wood et al. 1988). Similar results are presented by Shrader et al. (1989). For all combined performance measures, the effect of strategic planning is only slightly positive; however, this effect quadruples when profit is removed as a measure. The evidence that strategic planning in small companies fosters growth above all is confirmed by the findings of Lyles et al. (1993), who find a significant positive advantage of explicit strategic planning in small companies for only one of three performance measures, sales growth. Unfortunately, their study did not include the effects of non-significant results, which may result in a biased effect size. McKiernan and Morris (1994) also study small and medium companies. All five of their performance measures are positively related to an institutionalized strategic planning process. However, they find a significant effect only for returns on working capital.

Table 9: Empirical studies on the relationship between planning formalization and organizational performance (small companies)

Study	Relationship with organizational performance	Δ	Δ_r	M	N
Robinson and Littlejohn (1981)	Strategic planning for small companies positive; however, shorter planning horizons considered	0.12*	0.12*	p	67
Ackelsberg (1985)	For small companies, positive contribution of strategic planning if not too strictly formalized	0.10	0.10	r	135
Bracker and Pearson (1986)	For small companies, positive contribution of formal strategic planning	0.12	0.12	d	188
Gable and Topol (1987)	No benefit found for small and medium retail firms	0.05	0.05	t	179
Cragg and King (1988)	Written business plans exhibit negative influence on organizational performance in small metal processing firms	-0.13	-0.13	r	179
Wood et al. (1988)	Formal planning positive for real estate firms	0.13*	0.13*	d	126
Shrader et al. (1989)	Weak positive effect of planning in small firms can be quadrupled if profit is not considered as performance measure	0.02	0.02	r	97
Lyles et al. (1993)	Strategic planning fosters sales growth	0.35*	0.35*	p	67
McKiernan and Morris (1994)	Significant positive effect only for return on working capital in small firms	0.15	0.15	r_{ret}	66

* significant at a level of $\alpha = 5\%$ in primary study

Different results are found when the samples are not limited to small firms. Ansoff et al. (1970) were one of the first to show that strategically planning firms perform sig-

nificantly better in acquisitions. Thune and House (1970) find a positive contribution of strategic planning to organizational performance in a cross-sectional study. However, they also note that this positive effect could not be found in the food, oil or steel industries. Therefore, they are among the first to note the importance of environmental factors as moderators.

Table 10: Empirical studies on the relationship between formalization of strategic planning and organizational performance

Study	Relationship with organizational performance	Δ	Δ_r	M	N
Ansoff et al. (1970)	Positive effect of planning on strategic acquisitions	0.20*	0.20*	p	93
Thune and House (1970)	Positive contribution of planning except in food, oil and steel industries	0.42*	0.42*	d	36
Denning and Lehr (1972)	Non-significant positive contribution; firms introduce planning together with growing technological change and capital intensity	0.06	0.06	d	287
Herold (1972)	Chemical industry benefits from planning	0.66*	0.66*	d	10
Fulmer and Rue (1974)	Overall small negative effect, but strong dependency on industry	-0.18	-0.18	d	386
Karger and Malik (1975); Malik and Karger (1975)	Non-significant positive effect of formal planning on mechanical engineering industry	0.38	0.38	t	13
Wood and La-Forge (1979)	Significant positive effect of formal planning compared to randomized control group and non-planners	0.55*	0.55*	d	39
Kudla (1980)	Non-significant positive effect for shareholder return	0.05	0.05	χ^2	129
Leontiades and Tezel (1980)	Non-significant positive perceptions of strategic planning by CEO and CPO	0.08	0.08	χ^2	61
Whitehead and Gup (1985)	Only banks with low performance practice strategic planning	-0.16*	-0.16*	t	302
Rhyne (1986)	Non-significant positive effect of formal planning for 10-year shareholder return	0.05	0.05	d	89
Powell (1992)	Positive effect for apparel industry, but not for total sample	0.10	0.17	r_u	113
Bantel (1993)	Non-significant negative relationship; significant positive relationship with profit variance	-0.10	-0.13	r_u	80
Goll and Rasheed (1997)	Non-significant positive relationship in dynamic, attractive environment	0.14	0.14	r_u	62
Al-Shammari and Hussein (2007)	Positive relationship in growth markets or emerging markets	0.40*	0.40*	F	28
Glaister et al. (2008)	Positive relationship in growth markets or emerging markets	0.28*	0.28*	p	135

* significant at a level of $\alpha = 5\%$ in primary study

Although one may argue that the chemical industry, similar to the oil industry and the steel industry, is a less complex environment, Herold (1972) shows significant positive effects of formal strategic planning on organizational performance. Slightly positive effects are found by most other studies, although most of these results are non-significant. In addition to a non-significant positive effect, Denning and Lehr (1972) find that the introduction of formal strategic planning accompanies technological change, capital intensity and organizational size and complexity. In Fulmer and Rue's

(1974) study, durable goods firms benefit from formal strategic planning, whereas short-term-oriented consumer goods firms experience negative effects of strategic planning. For all industries, the effect size is slightly negative. Karger and Malik (1975) (same sample as Malik and Karger 1975) also study durable goods firms and use 13 different measures for organizational performance. Seven of these measures show significant benefits for strategic planning. The combination of all criteria for organizational performance, however, is non-significant. Kudla (1980) investigates whether the introduction of strategic planning delivers a positive return for shareholders but finds only non-significant positive effects, which are confirmed by Rhyme (1986) using ten-year total shareholder returns. Leontiades and Tezel (1980) ask whether CEOs or Chief Planning Officers (CPOs) perceive a positive contribution of strategic planning to organizational performance, but they find only a weak, non-significant positive effect.

Some studies focus on strategic planning in the banking industry. A significant positive relationship between formal planning and organizational performance is identified by Wood and LaForge (1979). They assume that formal planning is not the only reason for performance, but performance and formal planning are expressions of a progressive leadership style. A negative relationship is found by Whitehead and Gup (1985), who assume inverse causality in the banking industry; therefore, only banks with low performance consider it necessary to introduce strategic planning. This argument is supported by Bantel (1993), who finds a negative relationship. According to these findings, formal planning is more strongly required or communicated when banks' profits are liable to strong variances.

According to Powell (1992), the process and the tools of strategic planning are easily imitable, and an advantage is only apparent in markets with a low spread of planning methods. In a comparison of the furniture and apparel industries, Powell (1992) finds a significant positive effect in the apparel industry, but not in the furniture industry. The effects of both industries result in a slightly positive relationship with performance. Goll and Rasheed (1997) find positive effects on organizational performance for firms in a dynamic and attractive environment. In line with these findings, Al-Shammari and Hussein (2007) show that strategic planning yields advantages for companies in emerging markets. These results are confirmed by Glaister et al. (2008).

Due to the close proximity between formalization and rationality vs. emergence of strategic planning, the combined effects are presented at the end of the next section.

4.3.2 Rational vs. emergent strategy processes

Slevin and Covin's (1997) comparison of a rational strategic planning process with an emergent strategy process does not find significant differences. However, as the authors point out, the form of strategy formulation must fit the organizational structure of the firm. In organic (i.e., more flexible and less formal) structures of companies, emergent strategy generation is significantly positively related to organizational performance, whereas in mechanistic organizations, a formal strategic planning process is positively related to performance.

The finding of Covin et al. (2006) that the degree to which strategies emerge in companies is an important moderator of the relationship between an entrepreneurial orientation and company performance is particularly interesting.

Table 11 Empirical studies on the relationship between formal strategic planning vs. emergent planning and organizational performance

Study	Relationship with organizational performance	Δ	Δ_r	M	N
Slevin and Co- vin (1997)	Slight advantage of rational vs. emergent strategy genesis	-0.01	0,01	$r_{.u}$	112
Andersen (2000)	Effect of rational process stronger than effect of emergent process; both effects positive	0.29*	0.34*	$r_{.u}$	230
Andersen (2004a)	Both planning modes positively correlated with performance; emergent processes more relevant in turbulent environments	0.36*	0.12	$r_{.u}$	185
Andersen (2004b)	Both planning modes positively correlated with performance; emergent processes more relevant in turbulent environments	0.33*	0.35*	$r_{.u}$	185
Covin et al. (2006)	Rational planning less advantageous than emergent strategy formulation in entrepreneurial-oriented organizations	-0.10	0.01	$r_{.u}$	110
Andersen and Nielsen (2009)	In general, advantage of rational planning, but combination of rational and emergent methods is crucial	0.18*	0.10*	$r_{.u}$	185

* significant at a level of $\alpha = 5\%$ in primary study

Andersen (2000) compares rational planning processes with emergent strategy genesis. Both planning methods are significantly positively related to organizational performance, although the effect for the rational process is much stronger than the effect for the emergent process. The effect sizes indicated in Table 11 are calculated from the difference between the effect of a rational strategy process and the effect of an emergent strategy process. Andersen (2004a, 2004b) points out that emergent planning gains importance in turbulent environments. Andersen and Nielsen (2009) also note that, independent of the individual contributions of both types of strategy generation, it is crucial to pursue both rational and emergent planning processes simultaneously.

Of 31 studies on the relationship between formal strategic planning and organizational performance (Table 9 to 11), only nine studies consider partial correlations. The other studies did not publish sufficient data to partial out third variables. For the combination of all 31 effect sizes, we cannot assume a fixed-effects model for partial correlations³ ($Q = 139.64$, $Q_{crit} = 43.77$, $\bar{\Delta} = 0.09$) or for simple correlations ($Q = 126.75$, $Q_{crit} = 43.77$, $\bar{\Delta} = 0.08$). The random-effects model produces a confidence interval $CI = [0.06 \leq \bar{\Delta} \leq 0.12]$ (including partial correlations where possible) or $CI = [0.09 \leq \bar{\Delta} \leq 0.16]$ (all zero order correlations) for the total effect. Therefore, a significantly positive effect can be identified for formal strategic planning on organizational performance. If only the nine studies that allow the combination of partial correlations are considered, an even stronger effect can be found for a random-effects model ($Q = 34.04$, $Q_{crit} = 15.51$, $\bar{\Delta} = 0.15$, $CI = [0.03 \leq \bar{\Delta} \leq 0.27]$).

For small firms (Table 9), strategic planning seems to pay off. It is possible to combine the effect sizes under a fixed-effects model because homogeneity cannot be rejected ($Q = 14.83$, $Q_{crit} = 15.51$, $\bar{\Delta} = 0.07$). The combined effect is significant, with a confidence interval $CI = [0.01 \leq \bar{\Delta} \leq 0.13]$. When rational planning is directly compared with emergent planning (Table 11), a significant positive advantage of rational planning is apparent. It should be noted that most authors of the primary studies suggest

³ When partial correlations are not available in a primary study, zero-order correlations are used, even in the partial correlation combinations.

that both planning methods should be used in combination. The advantage of rational planning over emergent planning can be calculated as a combined effect and becomes positive and significant under a model of random effects with partial correlations ($Q = 12.22$, $Q_{\text{crit}} = 11.07$, $\bar{\Delta} = 0.12$, $KI = [0.02 \leq \bar{\Delta} \leq 0.22]$) as well as under a model of fixed effects for simple correlations ($Q = 5.84$, $Q_{\text{crit}} = 11.07$, $\bar{\Delta} = 0.13$, $KI = [0.07 \leq \bar{\Delta} \leq 0.20]$). Generally, it should be noted that, in most studies, the moderating influence of the environment is obvious: the more the environment is subject to changes, the more necessary a formal strategic planning process and supplementary emergent strategy generation become.

4.3.3 Intensity of strategic planning

Thus far, this study has focused on the existence of a strategic planning process in terms of a more or less dichotomous variable. Now, we focus on the intensity of strategic planning measured by ordinal or metric scales. Some empirical studies of intensity are not included in the reviews presented in Table 8. The results of these studies on the intensity of strategic planning reflect the challenges faced by researchers when studying the properties of the planning method. No clear results can be identified in the studies of Kraus et al. (2006) or O'Regan et al. (2008). O'Regan et al. (2008) limit their study to the analysis of the environment, whereas Günther (1991) studies a variety of strategic planning tools throughout the planning process chain. He considers the individual risk of each firm and concludes that high performance can be achieved for very good planners, but only at the price of high risk. This conclusion can also be seen in the fact that, in his study, excellent planners show relatively little variance in their performance figures but a lower level of performance. Günther (1991) notes that the relationship between the intensity of strategic planning and organizational performance takes a non-linear form. Burt (1978) studies the quality of strategic planning in a comparatively small sample and finds a strong positive effect of the intensity of strategic planning on organizational performance. Studying the banking industry, Wood and LaForge (1979) find significant positive effects of intensive strategic planning on organizational performance. Robinson et al.'s (1984) survey of small firms finds that strategic planning pays off in every life cycle phase of small companies, but different performance measures are affected in each phase. Ackelsberg (1985) also shows a clear positive relationship between the analytic intensity of strategic planning and organizational performance in small firms. Although Orpen (1985) presents a weak positive effect of strategic planning intensity, he concludes that a relationship does not exist due to the non-significance of his results.

The results of Cadez and Guilding (2008) are difficult to interpret. The results of their structural equation model do not reflect the partial correlations. Although their data fit a structural equation model with a significant path from the intensity of strategic management accounting to performance, the partial correlation does not support this path, with an effect size of 0.00. The influence of the intensity of strategic management accounting may be caused by other relationships that are not included in the model (omitted variables). However, the model has a high fit.

The results of Hopkins and Hopkins (1997) are interesting. They examine single planning steps rather than considering the planning process as an entity. Hopkins and Hopkins show that intensive strategic planning in the mission development phase, alternative evaluation and selection phase, and implementation and monitoring phases correlates strongly and positively with performance criteria, whereas no relationship is

apparent for the goal development and analysis phases. A potential problem arises with this research design when the implied processes are not implemented in some of the surveyed firms. However, it is also interesting that the environment does not significantly influence the performance effect of strategic planning.

Table 12 Empirical studies on the relationship intensity of strategic planning and organizational performance

Study	Relationship with organizational performance	Δ	Δ_r	M	N
Burt (1978)	Planning quality positive for organizational performance in large retail chains	0.55*	0.55*	r	14
Wood and La-Forge (1979)	Banks benefit from intensive strategic planning	0.46*	0.46*	d	39
Fredrickson (1984)	Positive relationship in stable environment	0.49*	0.49*	r_u	38
Fredrickson and Mitchell (1984)	Negative relationship in dynamic environment	-0.35*	-0.35*	r_u	29
Robinson et al. (1984)	Small firms improve organizational performance with intensive strategic planning independent of the life cycle phase of the firm	0.25*	0.25*	ρ	51
Ackelsberg (1985)	Analytic intensity of planning in small firms contributes to organizational performance	0.20*	0.20*	r	185
Orpen (1985)	Generally positive relationship	0.13	0.13	r	52
Günther (1991)	Contingency coefficient significantly positive, but very intensive planning firms take higher risk; non-linear relationship	0.29*	0.29*	χ^2	105
Priem et al. (1995)	Positive relationship; even stronger in uncertain environment	0.08*	0.24*	r_u	109
Hopkins and Hopkins (1997)	Generally non-significant positive relationship for banks; relationship depends on planning phase	0.18*	0.22*	r_u	112
Papadakis et al. (1998)	Generally, intensity of planning is non-significant but positively correlated (only for RoA significant positive); subjective indicators negatively correlated	0.05	0.15	r_u	70
Atuahene-Gima and Li (2004)	Relationship depends upon technological environment	0.01	0.10	r_u	373
Kraus et al. (2006)	No clear relationship (weak positive relation)	0.09	0.09	p	290
Mueller et al. (2007)	Nearly no relationship, but depends upon intended planning goal	-0.01	0.04	r_u	42
Cadez and Guilding (2008)	No direct relationship of planning intensity, but indirect relationship can be found	0.00*	0.59*	r_u	193
O'Regan et al. (2008)	No clear relationship (weak positive relation)	0.04	0.04	r	170

* significant at a level of $\alpha = 5\%$ in primary study

Papadakis et al. (1998) find a weak positive correlation. Their assumption of an inverse causal relationship is interesting, suggesting that prior organizational performance allows companies to implement more intensive planning processes.

Studies that consider environmental factors as contingency factors may contribute to the understanding of these relationships. Fredrickson (1984) and Fredrickson and Mitchell (1984) find that in a dynamic environment, an intensive strategic planning process negatively affects organizational performance, whereas in a stable environment,

intensive planning contributes positively to organizational performance. Both studies operationalize environmental dynamism with industry properties such as price or contribution margin variances. The results of Fredrickson (1984) and Fredrickson and Mitchel (1984) are impressive due to their high effect sizes, which, according to the authors, are partial correlations.

Atuahene-Gima and Li (2004) show that the relationship between the intensity of strategic planning and organizational performance is heavily dependent on the environment. Priem et al. (1995) find that in an uncertain environment, more intensive strategic planning correlates positively with higher organizational performance. Even when the environmental influence is partialled out from this result, a positive relationship is apparent. Finally, Mueller et al. (2007) do not find a relationship between planning intensity and organizational performance. However, when the relationships are distinguished by the intended goal of the planning, negative relationships with the performance criteria can be found when planning is used persuasively or for monitoring purposes. In contrast, Mueller et al. (2007) find a strong positive relationship when the intended planning goal is to satisfy information needs or to serve a symbolic purpose.

The combined effect of strategic planning intensity on organizational performance has been studied in 16 different papers, with eight papers allowing for the analysis of partial correlations. Random effects must be assumed for the analysis of partial correlations ($Q = 33.96$, $Q_{\text{crit}} = 25.00$, $\bar{\Delta} = 0.13$, $CI = [0.05 \leq \bar{\Delta} \leq 0.21]$) as well as for the analysis of simple correlations ($Q = 28.68$, $Q_{\text{crit}} = 25.00$, $\bar{\Delta} = 0.22$, $CI = [0.14 \leq \bar{\Delta} \leq 0.30]$). In both cases, the combined effects are significant at $\alpha = 5\%$. It should be noted that some studies point out that the environment should not be neglected as an important moderator. It seems that in an overly dynamic environment, intensive planning results in lower performance.

4.4 Overview of relationships

When combining the effects on the basis of partial correlations (Table 13), significant effects can be found for the functional diversification of the involved planners as well as for all three facets of the planning method. Formal strategic planning, a rational planning process and an intensive planning process are positively correlated with organizational performance. Positive significant effects can also be found between consensus on means and organizational performance, but the number of studies is too small to formulate a scientifically sound statement, with only two out of five studies allowing the analysis of partial correlations. More studies would be desirable and would allow biases caused by the design of the primary studies to be avoided or leveled. More studies would also facilitate a better analysis of moderating influences, such as the industry or environmental dynamics.

Table 13 Empirically studied design parameters

Dimension	Parameter	Ratio of studies with partial correlations	Combined effect	Homogeneity measure Q (critical level in brackets)	Significance of homogeneity p(Q)	Combination model
Organization	Planning location	11 out of 12	0,04	38,91 (19,68)	No	Random effects
	Involved planners (Functional diversification)	9 out of 9	0,13*	19,47 (15,51)	No	Random effects
Strategists	Consensus on goals	2 out of 4	0,10	3,40 (7,81)	Yes	Fixed effects
	Consensus on means	2 out of 5	0,23*	3,92 (9,49)	Yes	Fixed effects
	Risk taking	5 out of 5	0,08	54,18 (9,49)	No	Random effects
Planning method	Formalization	9 out of 31	0,15*	34,04 (15,51)	No	Random effects
	Rationality vs. emergence	6 out of 6	0,12*	12,22 (11,07)	No	Random effects
	Intensity	8 out of 16	0,13*	33,96 (25,00)	No	Random effects

* significant at a level of $\alpha = 5\%$ in primary study

5 Limitations and future research

Acknowledging the vast number of empirical studies, this review is limited to work that relates the design parameters of the strategic planning process to organizational performance. Although some results provide clear conclusions, others are more difficult to aggregate. Often, we find small effects (Table 13), which are a common phenomenon in strategy research (Mazen et al. 1987) due to the “black box” approach of many studies. Relationships are identified, but, often, the exact mechanisms are not analyzed. Nevertheless, the low total effects demonstrate the need for future research. If we can observe significant effects from small changes in a complex context, it is worthwhile to search for the exact cause and effects. By identifying interactions in isolated causalities, we may observe stronger effects, and we may be able to clarify which negative interactions are influenced by mediators that are overcompensated by positive effects in the black-box relations and therefore cannot be observed.

The diversity of the underlying methods and operationalizations of primary studies are frequently cited as arguments against meta-analyses (Fricke and Treinies 1985, p. 169ff.). For example, the rationality and the intensity of the strategic planning process are not separated in older studies. Because of the diverse operationalizations, the least common denominator for the interaction between both constructs is that a deliberate form of strategic planning is advantageous in comparison to unintended or nonexistent strategic planning. However, it should be noted that the transformation of different statistical measures in comparable effect sizes during the meta-analysis makes the research results more comparable. Meta-analysis is explicitly designed to analyze whether statistically robust results, in the sense of a method triangulation, can be derived for different operationalizations (Hunter and Schmidt 2004).

Meta-analyses are also intended to integrate studies that result in unclear or non-significant results (Rustenbach 2003). Studies without significant interactions can be found particularly in relation to the discussion on the benefits of strategic planning. Thus, we hope that the systematic distortion due to insignificant and unpublished results (publication bias) is low in this meta-analysis (Rosenthal 1979, p. 639; Fricke and Treinies 1985, p. 169 ff.; Rustenbach 2003, p. 38).

For the aggregation of primary studies, it must be recognized that only a few primary studies are available for some interactions, which restricts or limits the meaningful aggregation for a total effect. Rustenbach recommends a minimum of 15 primary studies to enable the explanation of the study results using moderator analysis (e.g., for the influence of industry) (Rustenbach 2003, p. 163). This threshold is not met for partial correlations for any of the research areas under study. Thus, in relation to research fields such as psychology or medicine that frequently use meta-analyses, strategic planning has a backlog demand for empirical studies—especially replication studies, which allow further analysis of moderating and mediating effects. The possibility of considering mediators in meta-analysis is provided by meta-analytic structural equation modeling (Viswesvaran and Ones 1995), which is beyond the focus of this study but offers opportunities for future research.

Due to the limited number of primary studies, we cannot explore whether different operationalizations of organizational performance have an impact on effect sizes. Further studies are desirable for this purpose.

By calculating the partial correlations rather than simple correlations, we attempted to isolate the effects of the examined design parameters. However, the lack of sufficient information for all primary studies required us to consider single correlations in addition to partial correlations. Due to the chosen statistical measures, causalities can be assumed but not statistically proven because time lags are not analyzed in primary studies.

6 Final conclusions

As a field of research, strategic management has a history of more than 50 years. Within this field, strategy-content and strategy-process research can be distinguished. Some empirical studies focus on single design parameters of the strategy-planning process and their impact on organizational performance. A comprehensive overview that goes beyond studies on the impact of formal strategic planning is lacking. The existing reviews on formal strategic planning are primarily narrative. This study expands existing reviews by investigating organizational properties, strategists' properties, rationality vs. emergence and the intensity of strategic planning. Furthermore, we add to narrative reviews by transforming statistical measures for large-scale empirical studies into unified, comparable effect sizes and by aggregating the effects of several primary studies for a total effect. This process was not possible for all of the studies because some of the published material did not allow for transformation, and some of the published results are too heterogeneous to allow for a reliable estimate of a total effect. In summary, significant interactions with organizational performance can be found for the functional diversification of involved planners as well as for the formalization, rational implementation and high intensity of strategic planning.

Our results suggest the potential for future research on the unexplained impact of the properties of the strategists and the impact of context variables as moderators and medi-

ators. A larger body of empirical studies in this research field is desirable to promote future research.

Our results allow for direct practical use by providing a starting point for designing and increasing the benefits of practical strategic planning processes.

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CEO Duality, TMT Composition, and Management Control in Low- and High-risk-taking Firms

Sandro Kürschner

Abstract Research on the effect of the top management team (TMT) in a firm on management control systems is scarce. The upper echelons theory and attention-based theory promise to facilitate theory building in this stream of research. This study aims to clarify the relationship between the composition of TMTs and the configuration of management control systems. This study also considers the power-structure-biasing effect of CEO duality. Survey data from 97 companies together with publicly available data are used to empirically clarify whether CEO duality and TMT composition affect the setup of management control systems. The results show that dual CEOs use their power to limit the rational approach to forecasting and budgeting but facilitate an efficiency orientation of management control. Certain TMT compositions also support this efficiency orientation; however, these TMT compositions also positively influence the rational approach to forecasting and budgeting. Nearly all relationships thus identified are moderated by the risk-taking orientation of firms. Therefore, including risk taking as a moderating variable is recommended.

Keywords CEO Duality · TMT composition · Management control systems · Risk Taking Propensity

S. Kürschner (✉)

University of Zurich, IBW – Department of Business Administration

Plattenstrasse 14, 8032 Zurich, Switzerland, Email: sandro.kuerschner@business.uzh.ch

1 Introduction

Management control systems encompass a broad scope of information, ranging from formal external information to informal personal and social controls (Chenhall 2003). Researchers are interested in the design of management control systems for multiple reasons. The design of management control systems has been linked to strategic renewal (Poskela and Martinsuo 2009; Chenhall et al. 2011); also, it provides opportunities to foster innovation (Bisbe and Otley 2004; Davila et al. 2009). Auditors consider the design and management control philosophy while judging the complexity of the auditing contract (Cohen and Hanno 2000).

Often, the contingency theory is used to predict control elements depending on external and internal organizational factors (Otley 1980). Researchers who focus on organizational characteristics occasionally utilize the upper echelons theory to explain the setup of management control systems. The upper echelons theory states that the design of organizational elements depends largely on the characteristics of the members of the top management team (TMT). Other researchers linked management control to top management by employing the attention-based theory, which predicts that the information available to the TMT influences the actions of its members.

Previous research on the effects of the top management on management control is scarce. Naranjo-Gil and Hartmann (2006) showed that professional TMTs use management accounting systems in a rather interactive manner and rely more on nonfinancial information. In contrast, administrative TMTs make greater diagnostic use of financial information. A follow-up study showed that the characteristics of the CFO determine the adoption of management accounting innovations (Naranjo-Gil et al. 2009). Cho (2011) suggested that firms' environmental scanning behavior is a function of the mindset of their TMTs. Abernethy et al. (2010) found that TMT members with a consideration leadership style opposed an initiating structure style. The results of this research are similar to those of the research on the enabling-coercive management style initiated by Adler and Borys (1996).

To date, previous studies ignored the fact that TMTs in many economic environments are monitored by boards. The power structure in a TMT may be severely modified when the CEO is also the chairman of the board. Speckbacher and Wentges (2012) recently demonstrated the consequences of a disturbed power structure in the TMT on management control. Although there are many reports on the effects of CEO duality on several organizational outcomes, there are no findings on the effect of CEO duality on management control implementations exist.

Furthermore, although Naranjo-Gil and Hartmann (2006) produced some important findings on the consequences of TMT composition on the use of management control systems, several aspects of the relationship of TMT composition with configuration options of control elements remain unstudied.

This paper begins to fill these gaps. However, the contribution of this paper is not limited to the findings on the effect of governance on management control; another important contribution is the introduction of risk taking as a moderating variable in this type of research. Although some important relationships can be found in an adequately large sample, they become much more visible after considering the moderating influence of risk taking. Moreover, some findings only become visible in the respective low- or high-risk-taking subgroup.

The rest of this paper progresses with a recollection of the theoretical background. Hypotheses are then motivated and developed. Before the results are presented, the methods and some important data analysis considerations are explained. The paper concludes with a discussion on the results and limitations of these findings.

2 Development of the Model

2.1 Theoretical Background

Several frameworks for empirical studies in management control have been proposed. The introduction of management control systems in academic research is usually traced back to Anthony (1965), who distinguished between strategic control, management control, and operational control later renamed as task control (Anthony and Govindarajan 2007)). Simons (1995) developed the levers of a control framework which notes that management controls are more than accounting controls. By abstracting to belief systems, boundary systems, diagnostic control, and interactive control, Simons (1995) categorized management control not along an instrument-oriented dimension but more along a goal-oriented view. However, other researchers maintained the instrument-oriented view. Otley (1999) and Ferreira and Otley (2009) proposed a starting control framework that also considered structural and strategic elements as management control systems. In 1985, Merchant began to develop a different understanding of management control systems, which was later evolved into the Merchant and van der Stede (2003, 2012) textbook. In the mentioned framework, accounting controls are a subset of results control, which are supplemented by action control, personnel control, and cultural control. The most recent approach, which also sums up all previous approaches, is the Malmi and Brown (2008) framework. According to this framework, management control can be conceptualized in three different layers: cultural control, accounting control, and administrative control. The accounting control layer is divided into planning, cybernetic, and reward control. Because their approach is the most recent summary of previous approaches and the most intuitive one, their accounting layer forms the framework for guiding the study in this article.

Most frameworks employ an instrument-oriented view. However, Simon's (1995) levers of a control framework are more goal-oriented; so is the coercive-enabling framework of Adler and Borys (1996). Coercive and enabling structures may be presented in many forms. One of the more recent analyses employing this framework is the study by Naranjo-Gil and Hartmann (2006) on the usage of management accounting systems by TMTs. Their main finding was that the professionalism of TMTs influences the setup of management accounting systems. While analyzing management accounting systems with an instrument-oriented view, they used their findings to proxy for a coercive or enabling use of management accounting systems: "the diagnostic use of management accounting systems (MAS), the use of financial MAS information, and the use of MAS for performance evaluation are control elements that contain considerable similarity to the coercive use of MAS, as that refers to more typical top-down management that focuses on central control, emphasizes its role in performance evaluation, and uses preset financial standards" (Naranjo-Gil and Hartmann 2006, p. 30).

The widely accepted contingency theory explains the design of management control systems (McMahon and Perritt 1973; Hayes 1977; Otley 1980; Fisher 1998; Chenhall

2003). The main finding of contingency research is that the design of management control systems is contingent on both external and internal factors (Abdel-Kader and Luther 2008). This finding is valid for the management control package as a whole and for the accounting layer; firms adapt their control requirements to their situation (Otley 1980; Gerdin 2005). At a more general level, some important attributes of management control systems include knowledge acquisition and information distribution (Kloot 1997). In the context of a given asset specificity, goal setting as a specific outcome control has been shown to be useful (Dekker 2004; Caglio and Ditillo 2008).

Management control systems should support collaborative strategies (Adler and Chen 2011). The strategic focus of a firm and the consequent attention of the TMT also affect the design of management control systems (Davila 2000). Another influence of the TMT may be exercised by its leadership behavior, which may be either empowering or directive (Hmieleski and Ensley 2007). Specific instruments studied in the accounting layer of the management control systems package include the weight assigned to financial measures (Widener 2006; Tayles et al. 2007), allocation of resources (Dekker 2004, Scott and Tiessen 1999; Clinton and Hunton 2001), the performance evaluation process (Naranjo-Gil and Hartmann 2006; Hartmann and Slapničar 2009), or environmental scanning behavior (Cho 2011).

Few studies have explicitly examined the influence of the TMT on the design of the management control system. Speckbacher and Wentges (2012) studied the influence of family members in the TMT and found that founding family members make less use of performance measures. Naranjo-Gil and Hartmann (2006) found that TMTs with a background in internal processes are more inclined toward process enhancements, while dominant backgrounds lead to a focus on key financial figures. The composition of the TMT influences even the strategy adopted by firms (Cho et al. 1994). Much of the research on top management is driven by the upper echelon theory proposed by Hambrick and Mason (1984), which states that organizational outcomes are at least partly predictable by managerial backgrounds.

One frequently studied background property is the functional diversity of the TMT (Buyl et al. 2011; Cannella et al. 2008; Kürschner and Günther 2012). However, Menguc and Auh (2005) found that for strategy implementation, less functional diversity and interfunctional coordination are needed. They suggested more homogenous TMTs for strategy implementation. The composition of the TMT also depends on the relatedness of firms' businesses (Michel and Hambrick 1992).

Many effects on firm performance predicted by the upper echelon theory are moderated by the characteristics of the CEO (Buyl et al. 2011). The duality of the CEO and the president of the board of directors has been studied (Ho 2011; Judge et al. 2003; Chen et al. 2005). Indeed, Papadakis (1998) suggests that when studying TMT characteristics, CEO characteristics should always be studied. Among many other findings, CEO duality was shown to hamper the board's monitoring function (Tuggle et al. 2010). Whether CEO duality negatively affects corporate performance needs to be determined. Negative findings (Rechner and Dalton 1991; Ramdani and van Witteloostuijn 2010) oppose findings with no relationship (Heracleous 2001; Carty and Weiss 2012). Both results are explained by theory, and Harris and Helfat (1998) suggested both agency theory and leadership theory to explain such findings.

Considering all these insights and findings, it is established that many leads exist, suggesting that the functional composition of the TMT and CEO duality somehow affect the setup of the management control system. The following section presents some hypotheses regarding possible relationships.

2.2 Development of Hypotheses

CEOs who also serve as the chairmen of the board—commonly dubbed CEO duality—may influence the information processed in the management control system. CEO duality offers a unified chain of command whose usefulness particularly in turnaround situations was established by Mueller and Barker III (1997) and (Brockmann et al. 2006). However, they also argued that dual CEOs may use their discretion to pursue their own interests, which may be a reason why shareholders value CEO non-duality (Saibaba and Ansari 2011). Another reason may be that dual CEOs also increase IPO underpricing (Chahine and Tohme 2009) and earnings management (O'Connor et al. 2006; Sarkar et al. 2008; Chang and Sun 2009; Garcia-Meca and Sanchez-Ballesta 2009; Prencipe and Bar-Yosef 2011). Few researchers could not identify an effect of CEO duality on earnings management (Lai 2012). However, shareholders may prefer that CEO duality increases the probability to pay dividends (Gill and Obradovich 2012). Several researchers found the negative effects of CEO duality on corporate performance (Rechner and Dalton 1991; Judge et al. 2003; Chen et al. 2005; Grove et al. 2011; Ho 2011), while others found no effect (Heracleous 2001; Nahar Abdullah 2004; Jackling and Johl 2009; Pandya 2011; Yan Liu et al. 2011; Carty and Weiss 2012; Shukeri et al. 2012) or positive effects (Ramdani and van Witteloostuijn 2010). The influences exercised by dual CEOs on their management lead audit firms to charge higher audit fees (Bliss et al. 2007; Bliss 2011).

Tuggle et al. (2010) concluded that CEO duality hampers the monitoring function of the board by selectively directing their attention. If the CEO selectively directs the attention of the board, he or she may also direct the management's attention and eventually that of the management control system. Dual CEOs tend to make less information externally available (Gul and Leung 2004; Huafang and Jianguo 2007), although other researchers found no evidence of such relationships (Cheng and Courtenay 2006; Jing Li et al. 2008). In particular, dual CEOs disclose less forward-looking information (Cerbioni and Parbonetti 2007), partly because they themselves employ less external information when making decisions. Dual CEOs may perceive less need to rationalize their decisions with external information. Thus,

H1: CEO duality relates to using less external information for management control.

H2: CEO duality relates to lower participation in the resource allocation process.

CEO duality negatively affects the relationship between innovative efforts and performance (Jermias 2007). One possible explanation might be that the CEO exercises better control of the resource allocation process if he or she is also chairman of the board. Peng et al. (2010) found the effect of interaction of CEO duality and organizational slack on organizational performance. However, this interaction effect is positive instead of negative. Moreover, Min-Hsien Chiang and Jia-Hui Lin (2007) found that CEO duality enhances productivity. CEO duality may well lead to a focus on outcome optimization or more generally, efficiency orientation. Taken together, these hints lead to the following hypothesis:

H3: CEO duality results in more efficiency orientation in the management control system.

The configuration of the TMT may affect its environmental scanning behavior (Shank et al. 1988; Cho 2011). Researchers had already found that a high functional diversity in the TMT supports an innovation orientation (Talke et al. 2011; Zahra and Wiklund 2010). TMT members participating actively in the collection of external information respective market information also contribute to an innovative orientation (Harmancioglu et al. 2010). The attention-based theory argues that “what decision makers do depends on where they focus their attention” (Barnett 2008, p. 606). Divisional TMT members are responsible for a specific business unit or division; therefore, they are likely to drive the market orientation of a company and increase the need for external information (Ocasio 1997). External information is also required to rationalize resource allocation decisions and new product development decisions (Langerak et al. 2007):

H4: Regarding management control, divisional TMT members relate to using more external information.

Menguc and Auh (2005) suggested more homogenous TMTs for strategy implementation. They argued that efficiency is critical for the strategy implementation process. Team members with similar information and interests and a symmetric distribution of information enjoy greater TMT decision-making effectiveness (Edmondson et al. 2003). For a given business unit or division, greater homogeneity is given when a specific TMT member is responsible for this division. These divisional members supposedly possess the greatest experience in their business unit. According to Naranjo-Gil and Hartmann (2006), professional TMTs need less support from their management accounting system because they are confident of the resource allocation decisions made by their lower-level peers. Divisional TMT members with a focus on their internal and operational processes also “tend to be more inclined toward improving the content of processes” (Naranjo-Gil and Hartmann 2006, p. 29). Therefore,

H5: Divisional TMT members relate to greater efficiency in management control systems.

However, with divisional TMT members possessing a deeper insight into resource allocation processes, they also seem likely to assign resources more directly. Divisional TMT members with their responsibility for a single business unit can be considered as a subgroup of the TMT. Barkema and Shvyrkov (2007) showed that subgroups in the TMT hamper communication:

H6: Divisional TMT members relate to less participation in the resource allocation process.

Cannella et al. (2008) showed that the effects of TMTs’ functional design depend on the geographic distance of TMT members from one another. One possible explanation is that TMT members are subject to groupthink processes to a greater extent when they are close to one another. Similar mechanisms may occur when some members of the TMT bear responsibility for a certain region; instead of being included in the TMT as part of a steering system, they are included as an interface to their region. Factionalism may enhance such identification processes when the regional TMT members feel more responsible for their dedicated region than for the company as a whole. Other effects

that multi-regional companies face may also hamper efficiency. Rivera and Milani (2011) detailed that multi-regional operations face potential currency exchange rate problems, specific budgets, or transfer price issues (Jacobs and Larkins 1992) that cannot be controlled by regional TMT members. Taken together,

H7: Regional TMT members relate to a less efficient orientation in the management control system.

2.3 Risk Taking as an Intervening Variable

The propensity for risk taking is “the perceived probability of receiving the rewards associated with success of a proposed situation, which is required by an individual before he will subject himself to the consequences associated with failure” (Brockhaus 1980, p. 513). Researchers studied risk taking in several different contexts. Papadakis and Barwise (2002) showed that risk taking significantly influences strategic decisions made. Carpenter et al. (2003) argued that risk taking should be considered as a variable associated with corporate government. According to their study, the experience and background of TMT members support risk-seeking behavior. Risk taking supports change (Shropshire and Hillman 2006), and change requires management control systems for adaptation (Lebas and Weigenstein 1986). Diversification strategies also lead to increased risk taking (Hoskisson et al. 1991). Firms taking more risks are also more strongly committed to learning (Wang 2008). That risk-taking firms are also strong opportunity recognizers (Tang et al. 2009) or are highly adaptive in their resource marshaling behavior (Warnock 2008) supports the notion that risk taking is an important intervening variable when studying relationships with management controls.

Some researchers found evidence that risk taking generally has a positive influence on corporate performance (Walls and Dyer 1996; Simsek 2007; Wang 2008), while Richard et al. (2004) found no evidence of a relationship. In a meta-analysis, Kürschner and Günther (2012) also found no evidence for a positive relationship between risk taking and corporate performance in the strategic planning context. However, this paper differs from the aforementioned studies in that it models risk taking not as an independent variable but as a moderating variable.

According to March and Zur Shapira (1987), managers believe that they can reduce risks using skills to control dangers. Managers facing high-risk environments or situations may attempt to modify the risk descriptions by either securing new information or adopting a different perspective (March and Zur Shapira 1987, p. 1410). The outcome in environments with low uncertainty is assumed to be relatively safe. Complex controls are not required, and simple adjustments are sufficient (Evans III et al. 1986). Therefore, expecting that the previously postulated hypotheses hold only in high-risk environments but not in low-risk environments seems reasonable. Furthermore, Miller (1987) showed that risk taking is related to the power structure of the firm.

Taken together, that risk taking has not been considered as an intervening variable in the relationship between corporate governance variables and management controls to date is remarkable. Thus, the author proposes the following:

P: Risk taking moderates the aforementioned hypotheses.

2.4 Control variables

Researchers found that studies on corporate governance characteristics should pay heed to certain influential variables that may otherwise lead to overestimated results if ignored. Environmental turbulence has been shown to be an important moderator in research on planning processes (Miller and Cardinal 1994; Andersen 2004). Boyd (1995) and Elsayed (2007) showed that environmental turbulence is also an important moderator when studying CEO duality.

Another important control often studied in applications of the upper echelon theory is the size of the TMT (Amason and Sapienza 1997; Cho and Hambrick 2006). Carpenter et al. (2004) clarified that the TMT size should be considered as a control variable. However, the boards of directors may exercise an equally strong influence on organizational characteristics. Therefore, this study also includes the size of the boards of directors as a control. Finally, probably, one of the strongest factors that shape control systems is firm size. Miller (1991) showed that firm size affects the relationship between organizational characteristics and outcome variables.

3 Method

3.1 Sample

To keep the results of this study as generalizable as possible and as comparable and as valid as possible at the same time, a cross-sectional design within the manufacturing industry is deemed appropriate. Several previous researchers of management control systems selected manufacturing firms as a study object (Simons 1987; Abernethy and Lillis 1995; Bisbe and Malagueno 2009). Two data sources were used in this study. First, a questionnaire that utilized the tailored design method by Dillman et al. (2009) was designed; after iterative pretesting of the questionnaire with three practicing accounting experts, some items were deleted because of continued criticism on the length of the questionnaire. The back cover of the questionnaire leaflet was intentionally left blank to avoid immediate annoyance. Following in initial informatory contact, the questionnaire was sent as a second contact. The third contact was a reminder included in an issue of the research institute's quarterly journal as a thank-you gift. The reminder was followed by a final distribution of the questionnaire to non-responders. All participants were told that they would receive the results of the study. At each company, two individuals were invited to participate in the study to avoid the single informant bias. However, only 9% of the participating companies agreed to follow this procedure. These replies were aggregated into a single reply by following a procedure recommend by Wagner et al. (2010). This data collection phase lasted approximately ten weeks. Out of the 497 contacted companies, 178 companies participated for a 36% response rate.

Second, given the shortened questionnaire, some variables were collected from publicly available data sources. Of the 178 participating companies, 54% published information about their leadership structure on their homepages, resulting in a final sample of 97 companies.

3.2 Measures

External information in management control was operationalized with two different measures reflecting different stages in the control process. First, external information appears to be essential in the forecasting process. Hilary and Hsu (2011) found that managers relying on successful past forecasts tend to be less accurate in the future. Kirchgässner and Müller (2006) pointed out that less open-minded forecasting managers may be reluctant to revise their forecasts on a regular basis. To avoid biases in forecasting, Flyvbjerg (2008) suggested constructing reference classes that can then be used to conduct a more rationalized forecast. An even more obvious alternative to overcoming optimism biases or advocacy biases was shown by Tyebjee (1987). He suggested consulting external advisors in the forecasting process. The scale developed from this short literature review is included in the Appendix. Second, external information in management control may also be utilized during the budgeting process. Spreiter (2010) showed that companies can engage in market-specific benchmarking, industry-specific benchmarking, or benchmarking irrespective of any industry or market. The scale developed for this study incorporates these levels and is included in the Appendix.

Resource allocation is commonly related to budgets and the budgeting process. Several measures were proposed to circumscribe efficiency in budgeting. One prominent measure used is budgetary slack (Otley 1978), which Fisher et al. (2002) linked to efficiency. Different scales were developed to measure slack in surveys. Onsi (1973) suggested four items for the evaluation of the attitude toward budgetary slack, which can be considered a good proxy for an ex-ante evaluation of budgetary slack. Moreover, Nohra and Gulati (1996) proposed an ex-post measure consisting of two items. Simons (1988) argued that goal tightness reduces budgetary slack and offers four items for measurement. Finally, Kenis (1979) offered a scale to measure goal tightness, of which items 1–3 and 5 were consolidated down to two questions in this study. A scale offered by Milani (1975) was used to evaluate budgetary participation. The scales used are included in the Appendix.

CEO duality is a dichotomous variable. TMT divisional members are measured as the ratio of those TMT members with a product or product group function description. TMT regional members represent the ratio of TMT members with a regional assignment. For ratio calculation, CEO and CFO functions were ignored from the formula and TMT size as denominator was reduced by two. A subdimension of the entrepreneurial orientation construct was used to evaluate risk taking. Covin and Slevin (1986) offered the items for the scale. The variable was median split to separately analyze low- and high-risk-taking firms.

The control variables, namely TMT size and board of directors size, are measured by their actual head count. Size is measured as the total number of employees. Environmental turbulence is measured using the method proposed by Miller and Friesen (1983).

3.3 Data Analysis Considerations

The six items of the Forecasting: External view scale reached a Cronbach's alpha of 0.64. After removing the first item of the scale, Cronbach's alpha increased to 0.69 and was deemed just acceptable. Benchmarked budgeting gained a Cronbach's alpha of 0.80. Principal factor analysis was conducted on the measures for efficiency orientation to validate the constructed scales. Table 1 lists the results of the analysis, which

Table 1 Rotated factor loadings of budget efficiency variables

	Attitude toward slack	Budgetary slack	Budget goal tightness	Uniqueness
Eigenvalues	1.45374	1.28109	1.83230	
ATS1	0.7417	-0.0276	-0.0846	0.4419
ATS2	0.7010	0.0518	0.0272	0.5052
ATS3	0.6997	-0.0487	-0.0736	0.5026
ATS4	0.1634	0.1389	-0.2837	0.8736
BSNG1	0.0417	0.5776	0.0118	0.6645
BSNG2	-0.1658	0.4741	-0.0878	0.7401
BGT1a	-0.0301	0.6872	0.0383	0.5254
BGT1b	0.0647	0.5060	0.1723	0.7101
BGT2a	-0.0795	0.0124	0.8334	0.2990
BGT2b	-0.0031	0.0360	0.8384	0.2957
BGT2c	-0.0039	0.1934	0.2963	0.8748

ATS1..4: Onsi (1973) attitude toward slack scale; BSNG1/2: Nohra and Gulati (1996) slack scale; BGT1a/b, 2a/c: Simons (1988) goal tightness scale; BGT2b: Kenis (1979) goal tightness scale

retrieved three factors, and shows that the slack scale of Nohra and Gulati (1996) and the slack-oriented questions of the goal tightness scale of Simon (1988) may add up to a common index. Furthermore, the results show that two items with low loadings and high uniqueness should be removed from the scales before analyzing the data. After removing one item from the Onsi (1973) attitude toward slack scale, Cronbach's alpha increased from 0.68 to 0.78. The final budgetary slack scale achieved a Cronbach's alpha of 0.64. According to several researchers (Simons 1988; van der Stede 2001; Auzair and Langfield-Smith 2005), the absolute minimum for Cronbach's alpha is 0.60. Considering that the scales used were applied in several other studies, accepting this low value seems justifiable. Finally, removing the last item from the budget goal tightness scale achieved a Cronbach's alpha of 0.84 for this scale. Budgetary participation also achieved a Cronbach's alpha of 0.63 and the risk-taking scale achieved a Cronbach's alpha of 0.69. After running the regression analyses, several tests for the final solutions were performed. One influential case needed to be removed from the regressions for the Forecasting: External view. Otherwise, Cook's d was well below 1. The regression solutions were tested for stability by including all possible independent variables in each regression. The beta coefficients deviated by 0.01 at most and, thus, proved stable. Multicollinearity was not an issue because the VIF never exceeds 1.10. The residuals did not deviate significantly from the normal distribution and did not correlate significantly with the regressor variables. However, for two regressions (attitude toward slack full sample; budgetary participation high risk sample), the residuals were significantly heteroscedastic. In these cases, a power transformation of budgetary participation and environmental turbulence in the case of budgetary participation and a power transformation of TMT size in the case of attitude toward slack was sufficient to achieve homoscedasticity. The regressions for attitude toward slack and budgetary participation were then rerun in all subsamples using the modified variables.

4 Results

Table 3 presents the results of the regression analysis. For each model, the author began with all focal and control variables and used stepwise regression to identify at least weakly significant coefficients. Stepwise regression has the disadvantage of overfitting the data. The author attempted to minimize the consequences of overfitting using two measures. First, the variables included are already well grounded in theory, while overfitting results primarily in situations in which regression analysis is used for data mining. Second, for each dependent variable, Table 2 contains the same independent variables across the sample and both subsamples, thus facilitating a comparison between the results for the full sample regressions and the risk-taking subsample regressions. Presenting all relevant coefficients also allows easier pattern recognition. However, the best model is the one containing only at least weakly significant coefficients. Therefore, Table 3 also contains information on the fully step-wised (dubbed *final*) regression models.

CEO duality ($\beta = -0.23; p = 0.022$), the percentage of divisional TMT members ($\beta = 0.25; p = 0.15$), and size of the organization ($\beta = 0.22; p = 0.033$) significantly explained the extent to which firms apply an external view in forecasting. The weakly significant contribution of the percentage of regional TMT members ($\beta = .19; p = .064$) may provide further explanation. The effect sizes of CEO duality and percentage of divisional TMT members are nearly equal but have opposite signs and may thus offset one another. CEO duality leads to significantly less external orientation in forecasting, while divisional TMT members seem to rationalize their forecast information with information that is more external. The same situation may be valid for regional TMT members; if present, they tend to acquire externally rationalized forecast information. Firm size proves to be a significant positive influence on the willingness to utilize external information when rationalizing forecasts. The overall model is significant and explains approximately 18% of the variance. The explained variance improves only when studying the high-risk-taking subsample. For the low-risk subsample, no variable yields any explanation for the observed utilization of external rationalizing in forecasting. These results already give some hints as to what to expect in the high-risk subsample; as for the full sample, CEO duality ($\beta = -.28; p = .028$), divisional TMT members ($\beta = .45; p < .001$), and firm size ($\beta = .32; p = .02$) significantly explain the application of an external viewpoint in forecasting. The discouraging effect of CEO duality is slightly stronger than that in the full sample. For high-risk-taking firms, divisional TMT members clearly apply an external view in forecasting. In addition, as for high-risk-taking firms, larger firms rationalize their forecasting data with external information to a greater extent. Whether or not a firm employs a regional structure in its TMT is of no importance for high-risk-taking firms. The final model explains about 38% in variance, which is very satisfactory. Thus, introducing risk taking in the relationships between TMT characteristics and the external view in forecasting sheds more light on the relationships, indicating that these findings support hypotheses 1 and 4.

Firms also apply rationalizing with external data when engaging in *benchmarked budgeting*. The significant coefficients and their signs are similar to those coefficients found in the external view in forecasting. For the full sample, CEO duality ($\beta = -0.23; p = 0.019$) and firm size ($\beta = 0.30; p = 0.003$) are significant predictors of firms' usage of benchmarked budgeting. The divisional TMT member ratio ($\beta = 0.18; p = 0.07$) remains a weakly significant predictor in the final model for the full sample, which explains a variance of 19%. The explained variance declines to 8% if

Table 2 Spearman rank order correlation matrix

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1 Risk Taking	8.71	2.98													
2 Forecasting Ext. View	17.48	5.25	-.06												
3 Benchmarked Budgeting	10.45	5.31	.13	.50***											
4 Attitude toward Slack	12.37	4.15	.10	.12	.23*										
5 Budgetary Slack	17.52	4.06	-.18 [†]	-.03	.01	.00									
6 Budget Goal Tightness	15.61	2.83	.00	-.22	.08	-.09	-.02								
7 Budgetary Participation	22.57	5.07	-.14	.03	-.09	-.12	-.03	.16							
8 Dual CEO	0.12	0.33	-.10	-.26*	-.23*	-.20 [†]	.06	.22*	.01						
9 TMT Divisional Members	0.30	0.38	-.04	.25*	.21*	.05	.18	.07	.02	.06					
10 TMT Regional Members	0.09	0.21	.07	.14	.01	.09	-.21 [†]	-.27*	.02	.00	-.27*				
11 TMT Size	5.71	2.52	.05	.16	.07	-.09	-.10	-.05	.13	.08	.20 [†]	.30**			
12 BoD Size	5.05	2.02	.24*	.09	.13	-.07	-.20 [†]	-.04	-.01	-.02	.29**	.01	.17		
13 Environmental Turbulence	34.60	5.12	.01	-.01	-.05	.17	.18	.10	.18 [†]	-.04	.08	-.01	-.11	.02	
14 Size	2457.85	4970.80	.31**	.22*	.33**	.05	-.22*	-.02	.01	.03	.23*	.14	.22*	.44***	.05

[†] p < 0.10; * p < 0.05; ** p < 0.01; *** p < 0.001

Table 3 Results of standardized regressions – comprehensive models

Variables	RT	Forecasting External View			Benchmarked Budgeting			Attitude Toward Budgetary Slack			Budgetary Slack			Budget Goal Tightness			Budgetary Participation			
		F	L	H	F	L	H	F	L	H	F	L	H	F	L	H	F	L	H	
Focal variables																				
1 Dual CEO		-.23*	-.20	-.29*	-.23*	-.22	-.27*							.21*	.28*	.10				
2 TMT Divisional Members		.25*	-.02	.50***	.19†	.05	.30*				-.20†	-.10	-.27†					-.08	-.34*	.13
3 TMT Regional Members		.19†	0.28†	.17				.19†	.16	.17	.17	.29†	.04	-.22*	-.39**	-.11				
Control variables																				
4 TMT Size								-.25*	-.43**	-.06								.27**	.41**	.12
5 BoD Size											.28**	.12	.41**							
6 Environmental Turbulence					-.11	-.33*	.07	.05	-.28†	.34*	-.21*	-.34*	-.08	.08	-.22	.42**	.19†	.08	.28†	
7 Size		.20*	.22	.31*	.30**	.17	.36**													
R ²		.179	.187	.408	.204	.181	.295	.084	.225	.144	.202	.229	.253	.117	.292	.206	.089	.227	.121	
Adjusted R ²		.139	.099	.350	.167	.094	.229	.054	.168	.088	.165	.150	.183	.087	.237	.152	.059	.172	.063	
F		4.53**	2.12†	7.06***	5.51***	2.09	4.49**	2.8*	3.96*	2.58†	5.51***	2.9*	3.64*	3.85**	5.36**	3.81*	3.00*	4.11*	2.11†	
N		88	42	46	91	43	48	95	45	50	92	44	48	91	43	48	92	44	48	

When stepwise further down to at least weakly significant variables:

Variables	1*, 2*, 3†	1*, 2***	1*, 2†	6†	1*, 2*, 7**	3†, 4*	4**, 6†	6*	2**, 5***	3†, 6*	2*, 5**	1†, 3*	1†, 3*	6**	4*, 6†	2*, 4*	6*	
Δ R ²	0		-.029	-.012	-.099	-.005	-.001	-.026	-.027	-.025	-.040	-.007	-.013	-.067	-.018	-.006	-.033	-.033
Δ Adjusted R ²	0		-.013	-.003	-.033	+.013	+.009	-.007	+.010	-.016	+.002	+.029	-.002	-.051	+.019	+.004	-.015	+.006
F	4.99**		8.99***	6.97***	3.99†	5.99**	4.24*	5.21**	6.38*	6.31***	5.03*	7.32**	5.19**	5.93**	11.13**	4.22*	5.28**	4.65*

† p < 0.10; * p < 0.05; ** p < 0.01; *** p < 0.001

F: full sample; L: low-risk-taking (RT) subsample; H: high-risk-taking subsample

benchmarked budgeting is studied only for the low-risk-taking sample. The only at least weakly significant predictor in the final model is the control variable environmental turbulence ($\beta = -0.29; p = 0.054$); the negative coefficient suggests that the more turbulent low-risk-taking firms perceive their environment, the less they engage in benchmarked budgeting. However, with the predictor being weakly significant, conclusions should be carefully drawn. However, the high-risk-taking subsample makes things clearer again. Again, CEO duality ($\beta = -0.26; p = 0.047$) is a significant predictor for high-risk-taking firms that utilize less external data for their budgeting process. However, divisional TMT members ($\beta = 0.31; p = 0.019$) significantly offset this effect as well. Firm size ($\beta = 0.35; p = 0.008$) proves to be a highly significant predictor of the utilization of benchmarks in budgeting once again. Overall, the final model for the high-risk-taking subsample explains 29% of the observed variance in benchmarked budgeting. Again, introducing risk taking in the model helps in clarifying the relationship between TMT characteristics and a specific management control. Hypothesis 1 is supported, while these specific results weakly support hypothesis 4.

Regional TMT members ($\beta = 0.19; p = 0.067$) influence the *attitude toward budgetary slack*. However, the coefficient is weakly significant. Furthermore, the effect is at least weakly significant for the full sample, which may indicate that the effect size is too small for the sample sizes involved. Because the change in the coefficient is not small for all sample sizes, a small effect that is not moderated by risk taking is likely to exist. The sample sizes in the subsamples are too small to let this effect become significant. However, for the full sample, the effect of regional TMT members becomes significantly offset by the size of the TMT team ($\beta = -0.26; p = 0.012$). The final model explains approximately 8% of the variance with a significant *F*-value. The explained variance increases to approximately 20% if only low-risk-taking enterprises are considered; however, neither CEO duality nor TMT membership type contributes to the attitude toward budgetary slack. The effect of TMT size ($\beta = -0.41; p = 0.006$) negatively influences the attitude toward budgetary slack, as shown by the highly significant coefficient. Larger TMTs allow for more efficient control of budgeting processes. Firms in more turbulent environments ($\beta = -0.28; p = 0.053$) have a rejecting attitude toward budgetary slack. That the beta coefficient is weakly significant, together with the following remarks on the high-risk-taking sample and the near zero coefficient in the full sample, makes clear that risk taking may be able to shed light on that relationship. The final model for the low-risk-taking subsample explains 20% of the variance and has a highly significant *F*-value. For the high-risk-taking subsample, environmental turbulence ($\beta = 0.34; p = 0.015$) is also the only significant predictor for a positive attitude toward budgetary slack. The corresponding *F*-value remains significant.

Corresponding to the results obtained from the evaluation of attitude toward budgetary slack, *budgetary slack* shows positive beta coefficients for regional TMT members. However, the effect is only weakly significant for low-risk-taking firms ($\beta = 0.26; p = 0.071$); no significant effects can be found in the full sample or the high-risk-taking subsample. In contrast, the coefficient for divisional TMT members ($\beta = -0.25; p = 0.017$) is significantly negative for the final model in the full sample. Furthermore, for the full sample, a greater number of board of directors ($\beta = 0.30; p = 0.003$) results in a significant increase in budgetary slack, which offsets the effect of divisional TMT members to greater extent. However, turbulent environments ($\beta = -0.21; p = 0.033$) seem to reduce the slack. The final model for the full sample accounts for a variance of 18% and has a high *F*-value. The explained variance in the

low-risk-taking subsample changes minimally to approximately 19% after the introduction of risk taking. The influences of divisional TMT members and the size of the board of directors become non-significant for the low-risk-taking subsample, while the influence of regional TMT members ($\beta = 0.26; p = 0.071$) turns weakly significant. In low-risk-taking firms, environmental turbulence ($\beta = -0.34; p = 0.019$) leads to less budgetary slack, as shown by the larger beta coefficient. The final model for low-risk-taking firms' budgetary participation has a significant F -value. For the high-risk-taking subsample, the size of board of directors ($\beta = 0.43; p = 0.002$) again offsets the slack-reducing effect of divisional TMT members ($\beta = -0.30; p = 0.026$). The high-risk-taking subsample exhibits an explained variance of 25% and a highly significant F -value.

Interestingly, regional TMT member ratio ($\beta = -0.18; p = 0.072$) leads to less *budgetary goal tightness*, as shown by a weakly significant negative coefficient. The effect is offset by CEO duality ($\beta = 0.23; p = 0.023$), as shown by the significant positive coefficient. However, the explained variance is comparatively low at 10% but still offers a highly significant F -value. When conducting the same analysis in the low-risk-taking subsample, the explained variance increases to 23%. The contribution of CEO duality ($\beta = 0.39; p = 0.007$) to tight budgets increase approximately 50% and stays significant, while regional TMT members' ($\beta = -0.25; p = 0.078$) influence also becomes stronger with a larger but still only weakly significant negative coefficient. The final model for the low-risk-taking subsample comes with a highly significant F -value. However, for the high-risk-taking subsample, these effects subside. The single highly significant coefficient that explains budgetary goal tightness is environmental turbulence ($\beta = 0.45; p = 0.001$), thereby contributing to an explained variance of 20% in the final model and a highly significant F -value. The previous results on attitude toward budgetary slack and budgetary slack and goal tightness together lend partial support to hypotheses 3 and 5. The results are mixed for hypothesis 7; while the attitude toward budgetary slack (weakly) rejects the hypothesis, budgetary slack itself partially supports it only in the low-risk subsample.

For *budgetary participation*, the coefficients for the focal variables are non-significant in the full sample. TMT size ($\beta = 0.26; p = 0.012$) contributes significantly to budgetary participation. The coefficient for environmental turbulence ($\beta = 0.17; p = 0.092$) is weakly significant. The final model in the full sample accounted for approximately 8% of the total variance with a significant F -value. For the low-risk-taking subsample, a significant negative influence of divisional TMT members ($\beta = -0.35; p = 0.015$) on budgetary participation was found. The significant positive contribution of the TMT size offsets this influence. Introducing risk taking as a constraint raised the explained variance to 19% and to a highly significant F -value. For the high-risk-taking subsample, only environmental turbulence ($\beta = 0.30; p = 0.036$) possesses a significant explanatory power. The explained variance declines to 9%. These results partially support hypothesis 6 but do not support hypothesis 2.

5 Discussion

CEO duality causes firms to use less external information for forecasting and the budgeting process. These findings are in line with the research results of Gul and Leung (2004), Huafang and Jianguo (2007), and Cerbioni and Parbonetti (2007), although these researchers examined financial disclosure instead of management control systems. On the basis of these results, one may propose that observable disclosure characteristics

may proxy for unobservable characteristics of the control system. These results also show that dual CEOs use their power to influence the board or financial reporting, several management controls, and the potential consequences stemming from these control systems.

Interestingly, the aforementioned results hold only for the high-risk-taking subsample. The relationships are not significant for low-risk-taking firms. The beta coefficient for the full sample is for both measures inside the range given by the coefficients for the risk-taking subsamples. Again, these findings point to the proposition that risk taking may moderate these relationships. However, although the coefficients are not significant, they bear the correct sign and are equally strong. The relationships thus examined may well become significant for low-risk-taking firms in a larger sample.

Another control influenced by dual CEOs is the budget goal-setting process. Dual CEOs use their power to set tighter budget goals and thus facilitate higher efficiency in the resource allocation process. Note that this result does not hold for the high-risk-taking subsample. Contrary to the external information results, the beta coefficient for the high-risk-taking subsample is much lower than that for the full sample or the low-risk-taking subsample. This relationship is probably significantly weaker even with a larger sample size. However, even if not significant, the coefficient is greater than zero with a positive sign; therefore, it may become significant in a larger sample regardless of the relevance.

Divisional TMT members may mitigate the negative effects of CEO duality on the use of external information. The larger the percentage of divisional TMT members, the more rational the approach to forecasting or budgeting. These findings are consistent with the predictions from the attention-based theory (Barnett 2008). Divisional TMT members also focus their attention on specific products. Rather than being driven by functional information, they are more interested in product-specific information and thus are more likely to utilize external information sources.

The results obtained after controlling the risk-taking orientation are significant. The effects of divisional TMT members vanish in the low-risk-taking subsample for both external information measures. The coefficients are not only non-significant but also very close to zero. A larger sample may not reveal any significant result. In contrast, high-risk-taking firms exhibit strong relationships between divisional TMT members and external information to rationalize forecasts and budgets. Considering this effect, obviously only a weakly significant effect with the benchmarked budgeting measure for the full sample was found.

Divisional TMT members bring about more efficient orientation in the resource allocation system. However, the effect is visible only with the slack measure and not in low-risk-taking firms. While the attitude toward the slack measure may be understood as an expression of corporate culture or values, the slack measure is an expression of executed control. Thus, the divisional TMT members may possess more knowledge regarding their business area and can control the budgets more closely, which is consistent with the findings of Naranjo-Gil and Hartmann (2006). This phenomenon seems particularly true for firms undertaking high risks. In this light, the results for budgetary participation are of great interest: the proposed relationship can only be found in the low-risk-taking subsample. Within this subsample, an interaction effect may exist between divisional TMT members and budgetary slack (or participation) on budgetary participation (or slack).

Regional TMT members also drive the utilization of external information in management control systems. However, the effect is weakly significantly for

forecasting in the full sample. This finding alone does not provide any conclusion. However, when studying only the low-risk-taking group, the beta coefficient increases but remains weakly significant. Therefore, that regional TMT members—given their market-oriented function—facilitate the use of external information, particularly in low-risk-taking firms, may be proposed. This proposition remains subject to further testing in a larger sample.

Further findings address the efficiency orientation of the management control system. The weakly significant findings for attitude toward budgetary slack and budgetary slack in low-risk-taking firms allow for conclusions when viewed in light of the findings for goal tightness. The signs of the coefficients of the latter measure are opposite. Although the findings are not significant in all risk-taking subgroups, concluding that regional TMT members at low-risk-taking enterprises negatively influence the efficiency orientation seems justified, which is consistent with the arguments provided by Jacobs and Larkins (1992), Cannella et al. (2008), and Rivera and Milani (2011). These results do not hold for high-risk-taking firms. A possible explanation may be that these firms are forced to better control their regional endeavors.

Table 3 presents 21 coefficients in three samples; each of these is obtained with one or more coefficients per subsample that are at least weakly significant. Note that for 90% of these variables, the beta coefficient for the full sample equals the median value of the three coefficients for the full, low-risk-taking, and high-risk-taking subsamples. Although several of these coefficients are not significant, this finding may indicate a moderating role of the risk-taking orientation of firms. Further, for all dependent variables, the explained variance obtained from one of the subsamples was the largest after separately analyzing the low- and high-risk-taking subsamples. At a general level, the maximum variance ranges between 19% and 38%; these values are consistent with and even partially higher than those obtained in other studies (Miller and Friesen 1982; Abernethy and Brownell 1997; Chenhall 2005).

Once again, the findings also confirm the predictions from contingency theory; firms adopt their management control systems on the basis of not only external factors but also internal factors. Divisional TMT members' utilization of external information in the forecasting or budgeting process also lends support to the attention-based view of management control.

6 Limits

Some limitations may inhibit the generalizability of this study. Small sample sizes, particularly for the findings on regional TMT members, allow only cautious inferences. Although other scholars (Ucbasaran et al. 2003; Naranjo-Gil and Hartmann 2006) also accepted weak significances, a replication study seems attractive to improve the reliability of the results. Furthermore, this study contains 18 final regression models with 15 total regression coefficients for the focal variables and 17 coefficients for the control variables. At a 90% significance level, one out of the ten weakly significant findings may be due to chance. For the focal variables, the consistency between the findings and the theoretical background may be put forward as arguments. As for the control variables, no potential wrong conclusions were drawn in this study.

In addition to another independent variable, this study examined the relationship between divisional and regional TMT members in the management control system setup. This TMT configuration may very well reflect the organization's general

structure, which is not considered an independent variable because of complexity and comparability. The results also do not allow any inference on causality because temporal processes were not controlled. However, a likely sound assumption is that the structure of the TMT or organization shapes the management control system and not vice versa. Survey data are also always subject to certain informant biases. This study attempted to minimize these biases by writing to an organization member who is as high as possible in the hierarchy.

7 Conclusion

Further research is required to evaluate the implications of CEO duality on organizational performance. Given the nature of performance antecedents, potential links are likely to be small and would require large sample studies. This study showed that dual CEOs use their power to limit a rational approach to forecasting and budgeting. In contrast, they facilitate efficiency orientation by setting tighter goals. Divisional TMT members also facilitate efficiency orientation. However, when present on the TMT, high-risk-taking firms tend to use more external information on forecasting and budgeting. In low-risk-taking firms, divisional TMT members inhibit budgetary participation. The presence of regional TMT members in low-risk-taking firms probably requires more of the control system's attention; all efficiency measures support the hypothesis that the presence of regional TMT members is related to less efficiency orientation.

Another important finding of this study is the strong influence of the risk-taking dimension. The moderating influence of this variable potentially explains why some predicted relationships do not present themselves as strongly as expected. Researchers should pay attention to this moderator.

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Appendix

The survey was conducted in German. The scales presented here are translated. The scales taken unchanged from the literature are omitted.

Forecasting External View Scale

- When forecasting, my firm...
- ... relies on internal experiences from the past 1-7
- ... consults external, similar cases 1-7
- ... documents similar cases in writing 1-7
- ... creates a probability distribution for the external cases 1-7
- ... regularly adjusts the prognoses to changed external conditions 1-7
- ... asks an uninvolved person to review the prognoses 1-7

Benchmarked Budgeting Scale

Please state the extent to which you agree with the following statements on external benchmarks in budgeting:

When we build our budget, we attempt to align our budget with other companies that produce different products but possess similar supply chains.

- When we build our budget, we attempt to align our budget with other companies that serve similar markets. 1-7
- When we build our budget, we attempt to align our budget with other companies that produce similar products but for other markets. 1-7
- When we build our budget for single functional areas or processes, we attempt to align our budget with other companies that are supposed to be the best, even if they belong to our industry. 1-7

Attitude toward Slack Scale

Please state the extent to which you agree with the following statements:

- To protect himself, a manager submits a budget that can safely be attained. 1-7
- Some managers set two levels of standards: one between themselves and their team members and the other between themselves and their superiors. 1-7
- In good business times, superiors accept some level of slack in a budget. 1-7

Budgetary Slack Scale (reverse coded)

Please state the extent to which you agree with the following statements:

- How seriously would your company be affected if the people working at your company spent 10% of their time on other projects because of an uncontrollable development? 1-7
- How seriously would your company be affected if your budget was suddenly reduced by 10%? 1-7
- Our goals can only be achieved if we precisely meet our budget goals. 1-7
- We can only meet our budget goals if operating processes are free of errors, defects, or redundancy. 1-7

Budget Goal Tightness Scale

Budget goals in our firm..

- | | | |
|---|-----|--------------------------------------|
| ... are set too loosely | 1-7 | ... are set rather tightly |
| ... can be achieved rather easily | 1-7 | ... can be achieved only with effort |
| ...are set as not very accurate standards | 1-7 | ... are set as accurate standards |

Management Control, Entrepreneurial Orientation, and Moderating Influence of Participation

Sandro Kürschner

Abstract Although the performance relevance of entrepreneurial orientation is undisputed, few studies have examined how management control systems are related to this orientation. The concepts of control or entrepreneurial orientation vary significantly between these studies. This study adapts management control as a package framework and considers individual subdimensions of entrepreneurial orientation. The effect of management controls depends on the effectiveness of employee motivation to follow the impulses given by these controls. This study also shows how control effects can be increased by allowing lower-level managers to participate in the resource allocation process and contributes to the ongoing research on organizational slack. Empirical data from 178 companies were used to answer the research questions.

Keywords Management Control Systems · Entrepreneurial Orientation · Budgetary Participation · Slack · Non-Financial Measures

S. Kürschner (✉)

University of Zurich, IBW – Department of Business Administration

Plattenstrasse 14, 8032 Zurich, Switzerland, Email: sandro.kuerschner@business.uzh.ch

1 Introduction

The large body of literature on corporate entrepreneurship shows that for organizations to survive and grow, innovation is not the only relevant success factor. Instead, innovators are initially required to take significant risks when first developing and promoting their innovations. Innovators should also move quickly to ensure that a competitor does not already occupy their new product–market combination (Miller 1983; Covin and Slevin 1991). Corporate entrepreneurship is considered to be a firm-level phenomenon and an organizational outcome because it more or less represents new entry. To achieve corporate entrepreneurship, firms should be entrepreneurially oriented (Lumpkin and Dess 1996).

During the past 25 years, a significant volume of empirical research on entrepreneurial orientation has been published, but few studies have investigated how management controls may help a firm in becoming entrepreneurially oriented. Furthermore, of these papers, most scholars studied the relationship between entrepreneurial orientation and individual controls, while an extremely small number of studies examined more than one control. This finding is troubling because according to Otley (1980) and Malmi and Brown (2008), management accounting researchers have referred to the study of management controls as a package for decades. Malmi and Brown (2008) argued that controls do not operate independently from one another because new controls may influence other controls; therefore, a major theoretical question is how management control systems should be designed to achieve the desired outcomes.

Miller and Friesen (1982) studied conservative and entrepreneurial firms for their difference with respect to environmental scanning activity and cost or profit controls. In this initial study, they found no difference between conservative and entrepreneurial firms in the use of scanning or controls. However, when Simons (1987) compared prospector firms and defender firms, he found strong differences in their usage of budget controls, cost controls, and reward systems. Barringer and Bluedorn (1999) simultaneously considered strategic and financial controls but could not find the relationship between financial controls and entrepreneurial orientation.

These contradictory findings may be explained through different measures for corporate entrepreneurship and strongly differing measurement methods for management control systems. Simons (1987) is the only study to date that considered a complete accounting layer of the management control package. However, this study is not truly comparable because the applied measure for entrepreneurial orientation does not fit within that stream of literature. One more reason may explain these different findings. Until now, not a single study has considered the potential moderating effect of budgetary participation on the relationship between management control systems and entrepreneurial orientation. This finding is surprising because controls that are intended to influence employee behavior should obviously consider the active involvement of these employees in the goal-setting process. Involvement ensures a higher commitment to agreed-on targets and a more business-requirements-oriented planning process. Thus, assuming that the effect of management controls on the entrepreneurial orientation is intensified by combining these controls with budgetary participation seems reasonable. Whether this assumption holds has not been previously researched.

This study sets out to bridge this gap. Furthermore, it contributes to the stream of research on management controls and entrepreneurial orientation by focusing on the subdimensions instead of considering the full construct. Hughes and Morgan (2007) and Covin and Wales (2012) provided several arguments for considering entrepreneurial orientation as a construct without strictly co-varying subdimensions; thus, a lump examination is insufficient. Therefore, the research question can be formulated as follows:

RQ: Which management controls show significant relationships with the subdimensions of entrepreneurial orientation when considered as a package? Do certain elements require more attention than others?

To answer this question, this study employs a combination of hypothesis testing methods and traces of explorative analysis methods. Hypothesis testing is used after a careful review of the related literature on controls and elements of entrepreneurial orientation. The management controls thus identified are initially tested as a package. Traces of explorative methods are then used to eliminate the controls that do not contribute to the considered subdimension of entrepreneurial orientation.

The rest of this paper is organized as follows. Section 2 begins with a short presentation of the main concepts of this paper, followed by the development of the hypotheses. Section 3 explains the sampling, measurement, and data analysis processes. Section 4 presents the statistical results of the empirical study. Section 5 presents the results for the individual hypotheses. The paper ends with a short discussion on the limitations of this study and presents the conclusions.

2 Development of Model

2.1 Theoretical Background

Several frameworks have been proposed for empirical studies on management control. The introduction of management control systems in academic research is usually traced back to Anthony (1965), who distinguished between strategic control, management control, and operational control (later renamed task control (Anthony and Govindarajan 2007)). Simons (1995) developed the levers of a control framework which notes that management controls are not merely accounting controls. By abstracting to belief systems, boundary systems, diagnostic control, and interactive control, Simons (1995) categorized management control not along an instrument-oriented dimension but along a goal-oriented view. However, other researchers stuck to the instrument-oriented view. Otley (1999) and Ferreira and Otley (2009) proposed a starting control framework that also considered structural and strategic elements as management control systems. In 1985, Merchant began to develop a different understanding of management control systems; this was later evolved into the Merchant and van der Stede (2003, 2012) textbook. In their framework, accounting controls are a subset of result control, which is supplemented by action control, personnel control, and cultural control. The most recent approach, which also sums up all previous approaches, is the Malmi and Brown (2008) framework. According to this framework, management control can be conceptualized in three different layers: cultural control, accounting control, and

administrative control. The accounting control layer is split into planning, cybernetic, and reward control. Because their approach is the most recent summary of previous approaches and the most intuitive one, their accounting layer forms the framework for guiding the research in this article.

Entrepreneurship may be studied with respect to an individual at the subject level in a truly entrepreneurial or small business context. In contrast, organizations may also exhibit entrepreneurial behavior, and entrepreneurship can be seen as an organizational characteristic (Covin and Slevin 1986). Miller (1983) treated entrepreneurship as a multidimensional product with respect to the following: the innovativeness for new product–market combinations or technological renewals, the risk taking shown in firms' actions, and the proactiveness present in firms' pioneering behavior. Lumpkin and Dess (1996) added autonomy in decision making and competitive aggressiveness to these dimensions. The effect of entrepreneurial orientation on firm performance has been studied numerous times. A meta-analysis by Rauch et al. (2009) found an overall positive and significant relationship from the size effect of $r = 0.242$. Many studies treated entrepreneurial orientation as a unidimensional higher-order construct. However, George and Marino (2011) argued that under such a research design, important information on how the individual subdimensions of entrepreneurial orientation are influenced by some antecedents becomes hidden. Covin and Wales (2012) supported this line of argument and presented several alternatives for the measurement of entrepreneurial orientation. Thus, the present study strives to contribute to this research stream with information at the subdimensional level.

2.2 Development of Hypotheses

Whether planning quality improves entrepreneurial orientation remains difficult to infer from previous studies. Entrepreneurial spirits are often subject to optimism biases (Meza and Southey 1996; Ucbasaran et al. 2010), which may result in overconfidence. Rational planning approaches may mitigate the effects of overconfidence on entrepreneurial activities (Trevelyan 2008). However, such approaches may also lead to undesired results in that rationality may hamper proactiveness (Cassar 2010). Rationality also includes benchmarking with competitors, as proposed in the beyond budgeting concept (Hope and Fraser 2003). Schäffer and Zyder (2005) pointed to potential inhibitors in this control element; benchmarking may lead to risk-averse, shortsighted follower behavior instead of proactive behavior. Although some researchers provided beneficial findings for rational planning approaches to entrepreneurial behavior (Ross 1987; Spatig 2007), others concluded that rational planning approaches are not a prerequisite for venture performance (Honig and Samuelsson 2012). When the focus of the planning process is not limited to current product–market combinations, new opportunities may be recognized. Kemelgor (2002) and Tang et al. (2009) already showed that opportunity recognition in turn leads to entrepreneurial orientation. Simsek et al. (2009) suggested setting up an entrepreneurially alert information system. Droge, Calantone, and Harmancioglu (2008) and Kreiser et al. (2010) also showed that the proactiveness of the entrepreneurial subdimension is related to opportunity recognition and market intelligence. Opportunity recognition is related to environmental scanning behavior. McEwen (2008) suggested that entrepreneurial organizations learn from their environment by scanning it regularly. In fact, Li, Tse, and Gu (2006) showed that the intensity of environmental scanning is

directly related to the entrepreneurial orientation construct. Although this information-seeking behavior may vary with the studied cultural contexts (Stewart, May, and Kalia 2008), it seems to be an important antecedent of entrepreneurial orientation. Busenitz (1996) also found that entrepreneurs are more alert than managers. However, until now, it is unclear whether this scanning behavior is reflected in the management controls employed. Furthermore, these past findings do not clarify which subdimension of the entrepreneurial orientation construct contributes to this relationship. Few hints appear contradictory at first sight and do not lead to any conclusion apart from the suggestion that proactiveness seems to be related to the entrepreneurial orientation construct (Droge, Calantone, and Harmancioglu 2008; Cassar 2010; Kreiser et al. 2010). However, most studies expected positive effects on proactiveness. Competitive aggressiveness as a subdimension of entrepreneurial orientation is strongly related to proactiveness. Therefore,

H1: External (more rational) information will be positively linked to proactiveness and competitive aggressiveness.

The accounting layer of the MCS-as-a-package framework considers as a second component budgets and the budgeting process. Slack as an attribute of budgets received some attention from several researchers. Singh (1986) introduced slack in the research on organizational decision making without considering other entrepreneurial subdimensions. According to his studies, slack can lead to more risk taking depending on the type of slack involved. Martinez, and Artz (2006) showed that available slack acts as an incentive for taking more risks. In the strategic context, Moses (1992) showed that the availability of slack leads to a riskier price penetration strategy. In contrast, Bromiley (1991) found that risk taking is in fact driven by a lack of slack, which is most often related to low performance. He concluded that slack might reduce risk taking. Panzano and Billings (1994) supported this conclusion and found that slack was negatively related to objective risk-taking measures.

Coombes (2008) introduced contingency criteria into slack research and found that the board must remain active for slack to allow any entrepreneurial activity. Slack ensures access to resources, which is also considered important for entrepreneurial orientation (Sciascia, Naldi, and Hunter 2006). Simsek, Veiga, and Lubatkin (2007) circumscribed access to resources as discretionary slack and showed that slack positively contributes to entrepreneurial orientation. However, controversial findings exist. Bradley, Wiklund, and Shepherd (2011) found that slack exhibits only negative effects on entrepreneurial behavior. They argued that slack leads to exploitation of current resources rather than exploration of new resources. Chen (2007) presented another point of view and called for a differentiated study of the corporate reaction to slack. According to his research, slack inhibits the optimization of internal processes but allows for the exploitation of new opportunities. Nohria and Gulati (1997) and Nohria and Gulati (1997) probably fueled such findings and empirically showed an inverse U-shaped relationship between slack and innovativeness in multinational companies. Morris et al. (2006) arrived at the same conclusion and confirmed empirically that organizations with an intermediate level of slack exhibited a higher level of entrepreneurship. Geiger and Cashen (2002) presented a U-shaped relationship for both absorbed and unabsorbed slack with innovation. Heng and Ding (2010) supported the notion that slack can contribute to innovativeness regardless of whether it

is absorbed or unabsorbed. Some researchers challenged the U-shaped relationship between slack and innovativeness. Greve (2003) showed that high levels of slack increased the intensity of R&D expenditures. Nystrom, Ramamurthy, and Wilson (2002) presented a positive relationship between slack and innovativeness. However, when approaching this research problem from a different angle, other conclusions are drawn. Mellahi and Wilkinson (2010) showed that a reduction in slack following downsizing temporarily reduces innovation output.

Finally, researchers argue that slack allows proactive behavior in markets. Cheng and Kesner (1997) pointed out that allocation of slack may either promote or inhibit responses to environmental changes. Resources allocated to external activities increased responses, while resources allocated to internal efficiency projects decreased environmental responses. Similarly, Ferrier (2001) pointed out that slack allows more pricing attacks and thus more competitive aggressiveness.

Numerous scholars support the hypothesis that a positive relationship exists between slack and all subdimensions of entrepreneurial orientation. Thus,

H2a: Budgetary slack is positively related to all subdimensions of entrepreneurial orientation.

H2b: Budgetary slack has a U-shaped relationship with all subdimensions of entrepreneurial orientation.

Apart from budgets, hybrid financial measurement systems form another component of the cybernetic control section in the management-control-as-a-package framework. Hybrid financial measurement systems consist of both financial and non-financial performance indicators. Non-financial performance indicators were shown to correlate with entrepreneurship as such (Mohamed et al. 2009); however, other researchers claimed that entrepreneurial companies and conservative types use non-financial measures (Hakola 2010). Ittner, Larcker, and Rajan (1997) analytically showed that prospector-type firms place more weight on non-financial measures than other firm types. Innovation requires organizational learning and knowledge conservation, and learning capabilities enable organizations to develop knowledge. Kaplan and Norton (1992, 1996) claimed that learning leads to innovation. Non-financial performance measures support learning in organizations (Dossi and Patelli 2010), build up of learning capabilities (Ma Prieto and Revilla 2006), and conservation of knowledge (Vaivio 2004). Thus, linking non-financial measures to innovativeness by Verbeeten and Boons (2009) is a logical conclusion.

Kaplan and Norton (1992, 1996) introduced the balanced scorecard into the academic and professional literature, which was developed to shift attention on more than only financial and thus retrospective measures. In addition to traditional financial measures, the balanced scorecard also considers measures of customer orientation, human resources, and internal processes. Multiple scholars linked customer orientation to entrepreneurial properties. Hakala and Kohtamäki (2010) showed a positive relationship between customer orientation and entrepreneurial orientation. As clarified by studies by several scholars, this relationship is centered on the innovativeness subdimension of corporate entrepreneurship (Matsuo 2006; Akman and Yilmaz 2008; Grinstein 2008; Laforet 2009; Grawe, Haozhe Chen, and Daugherty 2009). However, opposing findings exist. Kaya (2008) showed an empirical setting whereby customer

orientation relates negatively to three subdimensions of entrepreneurial orientation, namely risk taking, proactiveness, and innovativeness.

Human resource measures were also linked to corporate entrepreneurship or innovation. Haar and White (2013) linked employee retention measures to corporate entrepreneurship. These measures are prerequisites for so-called high-performance human resource practices, which are in turn linked to innovation (Zhang, Wan, and Jia 2008) or entrepreneurship (Morris and Jones 1993; Zhang and Jia 2010).

Thus, taking everything together results in the following hypothesis:

H3: Non-financial performance measures in internal reporting are positively linked to corporate entrepreneurship.

Non-financial measures may also be used directly in bonus contracts to determine rewards and compensation (Ittner, Larcker, and Rajan 1997). Widener (2006) suggested that using non-financial performance measures in compensation contracts is an indicator of greater reliance on human capital factors in companies. Human capital appraisal is another prerequisite for innovativeness. Schiehl and Bellavance (2009) showed that the inclusion of non-financial measures in the CEO compensation plan leads to higher organizational growth. Importantly, note the difference between using non-financial measures for organizational control and incentive purposes. Thus, a hypothesis with respect to measurement for compensation purposes is as follows:

H4: Non-financial performance measures in compensation contracts will be positively linked to corporate entrepreneurship.

2.3 Moderating Influence of Participation

The aforementioned management controls are suitable for providing managers and their teams with “perceptions of control over the work environment and perceptions of self-efficacy or competence” (Menon 2001) given a higher degree of information and flexibility. These controls are suited to creating learning situations that positively influence an employee’s behavior (Dewettinck and Buyens 2006). More information also leads to higher perceived competence, better-informed decisions, and more possible attributions, which in turn are significantly related to measures of intrinsic motivation (Arnold 1985). The opportunity to work with these controls, information received from these controls, and opportunities generated by these controls (slack, for example) are forms of empowerment (Conger and Kanungo 1988). Many scholars showed that empowerment is significantly related to organizational commitment (Howard and Foster 1999; Krishna 2007; Baek-Kyoo Joo and Ji Hyun Shim 2010; Dehkordi et al. 2011; Kazlauskaite, Buciuuniene, and Turauskas 2012).

Commitment is also achieved by yet another management control. Conger and Kanungo (1988) suggested that the first step to empowerment is participative management. In a seminal experiment, Cooper and Woods (1974) showed that participation in structured decisions leads to greater commitment to carry out the tested decisions. These experimental findings were confirmed in several other studies. Lines (2004) showed that participation in change processes exhibited a strong positive relationship with organizational commitment and a strong negative relationship with

resistance against change. Meyer and Allen (1997) decomposed organizational commitment into the three subcomponents of affective commitment, continuance commitment, and normative commitment. Direct participation in decisions leads to affective commitment (Torka, Schyns, and Looise 2010). Specifically, budget participation exerts informational effects, which lead to the goal commitment effect (Chong and Chong 2002; Chong and Johnson 2007). Nouri and Parker (1998) and Nor Yahya, Nik Ahmad, and Hamid Fatima (2008) also demonstrated high organizational commitment as a consequence of budgetary participation.

Budgetary participation also moderates relationships between various leadership styles and work outcome (Kyi and Parker 2008). The influence of slack or budgetary tightness on managerial performance is also moderated by budgetary participation (Lau and Buckland 2000). According to Lau and Buckland (2001), variances in the observed relationship could be explained by trust. Leach-Lopez, Stammerjohan, and McNair (2007) challenged this assumption by suggesting instead that the information and communication aspect of budgetary participation mediates its positive effect on organizational performance. Scholars suggested other potential moderators for the positive effect of budgetary participation on performance, i.e., instrumentality of the budget (Aranya 1990) or the degree of agreement on evaluation criteria for goal achievement (Dunk 1990).

This short discussion demonstrates that many points of contact or even intersections exist between the management controls mentioned in the first section and budgetary participation. The participation of subordinates in budgeting strongly influences the degree of job involvement and commitment to organizational goals. Assuming that participation thus moderates the relationship between the aforementioned controls and the subdimensions of entrepreneurial orientation appears reasonable, the following hypothesis can be put forth:

H5: Budgetary participation moderates the relationship between management control systems and subdimensions of entrepreneurial orientation.

2.4 Control Variables

Scholars found that studies on management control systems or entrepreneurial orientation should pay heed to some influential variables, which may otherwise lead to overestimated results if ignored. Environmental turbulence was shown to be an important moderator in research on planning processes (Miller and Cardinal 1994; Andersen 2004).

Hendricks et al. (2012) showed that the adoption of a balanced scorecard was much more likely in larger firms. Similarly, Snell (1992) demonstrated a positive relationship between firm size and the likelihood of executive use of human resource management control systems. The negative influence of family involvement on the use of certain key performance indicators is also moderated by firm size (Speckbacher and Wentges 2012). Firm size is also a predictor for the use of intelligence systems by companies (Mario Franco, Andre Magrinho, and Joaquim Ramos Silva 2011). With respect to entrepreneurial orientation, size and other factors affect the entrepreneurial orientation of a company (Xueming Luo, Lianxi Zhou, and Liu 2005). Yordanova (2011) confirmed that smaller firms achieve less corporate entrepreneurship. However, other researchers found no direct (Wolff and Pett 2006) or moderating (Heyde Fernandes and

dos Santos 2008) influence of firm size on entrepreneurial attributes. Size influences other key variables as well. Bahadir, Bharadwaj, and Parzen (2009) meta-analyzed several studies and found that size is a strong driver of organic sales growth. In addition, Lal (2004) discussed the positive relationship between size of operations and export performance.

Another often-considered control is the environment. When Miller (1983) first conceptualized entrepreneurial orientation, he already considered the significant positive influence of environmental dynamism. Frank, Kessler, and Fink (2010) later confirmed his findings in a replication study. Lumpkin and Dess (2001) showed that proactiveness is more effective in dynamic environments. More entrepreneurial managers perceive environments to be more uncertain (Weaver et al. 2002). Environmental dynamism also moderates the relationship between managerial characteristics and entrepreneurial orientation (Entrialgo 2002). Finally, when studying performance effects, Wang and Guo (2007) found that environmental uncertainty interacts with entrepreneurial orientation with respect to performance. However, Yamada and Eshima (2009) found no moderating influence for the same relationship.

3 Method

3.1 Sample

Several other prior studies on management control systems selected manufacturing firms as a study object (Simons 1987; Abernethy and Lillis 1995; Bisbe and Malagueno 2009). A questionnaire was designed following the tailored design method by Dillman, Smyth, and Christian (2009); after iterative pretesting of the questionnaire with three practicing accounting experts, some items were deleted because of continued criticism on questionnaire length. The back cover of the questionnaire leaflet was intentionally left blank to avoid immediate annoyance. Following a first inforamatory contact, the questionnaire was sent as a second contact. The third contact as a reminder included an issue of the research institute's quarterly journal as a thank-you gift. The reminder was followed by a final distribution of the questionnaire to non-responders. All participants were told that they would receive the results of the study. In each company, two individuals were invited to participate in the study to avoid the single informant bias. However, only 9% of the participating companies agreed to follow this procedure. These replies were aggregated into a single reply by following a procedure recommend by Wagner, Rau, and Lindemann (2010). This data collection phase lasted for approximately ten weeks. Out of the 497 contacted companies, a total of 178 companies participated, resulting in a response rate of 36%.

3.2 Measures

To keep the results of this study as generalizable as possible—as comparable and valid as possible at the same time—a cross-sectional self-report survey design within the manufacturing industry was deemed appropriate. Some scholars criticized self-reported surveys for an assumed inherent vulnerability to common method bias. However, the data used in this study were only accessible using internal data sources. In this case, Conway and Lance (2010) recommended the use of widely validated constructs, which

was the case for the entrepreneurial subdimension measures and for most of the management control measures. The scales for external information in forecasting and benchmarked budgeting have been recently developed. However, Rindfleisch et al. (2008) explained that the measures most subject to the common method bias are abstract measures derived from socio-psychological research. External information in management control was operationalized with two different measures that reflected different stages of the control process. First, external information appears essential in the forecasting process. Hilary and Hsu (2011) found that managers that rely on successful past forecasts tend to be less accurate in the future. Kirchgässner and Müller (2006) pointed out that less open-minded forecasting managers may be reluctant to revise their forecasts on a regular base. To avoid biases in forecasting, Flyvbjerg (2008) suggested constructing reference classes that could be used to conduct a more rationalized forecast. Thebjee (1987) showed another obvious alternative to overcome optimism biases or advocacy biases. He suggested consulting external advisors in the forecasting process. The scale developed from this short literature review is included in the Appendix. Second, external information in management controls may also be utilized during the budgeting process. Spreiter (2010) showed that companies can engage in market-specific benchmarking, industry-specific benchmarking, or benchmarking irrespective of any industry or market. The scale developed for this study incorporates these levels and is again included in the Appendix. Thus, it becomes apparent that these measures are not exactly socio-psychological measures and should not suffer from the common method bias.

Different scales were developed to evaluate slack in surveys. Onsi (1973) suggested four items to measure attitude toward budgetary slack, which can be considered a good proxy for an ex-ante measure of budgetary slack. Nohria and Gulati (1996) proposed a more ex-post measure consisting of two items. Simons (1988) argued that goal tightness reduces budgetary slack and offers four items for measurement. Finally, Kenis (1979) offered a scale to also measure goal tightness, and the scale's items 1–3 and 5 were consolidated down to two questions in this study. A scale offered by Milani (1975) measured budgetary participation. The scales used are included in the Appendix.

Non-financial performance measures include the total number of non-financial indicators divided by the total number of performance indicators used in internal reporting. The indicators are derived from balanced scorecard studies (Hoque and James 2000; Hoque 2005; Dossi and Patelli 2010). The control variable size is measured as the total number of employees. Miller and Friesen (1983) measured environmental turbulence.

The entrepreneurial orientation scale developed by Miller and Friesen (1982) and Covin and Slevin (1986) was widely used in empirical research. Lumpkin and Dess (1996) proposed a modified version with the additional subdimensions of competitive aggressiveness and autonomy. The current study employs a version of the scale as utilized by Lumpkin (1996) that ignores the autonomy subdimension. The autonomy subdimension of entrepreneurial orientation overlaps with the administrative layer of the management control framework of Malmi and Brown (2008). Morris et al. (2006) demonstrated that autonomy might be used as well as an antecedent of entrepreneurial orientation. The decision was made to use the Lumpkin (1996) scale to avoid confusion in the interpretation of the results.

Table 1 Rotated factor loadings of slack variables

	Attitude toward slack	Budgetary slack	Budget goal tightness	Uniqueness
Eigenvalues	1.99107	1.12607	1.44775	
ATS1	0.7498	0.0401	-0.0876	0.4285
ATS2	0.7354	-0.0276	0.0534	0.4556
ATS3	0.7477	-0.0534	-0.1003	0.4281
ATS4	0.3497	0.1190	-0.2105	0.8193
BSNG1	0.0272	0.6086	0.0100	0.6287
BSNG2	-0.0971	0.5483	-0.0560	0.6868
BGT1a	-0.0070	0.6150	0.1012	0.6115
BGT1b	0.0197	0.4448	0.1801	0.7694
BGT2a	-0.0533	0.0155	0.7683	0.4066
BGT2b	-0.0520	0.0396	0.7838	0.3813
BGT2c	-0.0907	0.2050	0.3611	0.8193

ATS1..4: Onsi (1973) attitude toward slack scale; BSNG1/2: Nohria and Gulati (1996) slack scale; BGT1a/b, 2a/c: Simons (1988) goal tightness scale; BGT2b: Kenis (1979) goal tightness scale

3.3 Data Analysis Considerations

The six items of the Forecasting: External view scale reached a Cronbach's alpha of 0.63. After removing the first item of the scale, Cronbach's alpha rose to 0.67 and was deemed acceptable. Benchmarked budgeting gained a Cronbach's alpha of 0.80. Principal-factor analysis was conducted on the measures of slack to validate the constructed scales. Table 1 presents the results of the analysis, which retrieved three factors. The results show that the slack scale of Nohria and Gulati (1996) and the slack-oriented questions of Simon's (1988) goal tightness scale may be added up to a common index. This scale may be understood as the need for efficiency orientation, which is reverse-coded for the purpose of this study. Furthermore, the results show that two items with low loadings and high uniqueness should be removed from the scales before analyzing the data. After removing one item from the Onsi (1973) attitude toward slack scale, Cronbach's alpha rose from 0.76 to 0.81. The final budgetary slack scale achieves a Cronbach's alpha of 0.64. According to several authors (Simons 1988; van der Stede 2001; Auzair and Langfield-Smith 2005), the absolute minimum value of Cronbach's alpha is 0.60. Considering that the scales used were applied in several other studies, accepting this low value seems justifiable. Finally, after removing the last item from the budget goal tightness scale, a Cronbach's alpha of 0.81 for this scale was achieved. Budgetary participation also reached a Cronbach's alpha of 0.66. The subdimensions of the entrepreneurial orientation scale, widely used in scholarly research, reached a Cronbach's alpha of 0.67 for risk taking, 0.68 for innovativeness, 0.69 for proactiveness, and 0.68 for competitive aggressiveness.

After conducting regression analyses, several diagnostic tests for the final solutions were performed. No influential cases were found as Cook's distance was always less than $4/N$. Multicollinearity was not an issue, as the VIF never exceeded 1.53. Some residuals violated the assumption of normal distributed error terms, which was corrected through a power transformation of the dependent variables risk taking ($\lambda = 0.5$) and innovativeness ($\lambda = 2$). The White test for heteroscedasticity revealed no significant results. The variables used to calculate the interaction effect with budgetary participation were mean-centered to avoid multicollinearity.

4 Results

Tables 3 and 4 present the results of the regression analysis. For each model, the researcher began with all of the focal and control variables and used stepwise regression to identify at least weakly significant coefficients. Stepwise regression entails the danger of overfitting the data. The author attempted to minimize the consequences of overfitting by using two measures. First, the variables included are already well grounded in theory, while overfitting results primarily in situations in which regression analysis is used for data mining. Second, for each dependent variable, Table 4 contains the same independent variables across the sample and both subsamples, facilitating a comparison between the results for the full-sample regressions and the risk-taking subsample regressions. Presenting all relevant coefficients also allows easier pattern recognition. However, the best model is the one that contains only at least weakly significant coefficients. Therefore, Table 3 also contains information on the fully stepwise (dubbed *final* or *identification*) regression models.

None of the stepwise regressions revealed any significant relationship for the variable non-financial measures in reward and compensation, while the results obtained for non-financial measures in internal reporting were satisfactory. Therefore, Tables 3 and 4 do not present this variable.

Table 5 presents a closer examination of the relationship of the slack measures with the subdimensions of entrepreneurial orientation to identify potential U-shaped relationships. To do so, the linear term and the quadratic term were treated as a block in a manual stepwise regression procedure (Brannick 2010).

The *risk-taking* subdimension of entrepreneurial orientation in the full sample is influenced significantly only by firm size ($\beta = 0.19; p = 0.011$), which results in a low explained variance of 3.7%. However, the impression changes after splitting the sample into low and high budgetary participation companies. For low-participation companies, the results hold steady with only firm size ($\beta = 0.25; p = 0.018$) as a significant predictor of risk taking. The explained variance improves slowly to 6.2%. The findings obtained for the high-participation subsample are in contrast to these results. Benchmarked budgeting is highly significant ($\beta = -0.23; p = 0.025$) and negatively related to risk taking when budgetary participation is high. This effect is offset by attitude toward budgetary slack, which is highly significant ($\beta = 0.29; p = 0.005$) and positively related to risk taking. Surprisingly, goal tightness is also positively ($\beta = 0.22; p = 0.044$) related to risk taking. Of the control variables, instead of size, environmental turbulence can be significantly positively linked ($\beta = 0.25; p = 0.020$) to risk taking. In the high-participation subsample, the explained variance increases to 21.4% and the F-value becomes strongly significant, suggesting that this model is very well suited to explain risk taking in this group. For a comparison of the supportive effect of these management control elements for the risk-taking subdimension of entrepreneurial orientation, rerunning the regressions with all relevant variables included in all subsamples is necessary. The first columns of Table 4 present the results. The coefficients for benchmarked budgeting, attitude toward budgetary slack, budgetary goal tightness, and environmental turbulence are all non-significant for the full sample and the low-participation subsample. However, as indicated by the first three columns in Table 4, the beta coefficients for the full-sample variables are always between the coefficients for the low-participation and high-participation subsamples. Given α -error cumulation, a statistical test for these differences is not

Table 2 Spearman rank order correlation matrix

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12
1 Risk taking	8.85	2.92												
2 Innovativeness	13.53	3.28	.27***											
3 Proactiveness	13.41	3.06	.14 [†]	.45***										
4 Competitive aggressiveness	9.49	2.04	.26**	.24**	.26**									
5 Forecasting: external view	17.66	5.14	.02	.15 [†]	.18*	.09								
6 Benchmarked budgeting	10.11	5.09	.07	.13 [†]	.04	.01	.44***							
7 Attitude toward slack	10.18	3.77	.13	-.12	-.11	.12	.09	.19*						
8 Budgetary slack	17.48	4.04	-.12	-.03	-.10	.10	.00	.04	.01					
9 Budgetary goal tightness	10.51	2.03	.00	.09	-.03	-.05	-.06	.04	-.14 [†]	.08				
10 Non-financial measures in internal reporting	0.52	0.11	-.04	.18*	.26***	-.02	.16*	.08	-.16*	.03	.07			
11 Budgetary participation	22.87	5.14	-.13	-.05	.06	.00	.09	-.07	-.10	-.03	.07	.00		
12 Size	1913.89	4243.56	.19*	.13	.16 [†]	.05	.18*	.22**	.06	-.11	.04	-.03	.07	
13 Environmental turbulence	35.08	5.19	.03	.11	-.07	.21**	.04	.09	-.02	.14 [†]	.15 [†]	.11	.11	.01

[†] p < 0.10; * p < 0.05; ** p < 0.01; *** p < 0.001; N=160

Table 4 Results of standardized regressions – comprehensive models

Variables BP	Risk Taking			Innovativeness			Proactiveness			Competitive Aggressiveness		
	F	L	H	F	L	H	F	L	H	F	L	H
Focal variables												
1 Forecasting: External View							.16*	-.03	.35**	.16*	.00	.34**
2 Benchmarked Budgeting Attitude	-.04	.17	-.25*	.05	.18	-.03	-.10	.12	-.24*	-.08	.10	-.22*
3 Toward Budgetary Slack	.09	-.14	.29**	-.08	-.24*	.03	-.10	-.20†	.03	.10	-.02	.26*
4 Budgetary Slack							.11	.01	.19†			
5 Budgetary Goal Tightness	.03	-.10	.21*									
6 Non-Financial Measures				.18*	.17	.18	.26***	.34**	.19†	-.12	-.17	-.10
Control variables												
7 Environmental Turbulence	.09	-.04	.24*	.08	.20†	.00				.31***	.21†	.44***
8 Size	.20*	.18†	.11	.14†	.13	.15	.14†	.19†	.04			
R ²	.052	.097	.226	.080	.174	.055	.153	.231	.220	.128	.076	.308
Adjusted R ²	.023	.041	.176	.051	.123	0	.121	.172	.157	.100	.018	.261
F	1.80	1.73	4.51**	2.83*	3.41*	0.90	4.77***	3.91**	3.46*	4.63*	1.30	6.45***
N	170	87	83	170	87	83	164	85	79	162	85	77

† p < 0.10; * p < 0.05; ** p < 0.01; *** p < 0.001

coefficients for benchmarked budgeting, attitude toward budgetary slack, and the environmental turbulence control in the full sample perfectly matches with the arithmetic average of the coefficients in the low-participation and high-participation subsamples. However, for non-financial measures and size control, this conclusion cannot be drawn. In these cases, budgetary participation does not seem to have any moderating influence. The regressions for the comprehensive models also show that the introduction of budgetary participation raises the explained variance from 8% in the full sample to 17.4% in the low-participation sample. The results for *proactiveness* are significant. Utilizing an external view in forecasting is positively related to proactiveness, even if weakly significant ($\beta = 0.13$; $p = 0.084$) in the identification model. After introducing budgetary participation, interestingly the effect vanishes for the low-participation subsample and strongly increases to a highly significant effect in the high-participation subsample ($\beta = 0.33$; $p = 0.003$). No effect in the full sample or in the low-participation sample can be found for benchmarked budgeting. However, surprisingly, benchmarked budgeting, i.e., using external information in budget planning, is significantly negatively related ($\beta = -0.24$; $p = 0.028$) to proactiveness. Attitude toward budgetary slack is weakly related ($\beta = -0.18$; $p = 0.071$) to proactiveness in the low-participation subsample, while it is significantly positively related ($\beta = 0.23$; $p = 0.031$) to proactiveness in the high-participation subsample. Non-financial measures in internal reporting are strongly and positively related to

Table 5 Results of quadratic regressions for slack measures – final models

Variables BP	Risk Taking			Innovativeness			Proactiveness			Competitive Aggressiveness									
	F	L	H	F	L	H	F	L	H	F	L	H							
Attitude toward Budgetary Slack			.25*			-.20†			-.13†			-.22*			.17*			.20†	
(Attitude toward Budgetary Slack) ²			.12			-.05			-.02			-.03			-.11			.00	
Budgetary Slack																		-.21†	-.21†
(Budgetary Slack) ²																		.07	.07
Budgetary Goal Tightness	-.02	-.24†	.18†															-.26†	
(Budgetary Goal Tightness) ²	-.15†	-.29	-.15															-.32*	
R ²	.022	.058	.114			.045			.017	.052			.047	.119	.073				
Adjusted R ²	.010	.036	.070			.023			.005	.029			.036	.077	.027				
F	1.9	2.66	2.6*			2.00			1.46	2.30			4.26*	2.83*	1.59				
N	173	87	86	173	87	86	173	87	86	173	87	86	173	87	86				

† p < 0.10; * p < 0.05; ** p < 0.01; *** p < 0.001

proactiveness in the full sample ($\beta = 0.27; p = 0.000$) and in the low-participation subsample ($\beta = 0.34; p = 0.001$). In the high-participation subsample, the relationship of non-financial measures in internal reporting with proactiveness is lower but still weakly significantly positive ($\beta = 0.20; p = 0.063$). The control variable size is a significant predictor of proactiveness ($\beta = 0.23; p = 0.019$) only for low-participation companies. Given the introduction of budgetary participation as a moderator, the explained variance increases from 10.1% in the full sample to 21.9% in the low-participation group and 21.2% in the high-participation group. Although the situation presents itself slightly differently in the full-model regressions, model validities should be recognized to suffer with the non-significant coefficients present. Probably, the most relevant change in the full model is that size becomes weakly significant for the full sample ($\beta = 0.14; p = 0.080$). What again also becomes apparent is that the beta coefficients for the full samples reside between the coefficients for the low-participation and the high-participation sample. Testing these differences is also not feasible owing to α -error cumulation.

Finally, the entrepreneurial orientation subdimension *competitive aggressiveness* is related to proactiveness. Expecting similar results appears reasonable. Thus, the utilization of external (i.e., more rational) information in forecasting is related to competitive aggressiveness, even if only weakly significant ($\beta = 0.15; p = 0.053$) in the full sample. For the high-participation sample, utilization of external information in forecasting is significantly positively related ($\beta = 0.32; p = 0.003$) to competitive aggressiveness. This finding is also consistent with the findings for proactiveness. Furthermore, similar to the findings for proactiveness, benchmarked budgeting is significantly negatively related to competitive aggressiveness. The results for the

relationship between attitude toward budgetary slack with *competitive aggressiveness* is notable; while attitude toward budgetary slack is weakly significantly related to proactiveness in the low-participation subsample, it is significantly positively related ($\beta = 0.26; p = 0.010$) to competitive aggressiveness in the high-participation subsample. No relationship can be found for the budgetary slack measure. Given the relatedness of proactiveness and competitive aggressiveness, similar findings for non-financial measures in internal reporting could be expected. However, instead of a positive relationship, non-financial measures in internal reporting are weakly significant and negatively related to competitive aggressiveness in the full sample ($\beta = -0.14; p = 0.069$) and the low-participation subsample ($\beta = -0.17; p = 0.096$). The control variable environmental turbulence is very strong and positively related to competitive aggressiveness in the full sample ($\beta = 0.30; p = 0.000$) as well as in the high-participation subsample ($\beta = 0.43; p = 0.000$) and still weakly significantly linked to competitive aggressiveness in the low-participation sample ($\beta = 0.20; p = 0.054$). Although the explained variance for the low-participation subsample declines to 7.1% from 11.8% in the full sample, the introduction of budgetary participation still raises the explained variance to 29.9% in the high-participation subsample. F-value is highly significant for the full sample and the high-participation subsample and is still significant for the low-participation subsample. Again, a review of the comprehensive models indicates that the coefficients for the full sample again lie between the coefficients for the low-participation subsample and the high-participation subsample.

Table 5 provides a closer look at slack to identify U-shaped relationships with the subdimensions of entrepreneurial orientation. These results reveal few significant coefficients. The coefficients for the linear and quadratic terms should be interpreted together (Brannick 2010). For *risk taking*, no model is identified in the full sample. In the low-participation subsample, for budgetary goal tightness both the linear ($\beta = -0.24; p = 0.068$) and the quadratic term ($\beta = -0.29; p = 0.030$) are related weakly significant respective significant negative with risk taking. In the high-participation subsample, a model with a significant F-value can also be identified. In this subsample, attitude toward budgetary slack is significantly positively linked to risk taking ($\beta = 0.25; p = 0.023$) but not the quadratic term ($\beta = 0.12; p = 0.301$). Budgetary goal tightness is weakly significantly linked ($\beta = 0.18; p = 0.094$) to risk taking but not the quadratic term ($\beta = -0.15; p = 0.166$). Neither *innovativeness* nor *proactiveness* models with a significant F-value are identified, although the models contain some significant coefficients. This result is another indicator that slack alone is insufficient for explaining the variance in the subdimensions of innovativeness or proactiveness. Additionally, other control elements are required. Turning to *competitive aggressiveness*, models with significant F-values are identified for both the full sample and the low-participation subsample. Surprisingly, attitude toward budgetary slack is significantly negatively related ($\beta = -0.17; p = 0.027$) to competitive aggressiveness in the full sample. However, again, the quadratic term is not significant ($\beta = 0.07; p = 0.521$). In the low-participation subsample, budgetary slack is weakly and significantly positively related ($\beta = 0.21; p = 0.066$) to competitive aggressiveness but not the quadratic term ($\beta = 0.07; p = 0.521$). Finally, the linear term for budgetary tightness ($\beta = -0.26; p = 0.053$) is weakly and significantly negatively related to competitive aggressiveness, while the quadratic term is significantly negatively related to competitive aggressiveness ($\beta = -0.32; p = 0.014$).

Table 6 Budgetary Participation as interaction effect

	Risk Taking	Innovativeness	Proactiveness	Competitive Aggressiveness
Basic model variables (Table 4)	2, 3, 5, 7, 8	2, 3, 6, 7, 8	1, 2, 3, 4, 6, 8	1, 2, 3, 6, 7
R ²	.0516	.0958	.1504	.1187
F	1.76	3.43**	4.52***	4.15**
Budgetary Participation added as independent variable				
ΔR ²	.0042	.0000	.0092	.0001
Budgetary Participation added as interaction				
ΔR ²	.0973**	.0242	.0796*	.0548†

† p < 0.10; * p < 0.05; ** p < 0.01; *** p < 0.001

This short presentation of the results already offers several hints that budgetary participation may be suited to moderate the relationships between elements of a control package and the subdimensions of entrepreneurial orientation. Although the previous presentation of the results is very helpful in their interpretation, it is not suited to statistically test the significance of adding budgetary participation as a control. Thus, Table 6 summarizes the regression models, including budgetary participation modeled as an independent variable and an interaction effect. Adding budgetary participation as an additional independent variable yields neither a significant nor a relevant increase in explained variance. However, modeling budgetary participation as an interaction effect for each independent variable shows a highly significant increase in explained variance for risk taking ($\Delta R^2 = +0.0973$; $p = 0.0043$), a significant increase in proactiveness ($\Delta R^2 = +0.0796$; $p = 0.0225$), and a still weakly significant increase in competitive aggressiveness ($\Delta R^2 = +0.0548$; $p = 0.0721$).

5 Discussion

Hypothesis 1 stated that external (i.e., more rational) information is positively linked to proactiveness and competitive aggressiveness. This hypothesis received mixed support. Indeed, companies that use external information in forecasting act more proactively and exert greater competitive aggressiveness, although the coefficients are weakly significant. This result is consistent with the findings of Li, Tse, and Gu (2006) and McEwen (2008). Stronger support for this hypothesis is found within the high-participation subsample. As for the subdimensions of entrepreneurial orientation, proactiveness and competitive aggressiveness, the utilization of external data in forecasting is significantly related to both of them. However, in the high-participation subsample as well, benchmarked budgeting is significantly negatively related to proactiveness and competitive aggressiveness. Benchmarking is not a control element capable of stimulating entrepreneurial orientation but rather a control often employed by companies that only react instead of acting. This finding is consistent with that of Schäffer and Zyder (2005). Furthermore, the results also support their argument that benchmarking may lead to risk-averse behavior, even if it was not hypothesized in this study. Thus, the measure of benchmarked budgeting is clearly distinct from the external forecasting measure. It is interesting to note is that this effect is only visible in the high-participation subsample. The negative relationship of benchmarked budgeting

with proactiveness or competitive aggressiveness belongs to more than one hierarchical level and is not limited to top management. The moderating effect of budgetary participation bears more significance. The beneficial effect of external information for proactiveness and competitive aggressiveness in forecasting is only present and highly significant under conditions of high budgetary participation. The coefficient for low-participation companies in this relationship is non-significant and is nearly zero. Moreover, only under conditions of high budgetary participation do the negative effects of benchmarking for three of four subdimensions of entrepreneurial orientation become visible.

Hypothesis 2a states that slack is positively related to all subdimensions of entrepreneurial orientation. Without considering the moderating influence of budgetary participation, this hypothesis would have been completely rejected. However, with respect to budgetary participation, the hypothesis receives partial support, even though contradictory results are found. Attitude toward budgetary slack is significantly related to risk taking and competitive aggressiveness under conditions of high budgetary participation. Interestingly, conditions of low-participation attitude toward slack lead to less innovation and proactiveness. What seems controversial at first supports hypothesis 2. Considering that the scale determined how positive managers are attuned to slack, one possible explanation is that a positive slack attitude under budgetary participation creates a perceived cushion to engage in risk taking, aggressive competition, and a positive control experience. Instead, conditions of lacking participation slack might lead to conditions in which the need to innovate or act proactively is perceived to a lesser extent, as proposed by Bradley, Wiklund, and Shepherd (2011) and Chen (2007). Hypothesis 2a is also supported by the findings for budgetary slack. Under conditions of high participation, budgetary slack is weakly significantly related to proactiveness. Whether the findings for budgetary goal tightness contradict hypothesis 2a is subject to discussion. Arguably, tight goals signal lacking slack. In contrast, slack may come absorbed and unabsorbed (Singh 1986; Geiger and Cashen 2002; Heng and Ding 2010). Unabsorbed slack results in non-tight goals, while only absorbed slack results again in tight goals. Thus, these results are consistent with other findings which suggest that tight goals motivate managers to take more risks to achieve these goals.

Hypothesis 2b states that slack and the subdimensions of entrepreneurial orientation have a U-shaped relationship. According to the results presented in Table 5, significant coefficients are found for quadratic terms for budgetary goal tightness and risk taking, as well as competitive aggressiveness—both under low budgetary participation. The negative sign for the quadratic term points to an inverted U-shape. The negative sign for the linear (slope) term indicates that at the mean value of budgetary goal tightness, the U-shaped relationship with risk taking or competitive aggressiveness is again declining. Companies with low budgetary participation could benefit from a goal that is a little less stringent on these subdimensions. Under high budgetary participation, no U-shaped relationships are present, and the conclusion from the linear relationship holds that companies may use tight goals to motivate risk taking.

Hypothesis 3 hypothesized that non-financial performance measures in internal reporting were positively linked to the subdimensions of entrepreneurial orientation. The hypothesis received support for the subdimensions of innovativeness and proactiveness. The effect for innovativeness appears to be constant despite the level of budgetary participation; however, the reduction in sample size resulting from the budgetary participation median split leads to an insignificant effect in these subsamples.

However, interesting motivational effects are visible for proactiveness. A strong and highly significant positive effect is visible in the full sample, with a comparatively stronger and highly significant effect in the low-participation subsample. A weakly significant positive effect is still visible in the high-participation subsample. It is notable that the effects of non-financial performance measures in internal reporting under high participation do not appear to be as strong as those under low participation. Non-financial performance measures are largely defined by the process and human resource indicators. Under high budgetary participation, the necessity to monitor these indicators may well become less important. Nevertheless, the effect is visible, even if only weakly significant, and it should not be concluded that monitoring non-financial performance measures is not necessary under high participation to achieve proactiveness. Instead, a possible conclusion is that monitoring non-financial performance indicators support innovativeness and proactiveness. The negative effects visible for non-financial performance measures on competitive aggressiveness subside when looking at the comprehensive models with all relevant elements of the control package. However, interestingly, competitive aggressiveness appears impeded by monitoring these indicators, even if the results are non-significant for the comprehensive models. A possible explanation is the more internal orientation of non-financial measures, but determining the exact nature of these relationships calls for another study.

Hypothesis 4 proposed similar effects for non-financial performance measures of reward and compensation. However, no effects were found in any model; therefore, this study does not support hypothesis 4.

Hypothesis 5 proposes the moderating influence of budgetary participation. This hypothesis is supported for three of four subdimensions. Interestingly, the innovativeness subdimension is again not influenced by budgetary participation. Although research in the context of management control and innovativeness under budgetary participation is limited, research in other fields such as strategic decision making may explain this finding. Covin, Green, and Slevin (2006) studied strategic decision-making participativeness as a moderator in the relationship between entrepreneurial orientation and sales growth. They found that autocratic decision making is more effective in moderating the relationship of entrepreneurial orientation and performance than participative strategic decision making. They also offered an explanation in that participative decision making results in an incremental strategic change instead of bold, radical moves. However, budgetary participation effectively moderates the effects of management control on other subdimensions of entrepreneurial orientation, particularly risk taking and proactiveness. These findings support the hypothesis that the commitment effects of participation may indeed cause these moderations.

Thus, the initial research questions can now be answered. Most controls categorized into the accounting layer of the management control package were significantly related. Surprisingly, non-financial measures for reward showed no significant relationships with entrepreneurial orientation. However, attending to non-financial key performance indicators in internal reporting stimulates entrepreneurial orientation. Generally, entrepreneurial orientation is more stimulated under budgetary participation. However, adverse effects exist for benchmarked budgeting. When benchmarked budgeting is used, budgetary participation leads to less entrepreneurial orientation. In these cases,

the adaptation of other companies' experiences by budget-participating staff leads to risk avoidance and rather passive behavior.

These findings somehow contradict the findings of Miller and Friesen (1982), who found no relationships with controls. One explanation may be the different and more comprehensive control framework and measures in this study. The results of this study obtained by unboxing the prospector firm type into four subdimensions of entrepreneurial orientation are consistent with the findings of Simons (1987). The identification of the relationship between the interactive lever of control and entrepreneurial orientation by Henri (2006) is related to the findings of this study; budgetary participation is one method for interactively using a lever of control.

6 Limits

This study faces the same limitations as most cross-sectional studies. According to Rindfleisch et al. (2008), common problems include the ability to draw causal inferences and the potential systematic error from the use of a single rater or single source. Some scholars propose creating a temporal separation between an initial and a follow-up data collection. However, as Rindfleisch et al. (2008) noted, temporal separation or even a longitudinal study design does not necessarily enhance causal inferences because most relational ties probably passed their start date at the beginning of the survey. The downside of longitudinal settings for any observable cases that can be found is that statistical testing is no longer possible given extremely small samples. Therefore, the choice between a cross-sectional study and a longitudinal study is the tradeoff between statistical reliability, enhancing causal inferences, and the cost of the study. Zahra, Jennings, and Kuratko (1999) pointed out that this problem is common in studies on entrepreneurial orientation.

This study also attempted to address the common-method bias; however, securing adequate responses from multiple informants within each company was not possible. Another proposed solution against the common-method bias is sampling from multiple sources, but this approach could not be followed because relevant data were not available. Furthermore, to date, no study has shown how well objective measures could replace subjective measures of entrepreneurial orientation, which are usually surveyed via mail. The study by Miller and Le Breton-Miller (2011) is a promising avenue, but it was not validated using conventional entrepreneurial orientation measures. A Monte Carlo simulation by Rindfleisch et al. (2008) showed again that the common-method bias is less a threat than is commonly assumed. To further reduce the potential common-method bias, this study uses a different scale format for the entrepreneurial orientation scale from those used for most control measures.

7 Conclusion

This study examined the contribution of management controls as a package on entrepreneurial orientation. Drawing several conclusions is now possible. First, budgetary participation moderates and positively influences nearly all relationships. Ultimately, controls that rely on employee behavior to be effective are implemented more efficiently under participation. Second, rationalizing forecasts with external

information is advisable, but budgets should not be aligned solely with competitors, particularly under conditions of budgetary participation. Third, slack is a controversial management control. Although risk taking and competitive aggressiveness seem beneficial to maintaining a positive attitude toward budgetary slack under high budgetary participation, generating a positive slack attitude under low participation is not advisable given the negative effects on innovativeness and proactiveness. Although a positive attitude toward slack may serve as a cushion to allow for additional risk taking, tight goals under high budgetary participation also lead to increased risk taking. Attention to non-financial measures in internal reporting also leads to innovativeness and proactiveness but is more important in low-budgetary-participation companies than in high-budgetary participation companies.

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Appendix

The survey was conducted in German. The scales presented here have been translated into English. Scales taken unchanged from the literature are omitted.

Forecasting External View Scale

When forecasting, my firm...

- | | |
|--|-----|
| ... relies on internal experiences from the past | 1-7 |
| ... consults external, similar cases | 1-7 |
| ... documents similar cases in writing | 1-7 |
| ... creates a probability distribution for external cases | 1-7 |
| ... regularly adjusts the prognoses to changed external conditions | 1-7 |
| ... asks an uninvolved person to review the prognoses | 1-7 |

Benchmarked Budgeting Scale

Please state the extent to which you agree with the following statements on external benchmarks in budgeting:

- | | |
|--|-----|
| When we build our budget, we attempt to align our budget with other companies that produce different products but possess similar supply chains. | 1-7 |
| When we build our budget, we attempt to align our budget with other companies that serve similar markets. | 1-7 |
| When we build our budget, we attempt to align our budget with other companies that produce similar products but for other markets. | 1-7 |
| When we build our budget for single functional areas or processes, we attempt to align our budget with other companies that are supposed to be the best, even if they are not from our industry. | 1-7 |

Attitude toward Slack Scale

Please state the extent to which you agree with the following statements:

- | | |
|--|-----|
| To protect himself, a manager submits a budget that can be safely attained. | 1-7 |
| Some managers set two levels of standards: one between themselves and their team members and the other between themselves and their superiors. | 1-7 |
| In good business times, superiors accept a certain level of slack in a budget. | 1-7 |

Budgetary Slack Scale (reverse coded)

Please state the extent to which you agree with the following statements:

- How seriously would your company be affected if the people working at your company spent 10% of their time on other projects because of an uncontrollable development? 1-7
- How seriously would your company be affected if your budget was suddenly reduced by 10%? 1-7
- Our goals can only be achieved if we precisely meet our budget goals. 1-7
- We can only meet our budget goals if operating processes are free of errors, defects, or redundant work. 1-7

Budget Goal Tightness Scale

Budget goals in our firm..

- | | | |
|---|-----|--|
| ... are set rather too loosely | 1-7 | ... are set rather tightly |
| ... can be achieved rather easily | 1-7 | ... can be achieved only with effort |
| ...are set as not very accurate standards | 1-7 | ... are set as rather accurate standards |

