

Essays on Top Management Team Structures

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List of Abbreviations

AMD	Academy of Management Discoveries
AOM	Academy of Management
ASSIST	American Secondary Schools for International Students and Teachers
BMW	Bayerische Motoren Werke AG
BoD	Board of directors
CEO	Chief executive officer
CMO	Chief marketing officer
COB	Chair of the board
COO	Chief operating officer
CSO	Chief strategy officer
DAAD	Deutscher Akademischer Austauschdienst
etc.	<i>et cetera</i> (and so forth)
e.g.	<i>exempli gratia</i> (for example)
et al.	<i>et alii</i> (and others)
EVP	Executive vice president
FM	Functional manager role
GfK	Gesellschaft für Konsumforschung
GLS	Generalized least square
GM	General manager roles
ibid.	<i>ibidem</i> (in the same source=
i.e.	<i>id est</i> (that is)
RBV	Resource-based view
R&D	Research and development

ROA	Return on assets
ROE	Return on equity
SCOME	Supply chain and operations management executives
S&P 500	Standard & Poor's 500
SIC	Standard industrial classification
SMS	Strategic Management Society
SVP	Senior vice president
TMG	Top management group
TMT	Top management team
UE	Upper echelons
U.S.	United States of America
VP	Vice president

Summary

The upper echelons (UE) theory posits that studying senior executives' characteristics and behavior is essential to understanding why firms vary in their strategic decisions and organizational outcomes. Ever since the publication of Hambrick & Mason's (1984) seminal article, research has strongly focused on the composition of the top management team (TMT), that is, demographical characteristics. This dissertation shifts the focus to emerging research on TMT structures. Studies of these structures are concerned with TMT size, TMT role structures, and TMT hierarchies.

This thesis aims to advance our knowledge of TMT structures, and in this regard, each article contributes by addressing the following shortcomings: 1) lack of synthesis of the TMT structure literature, 2) lack of knowledge about TMT size antecedents, and 3) lack of understanding about when functional executives, such as CSOs (chief strategy officers), are valuable to firms. The thesis consists of three separate but interrelated articles.

Article I focuses on TMT structures, which comprise TMT size, TMT role structure, and TMT hierarchies. The article analyzes empirical studies on TMT structures in leading journals. It provides an inventory of TMT structures research, identifies patterns and gaps, and proposes five areas for future research opportunities. Article II explores the characteristics and antecedents of TMT size by using panel data of S&P 500 firms. This article studies possible determinants at the environmental, firm, and CEO (chief executive officer) levels. Article III uses an S&P 500 sample to examine when CSOs are valuable to firms. The article suggests that functional executives like CSOs are a critical resource for firms, but their value can only be unfolded when their expertise meets a specific need of the firm and when they are empowered to capitalize on their expertise.

Overall, these three articles make several contributions to theory and practice. The thesis contributes mainly to strategic leadership literature and specifically to TMT structure research. Finally, the findings inform practicing managers and consultants, especially those involved in designing and structuring TMTs.

Zusammenfassung

Die Upper-Echelons-Theorie postuliert, dass die Erforschung von Charakteristika und Verhalten von Spitzenführungskräften essenziell ist, um zu verstehen, warum strategische Firmenentscheidungen und Ergebnisse variieren. Seit dem Artikel von Hambrick & Masons (1984) hat sich die Wissenschaft auf die Komposition von Top-Management-Teams (TMT) fokussiert. Diese Dissertation lenkt nun das Augenmerk auf einen jüngeren Forschungszweig: TMT Strukturen. Die TMT-Strukturforschung, befasst sich mit der Größe, den Rollenstrukturen und den Hierarchien von TMTs.

Ziel dieser Arbeit ist es, unseren Wissensstand über TMT-Strukturen weiter zu entwickeln. Jeder Artikel benennt eines der folgenden Defizite: 1) mangelnde Synthese der TMT-Struktur-Literatur, 2) mangelndes Wissen über die Determinanten der TMT-Größe, 3) mangelndes Verständnis des Wertbeitrages von Chief Strategy Officers (CSOs). Die Dissertation besteht aus drei eigenständigen, aber zusammenhängenden Artikeln. Artikel I fokussiert auf TMT-Strukturen, welche TMT-Größe, TMT-Rollenstruktur und TMT-Hierarchiestrukturen umfasst. Dafür wurden empirische Studien über TMT-Strukturen analysiert, die in führenden Zeitschriften erschienen sind. Der Artikel bietet eine Bestandsaufnahme der TMT-Strukturforschung, identifiziert Muster und Forschungs-lücken und zeigt fünf Themengebiete für zukünftige Forschung auf. Artikel II erforscht die Charakteristika und Antezedenzen der Größe von TMTs und basiert auf S&P 500 Paneldaten. Der Artikel untersucht mögliche Determinanten, die TMT-Größe auf folgenden Ebenen beeinflussen: Unternehmensumfeld, Unternehmen und Chief Executive Officer (CEO). Artikel III untersucht, wann CSOs wertbringend sind und basiert ebenfalls auf einer Studie von S&P 500 Unternehmen. Die Ergebnisse zeigen, dass CSOs eine kritische Ressource sind. Ihr Wert kann jedoch nur entfaltet werden, wenn ihre Expertise zu den Firmenbedürfnissen passt und sie mit der Macht ausgestattet sind, diese Expertise wirksam einzusetzen.

Die Dissertation trägt vornehmlich zur Strategic-Leadership-Literatur – insbesondere zur TMT-Strukturforschung – bei. Die Erkenntnisse können sowohl von Top-Managern als auch von Beratern genutzt werden, die TMTs designen und strukturieren.

1. Introduction

Why do executives make the choices they do and how does it affect firm outcomes? This is the central question for strategic leadership scholars, who argue that performance is influenced to a great extent by top executives' strategic and organizational decisions. Actors in the strategic leadership domain include CEOs, top management teams (TMTs), boards of directors (BoDs), and individual executives like business unit heads (Finkelstein, Hambrick, & Cannella, 2009). Within the field of strategic leadership, this dissertation focuses on the TMT. A TMT is defined as the group of top executives at the apex of an organization who are tasked with strategic decision making (Jones & Cannella, 2011) and "overall responsibility for the organization" (Mintzberg, 1979, p. 24). Ever since the foundational article, "Upper echelons: The organization as a reflection of its top managers" by Hambrick and Mason (1984), researchers have examined top managers and TMTs to explore why organizations' strategic choices and performance vary. Top management teams have three main conceptual elements: composition, structure, and process (Finkelstein et al., 2009). For the past 30 years, upper echelons researchers have produced a large body of work on TMT composition, the process of strategic decision making, and the subsequent organization outcomes. A considerable body of empirical studies has emerged and links TMT composition (e.g., functional background heterogeneity, tenure diversity) to organizational outcomes (for reviews of this strand see Carpenter, Geletkanycz, & Sanders, 2004; Finkelstein et al., 2009; Nielsen, 2009). While this extant body of UE studies has demonstrated that TMTs matter, it has also produced inconclusive results.

In order to complement research on TMT composition and process, the need for studying TMT structures has been stressed by several scholars (Beckman & Burton, 2011; Hambrick, 1994, 2007). TMT structure entails TMT size, TMT roles, and TMT hierarchies – that is, the relationships between roles. Why is the study of TMT structure important? TMT structures vary significantly, reflecting organizational design choices made by managers and founders and signaling how organizations are structured (Beckman & Burton, 2011). For example, some firms have a functional, divisional, or matrix TMT structure (Chandler, 1962; Davis, Diekmann, & Tinsley, 1994). Some

organizations decide to have certain roles, like a CSO, included in the TMT. Some of those roles are hierarchically higher up than in other firms.

The strand of TMT structure research is rather young but has received more attention in recent years. Also, TMT structures have changed significantly in the past few decades. For example, TMT size has been growing (Guadalupe, Li, & Wulf, 2014), and new functional roles have emerged and become more prevalent (Menz, 2012; Menz & Scheef, 2014; Nath & Mahajan, 2008). Thus, this thesis responds to the need to enhance our understanding of TMT structures by addressing three shortcomings. The first article reviews empirical studies on TMT literature. The other two studies empirically analyze two distinct phenomena. The second study explores the characteristics and antecedents of TMT size, and the third study analyzes when functional executives are valuable to firms.

1.1. Motivation

Recent research has underlined the potential of TMT structure research, but we still know relatively little about it. This thesis, which consists of three articles, increases our knowledge of TMT structures. Each article addresses the following shortcomings:

Shortcoming 1: Lack of a synthesis of TMT structure literature

Despite the call for giving more prominence to research on TMT structures and scholars' increasing interest in TMT structure phenomena, the literature has not yet been reviewed. While several literature reviews exist on the topic of TMT demographical composition (Carpenter et al., 2004; Nielsen, 2009; Williams & Charles, 1998), no one has reviewed and synthesized prior findings on TMT structure. Since the three sub-streams of TMT structure – size, role structure, and hierarchical structures – have mainly been studied in isolation, a review is needed to integrate them. An integration and synthesis of previous findings are needed as a base for presenting future research avenues and to advance our knowledge of TMT structures.

Shortcoming 2: Lack of knowledge regarding the characteristics of different TMT sizes and their determinants

Understanding TMT size is both theoretically and practically important as it is an important structural feature and a key organizational design choice (Beckman & Burton, 2008; Guadalupe et al., 2014). Within upper echelons research, TMT size is a common control variable (Bantel & Jackson, 1989), and prior research informs us that it matters for outcomes on multiple levels: individual executive level (Boeker, 1997; Henderson & Fredrickson, 1996; Plambeck & Weber, 2010), team level (Amason & Sapienza, 1997; Iaquinto & Fredrickson, 1997; Simsek, Veiga, Lubatkin, & Dino, 2005), and organizational level (Boeker, 1997; Eisenhardt & Schoonhoven, 1990; Halebian & Finkelstein, 1993). However, much less attention has been paid to the drivers of TMT size and the characteristics of differently sized TMTs.

Shortcoming 3: Lack of understanding when functional executives are valuable to firms

Researchers have explored functional executives like the chief operating officer (COO; Hambrick & Cannella, 2004; Marcel, 2009), chief marketing officer (CMO; Nath & Mahajan, 2008), CSO (Menz & Scheef, 2014), and their value for firms. However, results on those functional executives' effects on firm performance have been mixed and inconclusive. These studies have only considered the presence of these functional roles and neglected that their power to execute their role may vary significantly. These roles can be found on different hierarchical levels within the TMT, which is important for the executive to influence strategic decisions and, consequently, firm performance.

1.2. Overview and status of the articles

In the past, TMT research has focused primarily on understanding TMT composition. The growing body of TMT structure research complements this research and offers many opportunities for future research. While each article constitutes an independent research project, all of them contribute to advancing our understanding of TMT structures from different methodological angles. Article I, a systematic literature review of TMT structure empirical work, lays the groundwork for our understanding. It identifies future research areas, which are further explored in Articles II and III. With an exploratory approach, Article II examines the determinants of TMT size and the

characteristics of TMTs of different sizes. Article III adopts a deductive, theory-testing approach to explore, by using the example of the CSO, when functional executives are valuable to firms. Table 1 provides an overview of each paper's research question, context, and method.

Table 1. Article overview

Title	Research question	Type	Context	Method
Article I: Top Management Team Structure: A Review and Research Agenda	- What is TMT structure? - What do we know about TMT structure? - Which areas of TMT structure should we explore further?	Literature review/ conceptual	Leading journals in strategic management	Systematic literature search and review of 34 articles
Article II: Top Management Team Size: An Exploration of Characteristics and Determinants	- What characterizes TMTs of different sizes? - What determines TMT size?	Empirical (inductive, exploratory)	S&P 500 firms, 2011–2014	Archival data sample; descriptive and random-effects generalized least square regression
Article III: What Value Do Functional Executives Provide for The Firm? The Case of the Chief Strategy Officer	- How and when are functional executives such as CSOs valuable for firms? - Which role do firm context and power play?	Empirical (deductive, theory testing)	S&P 500 firms, 2008	Archival data sample; ordinary least square regression analysis

Article I: Top Management Team Structure: A Review and Research Agenda

Authors: Elisabeth Radek and Markus Menz

Article status: This article is in preparation for submission to the Journal of Management Studies. We thank Johanna Gollnhofer, Georg Guttman, and Christine Scheef for their insightful discussions and helpful feedback to advance the article.

Abstract: The top management team (TMT) structure, which comprises the size, role structure, and hierarchy of a TMT, has received increasing attention of late. However, despite the literature's potential to complement research on strategic leadership (in particular, TMT composition and the heterogeneity of TMT members' experiences and psychological characteristics), the fragmented insights have complicated the task of assessing this promising research area. The purpose of this article is to review the empirical research on TMT structure and to identify gaps, patterns, and future research opportunities. Based on our review, we synthesize the research on the TMT structure into a framework and propose avenues for future research in the following areas: (1)

studying TMT structures jointly, (2) exploring new dimensions of the TMT structure, (3) applying new perspectives and approaches, (4) understanding the antecedents, and (5) combining the TMT structure with other strategic leadership research.

Article II: Top Management Team Size: An Exploration of Characteristics and Determinants

Author: Elisabeth Radek

Article status: The article is intended for submission to the Academy of Management Discoveries (AMD). I would like to thank Christine Scheef for her valuable feedback on earlier versions of the paper, as well as Céline Bilolo, Markus Menz, Günter Müller-Stewens, and Xena Welch Guerra for their insightful discussions and comments, which helped me improve the article.

Abstract: This article uses an exploratory approach to examine the various characteristics of top management teams (TMTs) of different sizes and what drives TMT size. Although TMTs have been expanding over the past 30 years, we still know relatively little about the drivers. Determining the size of a TMT is a key organizational decision as TMT size influences TMT processes and organizational outcomes. Based on a sample of S&P 500 firms from 2011 to 2014, the results show that TMT size ranges from two to 21 executives and that TMTs of different sizes differ little with regard to TMT composition but strongly in terms of TMT structure. Furthermore, we find that TMT size is influenced by firm size, firm growth, and TMT horizontal interdependence. It is not influenced by the environmental conditions and CEO characteristics that were tested. We contribute to the TMT literature by highlighting the characteristics of different TMT sizes and providing new insights into the determinants of TMT size. Our study exposes the power of information-processing theory to explain these determinants.

Article III: What Value Do Functional Executives Provide for The Firm? The Case of the Chief Strategy Officer

Authors: Christine Scheef, Elisabeth Radek, Markus Menz

Article status: This paper was presented at the AOM (Academy of Management) paper development workshop 2016 in Berlin. An earlier version of the paper was presented at the SMS (Strategic Management Society) conference 2014 in Madrid. The paper is intended for publication in the journal *Strategic Organization*. We thank Günter Müller-Stewens and participants in both conferences for the insightful discussions and comments that helped improve the article.

Abstract: While functional executives have become increasingly prevalent in top management teams, there is a lack of understanding about whether, how, and when they are valuable for their firms. We address this gap by arguing that functional executives' value for firm performance depends on their power within firms and their needs for such functional expertise according to the firm's specific context. In this study, the chief strategy officer (CSO) is used as the focal executive. For firms in need of strategic guidance, for example, when they are facing a decline in growth or a stable environment, we find that powerful CSOs have a positive effect on firm performance. By contrast, powerful CSOs are detrimental to firms in need of greater operational efficiency. These results suggest that whether or not a functional executive's role makes a difference for the firm depends on the context.

1.3. Discussion

Contributions

Overall, this thesis primarily contributes to the upper echelons theory and TMT literature by demonstrating the importance of different aspects of TMTs. Specifically, it advances the TMT structure literature and the functional top executive literature.

The first article contributes in three ways. First, we offer a definition of TMT structure that is different from previous ones as we include TMT size along with TMT structure and TMT role hierarchies. Second, we jointly review three sub-streams – TMT size, TMT role structure, and TMT hierarchies – to underline the importance and potential of studying them together. Third, based on a synthesis of previous research,

we suggest avenues for future research. Two of the identified research opportunities are addressed and empirically explored in Articles II and III.

The second article contributes to our understanding of TMT size. Our study demonstrates how TMTs of different sizes are designed with regard to both composition and structure and what determines TMT size. Given that we observe more differences in TMT structural characteristics than in TMT composition when comparing different TMT sizes with each other, this article emphasizes the importance of distinguishing between TMT structure and composition. It also corroborates the potential explanatory power of TMT structures, as highlighted by Hambrick, Humphrey, and Gupta (2015). Furthermore, our study contributes to the information-processing perspective (Sanders & Carpenter, 1998) as we find that the firm characteristics that increase complexity (i.e., firm size and firm sales growth) are related to TMT size. Our study also advances our understanding of diversification strategy and TMT size. Unlike previous research (Guadalupe et al., 2014), we do not find support for diversification influencing TMT size. One of the reasons for these different findings might be the different periods studied, suggesting that firms go through periods of change regarding firm diversification strategies and TMT structures. Furthermore, this article substantiates our understanding of the CEO literature. Contrary to expectations, our study did not find support for the notion that CEO-level variables influence TMT size. These findings complement Ma and Seidl (2018), who found that CEOs face constraints in changing TMT structures. Overall, this article contributes to the question of why TMTs look the way they do.

The third article contributes to research on functional executives by substantiating our understanding of when functional executives are valuable to firms. While most prior research has found mixed results for the association between the presence of functional roles and firm performance, we reveal that this relationship is more complex. We build on the resource-based view (RBV) by showing that functional executives like the CSO can be a valuable resource and source for a competitive advantage for the firm, depending on the firm's particular business needs (Hitt, Bierman, Shimizu, & Kochhar, 2001; Krause, Semadeni, & Cannella, 2013) and the structural power of the functional executive. Using the example of the CSO, we show that research should consider the structural power of the functional executive to account

for varying levels of influence on strategic decisions when assessing the value of functional executives for firm performance. Our study is the first to establish a link between the CSO and firm performance and, thus, complements prior CSO research (Menz & Scheef, 2014). It further contributes to TMT structure research as the study reveals that it is important to differentiate between the hierarchical levels of functional executives instead of studying their mere presence in the TMT.

Practical relevance

Our study of TMT structures also has practical implications for top executives, CEOs, BoDs, and management consultants. They have to understand the various aspects of TMT structures because the structures have an impact on organizational outcomes, change over time, vary significantly, and provide decision-makers multiple ways of structuring TMTs. For example, the size of TMTs in U.S. firms has doubled between the 1980s and mid-2000s (Guadalupe et al., 2014). In Europe, some well-known firms have also increased their top management: for example, Novo Nordisk in Denmark from six to nine TMT members in 2015 (Novo Nordisk, 2016), Beiersdorf in Germany from three to six members in 2014 (Handelsblatt, 2014), and FC Bayern München in Germany from four to five in 2013 (Handelsblatt, 2013). Role structures are also changing. For example, Novo Nordisk discarded the COO role and promoted divisional executives to the TMT, while other firms like BioNTech added the CSO role to the top team (BioNTech, 2020). These are just a few examples of changing and varying TMT structures that illustrate the importance of studying what determines these structures and what are the effects of different structural setups.

This thesis offers guidance to business practitioners – particularly CEOs – who are designing and structuring their TMT. The second article may assist them in deciding on the size of the TMT. Our research highlights that “TMT size” matters and that TMTs need to have a certain number of top executives. Our results show that large and growing firms require large TMTs, while environmental conditions do not seem to matter for TMT size. With the help of our study, CEOs can benchmark their TMTs with firms of similar characteristics and conditions. This benchmarking allows business practitioners and CEOs to evaluate their decisions and processes from the past and for the future. Since we did not find that CEO characteristics associated with power matter when it comes to TMT size, our study suggests that CEOs who are not the chair of the

board and do not have long firm tenures or are not external hires do not have a smaller chance to change the TMT size than CEOs who are considered to be more powerful. These insights might be encouraging to CEOs who do not have these putatively powerful characteristics.

The third article offers help to CEOs who are staffing and configuring their TMT and are deciding on the CSO role. The value of this increasingly prevalent role had previously been unclear. Our study highlights that structural power matters and needs to be considered when designing a TMT, along with the firm's needs. Firms benefit from the CSO role when the functional executive's expertise matches the needs of the firm and is equipped with the necessary formal power. Specifically, this means that firms that suffer from declining growth or require long-term strategic planning might benefit from having a CSO. However, adding the CSO role is not always beneficial. Firms with declining operational efficiency are better off without a CSO in their TMT. Our study helps CEOs to consciously consider the firm's needs and match them with the expertise that is needed at the top.

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2. Article I: Top Management Team Structure: A Review and Research Agenda

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Abstract: The top management team (TMT) structure, which comprises the size, role structure, and hierarchy of a TMT, has received increasing attention of late. However, despite the literature's potential to complement research on strategic leadership (in particular, TMT composition and the heterogeneity of TMT members' experiences and psychological characteristics), the fragmented insights have complicated the task of assessing this promising research area. The purpose of this article is to review the empirical research on TMT structure and to identify gaps, patterns, and future research opportunities. Based on our review, we synthesize the research on the TMT structure into a framework and propose avenues for future research in the following areas: (1) studying TMT structures jointly, (2) exploring new dimensions of the TMT structure, (3) applying new perspectives and approaches, (4) understanding the antecedents, and (5) combining the TMT structure with other strategic leadership research.

Keywords: Upper echelons; top management teams; TMT structure; TMT composition; TMT size; TMT hierarchy; strategic leadership; review

2.1. Introduction

“I have long thought that there needs to be much more attention paid to the ‘structure’ of TMTs, to complement – and improve – our understanding of TMT composition and processes.” (Hambrick, 2007, p. 337)

Since Hambrick and Mason’s (1984) seminal article introduced the upper echelons perspective of organizations 36 years ago, research on top management teams (TMTs) has developed into one of the most prominent areas of the management field. The main strand of this research involves TMT composition and posits that the heterogeneity of TMT members’ experiences and psychological characteristics affects TMT processes, such as social integration, consensus, and organizational outcomes (Finkelstein, Hambrick, & Cannella, 2009; Hambrick & Mason, 1984). However, studies in this vein, particularly those that use aggregate measures of individual TMT members’ observable demographic characteristics (e.g., age, tenure, education, and functional background), have produced mixed results (for reviews of this strand see Carpenter, Geletkanycz, & Sanders, 2004; Finkelstein et al., 2009). To answer the many open questions raised by previous studies and to complement research on TMT composition, scholars have recently devoted more attention to understanding the role of the TMT structure. Unlike the study of TMT composition, which concerns the (aggregate) characteristics of individuals, research on the TMT structure concerned with the antecedents and outcomes of (1) *TMT size* (e.g. Certo, Lester, Dalton, & Dalton, 2006; Guadalupe, Li, & Wulf, 2014; Henderson & Fredrickson, 1996), (2) *TMT role structure*, including the presence and interdependence of TMT member roles (e.g., Hambrick & Cannella, 2004; Hambrick, Humphrey, & Gupta, 2015; Menz & Scheef, 2014), and (3) the *hierarchy within the TMT* (e.g., Halebian & Finkelstein, 1993; Keck, 1997; Ling, Simsek, Lubatkin, & Veiga, 2008). Decisions about the structure of a TMT reflect key organizational design choices. TMT structures and their relationship to one another vary just as organizational structures do (Beckman & Burton, 2011).

Although the studies in this relatively nascent research area share the central idea that TMT structure choices may affect TMT processes and organizational outcomes

either directly or indirectly (via their interplay with TMT composition (Hambrick et al., 2015), for example, through the selection of individual executives for specific roles), the contributions are disconnected. Indeed, perhaps because most studies focus on one structural TMT feature (e.g., TMT size), they often fail to consider existing knowledge on other features, such as role structures. As a result, not only a wide variety of TMT structure phenomena but also different theoretical perspectives and methodological approaches have been studied. Particularly in light of this area's enormous potential, as well as its various unresolved and unexplored research issues, there is a need to integrate dispersed insights and approaches, which future studies can build on. A thorough understanding of the TMT structure is particularly warranted now since TMTs have changed, including the increase in TMT size (Guadalupe et al., 2014) and the rise in new functional TMT member roles (Menz, 2012), which affects the functioning of the TMT. Beckman and Burton (2011) highlight the need to give more prominence to the TMT structure within the TMT literature. We heed this call for research and hope that our review will prompt more research in this field.

Given these shortcomings and opportunities, this article has three main purposes. First, we make a clear distinction between TMT composition and structure, which will alleviate the inconsistent and inadequate usage of the two terms in the past. Second, following a description of our review's approach, we provide an in-depth review of the research on the three structural features of a TMT: TMT size, TMT role structure, and TMT hierarchical structure. Specifically, we organize the themes and dominant relationships into a conceptual framework of the TMT structure's role in TMT research and summarize the approaches and findings in each of the three sub-streams. Third, based on an overall synthesis of the literature, we identify critical gaps within and across the different sub-streams and suggest research avenues that encourage scholars to benefit from cross-fertilization and promise to contribute to the study of the TMT, as well as the related research areas such as CEO, TMT composition, and strategic leadership literature.

Definitions and scope of the review

Before defining the scope of this review, we distinguish between the concepts of TMT composition and the TMT structure. This distinction is important to avoid confusion between TMT structure and TMT composition and encourage using the terms consistently in future research. While some studies have not distinguished between TMT structure and composition, three studies have made the distinction clear (Beckman & Burton, 2008; Beckman & Burton, 2011; Ferguson, Cohen, Burton, & Beckman, 2015). The study of *TMT composition* is concerned with the demographic characteristics of individual executives or groups of individuals (age, education background, functional experience, gender, etc.). Studies of TMT demographical composition usually treat executives' demographical characteristics as a proxy "for underlying individual and group cognitions and behaviors" (Carpenter et al., 2004, p. 749). An important difference is that TMT composition studies often focus on the TMT's functional (background) heterogeneity, which is linked to the individual's functional experience, whereas TMT structure studies are interested in the heterogeneity of functional roles within a TMT.

The study of the *TMT structure* examines top management team roles independently of individual characteristics. Our definition of TMT structures takes into account 1) TMT size, 2) TMT role structures, and 3) TMT hierarchies. Previous research has defined the TMT structure as "the *structure* of a top group [referring] to the roles of members and the relationships among those roles" (Hambrick, 1994, p. 178). We expand this definition by including TMT size because the latter is a key structural element often directly linked to the role structure (e.g., functional vs. divisional, presence of a certain role) and the relationship between roles (e.g., role interdependence). For example, the decision to add a functional role can directly affect the size of the top team if all the other roles remain and possibly also the number of hierarchical levels.

2.2. Method

For a systematic, comprehensive and contemporary review of the TMT structure literature, we followed the structured approach by Webster and Watson (2002), other editors' advice on literature reviews (Cropanzano, 2009; Short, 2009), as well as best practice examples (Carpenter et al., 2004; Krause, Semadeni, & Cannella, 2014; Kunisch, Menz, & Ambos, 2015; Menz, 2012; Nielsen, 2009). First, we searched the leading journals in the field: *Academy of Management Journal*, *Strategic Management Journal*, *Journal of Management*, *Journal of Management Studies*, *Administrative Science Quarterly*, *Organization Science*, and *Management Science*. Second, using the Boolean search engine of the SSCI (Social Science Citation Index), we searched title keywords and article abstracts with the following terms "top management team*," "TMT*," "upper echelon*," "UE," "top management group*," "TMG," "c-suite," "executive suite," "top executive*," "corporate elite*," "top team*," "dominant coalition*," "top manage*," "senior executive*," "strategic leader*," "top group*," "corporate executive*," "executive manage*," "inner circle," and "managerial elite." Third, we set 1984 – the year in which the seminal upper echelons article was published (Hambrick & Mason, 1984) – as the starting point and triggered the vast literature in TMTs up until the end of 2018. Fourth, we manually screened the resulting 614 TMT articles that had been identified. We reviewed the articles focused on a structural TMT feature as a key construct, which also meant excluding studies that use the TMT structure merely as a control variable¹. Fifth, we examined the references in the identified studies to find further studies that the keyword search may not have yielded. We excluded all articles that did not study TMT structures as a main variable. This approach produced 34 studies in total.

Building on the analysis of the existing literature, we organized the review according to the three distinct features of the TMT structure: *TMT size* (15 articles),

¹ The big difference between the number of identified articles and our final sample can be explained by our broad definition of keywords to ensure that we identified all TMT structure articles.

TMT role structure (15 articles), and *TMT hierarchy* (8 articles)². For each of the three sub-streams, we conducted a descriptive data synthesis (Kunisch, Menz, Bartunek, Cardinal, & Denyer, 2018) offering a review of the studies' theories, methodological approaches, and findings, as well as a discussion of their contributions. All articles are chronologically summarized in Table 2 to 4 at the end of this article. As illustrated in Figure 1, the studies in the three sub-streams inform our knowledge about the antecedents (context of CEO, TMT, firm, and environment) and the outcomes of the TMT structure, both on a TMT/individual level and an organizational level. Subsequently, based on the descriptive data analysis and identification of gaps, we developed a framework for future research opportunities.

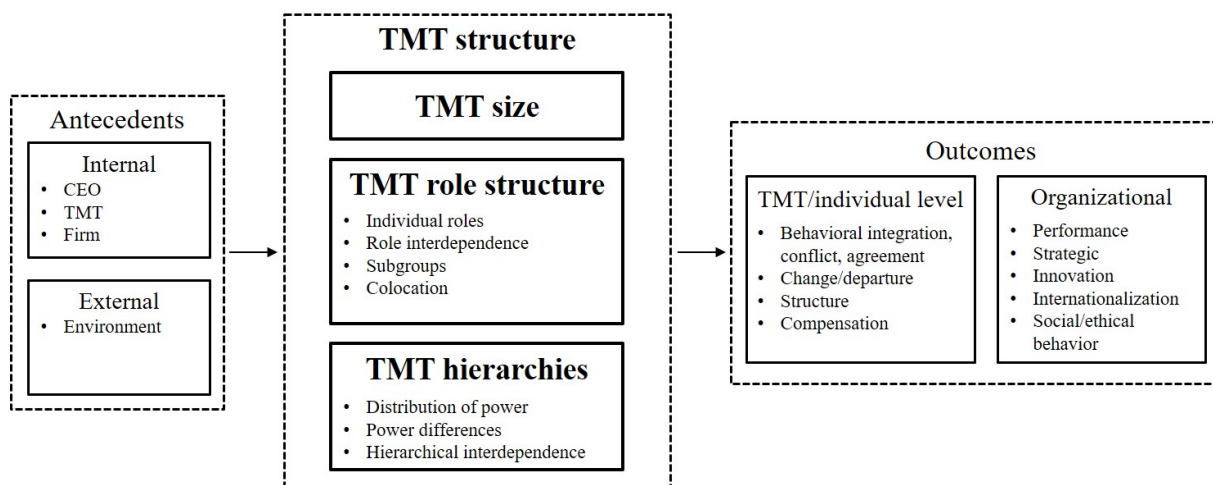


Figure 1. TMT structure research

2.3. Review

TMT size

The size of top management teams varies substantially from one firm to another. It is considered to be a fundamental aspect of the TMT structure (Keck and Merton as cited in Finkelstein et al., 2009). While the size varies depending on the definition applied and the setting of different studies, prior research informs us that TMT size is a structural element that has changed significantly since the mid-1980s, since when the

² Note that three articles study two TMT structure aspects jointly.

size of the group reporting directly to the CEO has doubled (Guadalupe et al., 2014). Within the TMT literature, the size of TMTs has mainly been regarded as a control variable when relating TMTs to strategy (Bantel & Jackson, 1989; Sanders & Carpenter, 1998). In our sample of empirical studies, 15 papers study TMT size as either an antecedent or an outcome. The average TMT size of all the studies varies from 1.22 to 19.11 top management team members (see Table 2. TMT size).

TMT size definitions

Scholars define TMT size in different ways depending on the research question, method, and context. In smaller and survey studies, for instance, CEOs define their TMT members (e.g. Amason & Sapienza, 1997; Barrick, Bradley, Kristof-Brown, & Colbert, 2007; Iaquinto & Fredrickson, 1997; Ling et al., 2008; Simsek, Veiga, Lubatkin, & Dino, 2005; Smith et al., 1994). TMT compensation studies commonly define TMT size as “the five highest-paid executives” (e.g. Dunn, 2004; Patel & Cooper, 2014; Ridge, 2015), while other studies include everyone who reports directly to the CEO in their definition of the TMT (e.g. Boeker, 1997; Guadalupe et al., 2014). Most TMT studies define TMTs as all executives with the title of vice president or above as reported in the firm’s form 10-K (Beckman & Burton, 2008; Cannella & Hambrick, 1993; Ferguson et al., 2015; Hambrick et al., 2015; Keck, 1997; Virany, Tushman, & Romanelli, 1992). Other studies use even broader definitions, for example, all officers (Sanders & Carpenter, 1998). An overview of TMT size definitions can be found in Tables 2 to 4. Interestingly, none of the studies define TMT size based on the number of roles within the TMT, although one person can have one or more roles within the TMT, such as a vice president of marketing and technology. We will return to this point in the future research section.

Antecedents of TMT size

Two studies explore the determinants of TMT size empirically, both from an information-processing perspective. Sanders and Carpenter (1998) study 258 S&P 500

firms in 1992 and apply two different TMT size operationalizations: (1) the total number of officers in the firm, with an average of 18.3, and (2) the number of executives who were in the top two tiers of the executive management, with an average TMT size of 6.47. With both operationalizations, they find support for the argument that large firms cope with complexity resulting from internationalization by having larger TMTs and longer-term CEO pay and often by separating the chairperson and CEO positions.

The study by Guadalupe et al. (2014) looks at 300 large U.S. firms over a span of 20 years (1986–2006). They observe that, between the 1980s and mid-2000s, the size of the TMT doubled from an average TMT size of five to 10, which they mainly attribute to an increase in functional managers and less to an increase in the number of general managers. Their explanation for the expanding TMTs and the growing number of functional executives is grounded in information-processing theory. Overall, they find a positive relationship between unrelatedly diversified firms and TMT size but not a significant relationship between IT investments and a TMT's size.

Outcomes of TMT size

Most papers on TMT size have focused on its effects. One group of studies explores the TMT processes and behavior that affect strategic decision making, and a second group focuses on the effects of TMT size on organizational outcomes. A common theme among scholars exploring the effects of TMT size is the positive and negative consequences for TMT (decision-making) processes.

First, several scholars studying TMT processes argue for a negative relationship between TMT size and social integration and informal communication (Smith et al., 1994), TMT agreement (Iaquinto & Fredrickson, 1997), and TMT behavioral integration (Simsek et al., 2005). Based on a study of 53 single-business, high-technology firms, including CEO interviews, TMT questionnaires, and archival data, Smith et al. (1994) find empirical evidence that TMT size has a negative relationship with social integration and informal communication and, thus, indirectly harms firm performance. They also suggest that “there is value in keeping the team size relatively small, to enhance informal communication and social integration” (Smith et al., 1994,

p. 434). In a similar vein, Iaquinto and Fredrickson (1997) explore the effect of TMT size on agreement within the TMT. They argue that teams with more diversity of opinion, which may not be heard, may break into subgroups, which, in turn, decreases the functionality of the team. Using samples from two industries – one highly unstable and one stable – from the 1980s, they do not find a significant relationship between TMT size and TMT agreement.

One of the most cited articles in this domain comes from Amason and Sapienza (1997), who study the effects of TMT size on cognitive conflict, defined as “task-oriented disagreement arising from differences in perspective” (p. 495) and affective conflict, defined as “individual-oriented disagreement arising from personal disaffection” (ibid.). Based on a survey of 48 TMTs in the food processing industry, they find a positive relationship between TMT size and both cognitive and affective conflict. These findings lead to a practical dilemma as larger teams with more cognitive conflict facilitate the exchange of information within the TMT, while affective conflict associated with larger teams is detrimental to decision making due to suspicion, distrust, and hostility among TMT members (Amason & Sapienza, 1997). Amason and Sapienza (1997) see managing the different conflicts as the solution to this dilemma, but they also highlight the need for further research to understand the double-edged effects of TMT size. Simsek et al. (2005) surveyed 402 firms to explore the association between TMT size and behavioral integration, a meta-construct “capturing three key interrelated and reinforcing elements of TMT process” (p. 69). In line with prior research, they find a negative relationship between TMT size and behavioral integration. To increase behavioral integration, they suggest that firms “structure larger TMTs in ways that minimize the negative impact of size on behavioral integration” (p. 80). Plambeck and Weber (2010) studied ambivalent issue interpretation, which has been argued to be important for mindfulness, creativity, and strategic change and, thus, for strategic decision-making processes involving the CEO and TMT. In a survey of 220 German CEOs regarding the enlargement of the European Union, they find no support for the hypothesis that the interpretation of strategic issues would be positively associated with larger TMTs.

Second, some studies explore strategic outcomes. For example, by conducting interviews with the CEOs of 98 U.S. semiconductor firms (1978–1985), Eisenhardt and Schoonhoven (1996) explore why organizations form strategic alliances. Taking a resource-based view, they extend theory with their findings that firms form alliances when they are in strategic need and have social opportunities. Social opportunities specifically mean that firms with larger founding TMTs, whose members had previously worked for many semiconductor firms in high management positions, have significantly higher rates of alliance formation. In a study of 67 semiconductor producers from Silicon Valley over 18 years (1976–1993), Boeker (1997) examines the effects of executive migration across organizations and the effect on strategic change, specifically product-market entry. Interestingly, he finds that smaller TMTs and teams with shorter tenures demonstrate a stronger relationship between executive migration and strategic change.

Another meta-study, conducted to find the drivers of firm multinationality, also considers TMT size (Kirca, Hult, Deligonul, Perry, & Cavusgil, 2012). This study aggregates 145 studies and the empirical findings from 154 independent samples. Overall, the findings of this meta-analysis strongly support upper echelons theory as executives' characteristics prove to be major determinants of firm multinationality. Concerning TMT size, it shows to be one of the drivers of firm multinationality but only before the inclusion of TMT international experience in the model.

One TMT size study sticks out among those exploring the effects on TMT processes or organizational outcomes as it investigates the effects on CEO compensation. Studying 189 firms from four industries (1985–1990), Henderson and Fredrickson (1996) take an information-processing perspective to argue that larger TMTs are better able to process information, which is “critical to organizational functioning and performance” (p. 576). They study the information-processing demands as determinants of CEO compensation and hypothesize that TMT size has a negative effect on CEO compensation because more TMT members reduce the amount of information processed by the CEO. While they find no significant effect of TMT size

on CEO compensation in general, the TMT size in conglomerate diversifiers has a positive relationship with CEO compensation.

Lastly, several scholars have explored the consequences of TMT size on firm performance. For example, Eisenhardt and Schoonhoven's (1990) study founding TMT's characteristics and organizational growth (sales) in technology-based ventures and is based on interviews in 92 U.S. semiconductor firms (1978–1985), along with archival data. Their argument that larger teams are better equipped to process diverse information and are, therefore, associated with higher growth is supported. The positive effect of TMT size on organizational growth has increased even more over time. In line with Eisenhardt and Schoonhoven (1990), Certo et al. (2006) study TMT characteristics and performance outcomes in the context of a comprehensive meta-analysis of 27 empirical studies, as well as 150 Fortune 500 firms in 2002. They find a positive and significant relationship between TMT size and sales growth; however, with regard to financial performance, they find no evidence of a significant, positive population correlation for TMT size and either ROA or ROE. Taking an information-processing perspective, Haleblian and Finkelstein (1993) look at 47 firms (1978–1982) from two industries: computer (unstable environment) and natural gas distribution (stable environment). They find that large TMTs are more profitable in a turbulent environment, which allows the CEO higher discretion than in a stable (low-discretion) environment. Recognizing that TMT size is an important feature of failing firms, Hambrick and D'Aveni (1992) study TMT size among other TMT characteristics and its relationship with failing or surviving firms in an exploratory study of 57 large bankruptcies and matched survivors. They find that in year one, the TMT size of the failing firms was abruptly smaller than the survivor firms and continued to shrink in the final years of their existence.

Discussion of TMT size studies

Collectively, research on TMT size informs us mainly about the effects of TMT size on TMT processes, as well as a variety of organizational outcomes. Overall, we know relatively little about the determinants of TMT size. We only know that TMT size

is influenced by the degree of internationalization (Sanders & Carpenter, 1998) and by functional centralization (Guadalupe et al., 2014), which helps explain why TMTs have been growing substantially since the 1980s. In the TMT process studies, it is noticeable that several scholars argue from a theoretical perspective that, for TMT (decision-making) processes, larger TMTs have positive consequences due to better information processing and more resources being available. However, the empirical data shows that TMT size is negatively associated with social integration, informal communication (Smith et al., 1994), and behavioral integration (Simsek et al., 2005), and positively with cognitive and affective conflict (Amason & Sapienza, 1997). Thus, while larger TMTs have advantages in resources and information-processing capabilities, they bring with them the disadvantage of increased conflict and integration. Turning to organizational outcomes, larger TMTs are associated with growth (Eisenhardt & Schoonhoven, 1990), alliance formations (Eisenhardt & Schoonhoven, 1996), and firm multinationality (Kirca et al., 2012), while smaller TMTs are associated with strategic change. Failing firms also have smaller TMTs. Overall, TMT size is not generally positively associated with better firm performance (Certo et al., 2006; Haleblan & Finkelstein, 1993) but dependent on the context. As expected, results for TMT size relationships differ depending on the environmental context (Haleblan & Finkelstein, 1993) and might be different from industry to industry (Henderson & Fredrickson, 1996). Altogether, comparing results of the reviewed studies has certain limitations due to the variety of different TMT size definitions and conceptualization. Despite the valuable insights in this domain, certain shortcomings need to be addressed by future research. These will be elaborated on and synthesized with opportunities to study TMT role structure and hierarchical structure after reviewing them.

TMT role structure

In recent years, there has been an increasing interest in TMT role structure. Role structure refers to the different roles that comprise a TMT and how they are structured. Deciding on the role structure at the top leaves one with many options: Which functional roles should be included in the team? Is it, for example, beneficial to have a chief

operating officer (COO) or chief strategy officer (CSO)? Should the TMT include more functional or more general manager roles? The latter decision influences the interdependency of roles because functionally structured TMTs are generally more interdependent than those comprising general managers who lead a more autonomous business unit (Finkelstein et al., 2009). Decisions about the role structure reflect important organizational design choices made by top managers and founders (Beckman & Burton, 2011). Practical examples show that TMT role structures vary significantly from firm to firm, and they are not constant. For example, companies may decide to add new roles, like Amerisource Bergen in 2012, who added the CSO role responsible “for enhancing the Company’s long-term strategic plan, identifying new market opportunities, and managing enterprise-wide risk” (BusinessWire, 2012). Other examples show that firms may change their TMT role structure with regard to functional and divisional roles. For instance, in 2012, Procter & Gamble expanded its entirely functionally structured TMT of 10 executives by adding 10 general managers and another functional executive (Procter&Gamble, 2013).

The different types of role structures studied can be clustered into four groups. First, among TMT role structure studies, one group of researchers studies what leads to the (increased) presence of certain roles and its effects on organizational outcomes. In concrete terms, these scholars study the presence of the COO (Hambrick & Cannella, 2004; Marcel, 2009) and CSO roles (Menz & Scheef, 2014), the creation of roles such as supply chain and operations management executive (SCOME) roles (Hendricks, Hora, & Singhal, 2015), structural elaboration through the creation of new roles (Ferguson et al., 2015), and the increased presence of functional roles (Guadalupe et al., 2014). Second, another group explores the role of TMT interdependence as a moderator of TMT characteristics and different outcome variables (Barrick et al., 2007; Hambrick et al., 2015; Wei & Wu, 2013). Third, scholars study the antecedents and outcomes of subgroups and different types of roles (Beckman & Burton, 2008; Eesley, Hsu, & Roberts, 2014; Ma & Seidl, 2018; Virany et al., 1992). Fourth, one study introduces the concept of TMT colocation, that is, TMT roles in the same location (Cannella, Park, & Lee, 2008). While the TMT role structures can be summarized in these four groups, we

will review the 15 papers from our sample in terms of antecedents, outcomes, and moderator. An overview is also provided in Table 3. TMT role structure.

Antecedents of TMT role structure

The antecedents of TMT role structure that have been studied are on the TMT, firm, and environment/industry level. On the TMT level, Beckman and Burton (2008) study 1,485 executives in 167 high-technology entrepreneurial firms in Silicon Valley (1994 – 1996). They take a path dependency perspective and argue that a founding team's initial functional experience will also influence the initial functional team structure; however, they only find weak support for this hypothesis. They further argue that the founding team's functional structure influences the breadth and depth of both 1) the subsequent functional structure and 2) the subsequent functional experience. A firm has a broad functional team when it has defined executive-level positions in each of the following six functional areas: sales and marketing, general administration (including human resources), science/R&D/engineering, operations, business development/strategic planning, and finance/accounting. The higher the number of executive positions in one of these areas, the deeper the functional structure/experience. The study demonstrates that firms beginning with a range of functional structures are more likely to develop more complete functional structures. However, contrary to their expectations, initial functional structures do not serve as placeholders to attract executives with relevant functional experience later on. Ferguson et al. (2015) also explore antecedents on the TMT level in their study of the concept of TMT misfit. Their sample includes 1,918 TMT roles and 1,452 executives in 167 high-technology entrepreneurial firms over several years. TMT misfit refers to overqualification and underqualification according to discrepancies between the role structure and composition, and the authors study it in the context of developmental milestones (venture capital financing and initial public offerings). Their study finds that overqualified TMTs elaborate their TMT structure without hiring new executives, while underqualified TMTs reinforce their existing expertise by employing new executives without elaborating the role structure. Furthermore, they find that firms that have not

reached developmental milestones are less likely to make changes to the TMT, even if they face a misfit. This means that TMTs need to develop their TMT composition and structure but may be constrained by their (in)ability to change. These two studies demonstrate the importance of jointly studying TMT composition and TMT structure, as well as the potential for gaining new insights by doing so.

Two studies examine the presence of certain functional roles on the TMT. First, Hambrick and Cannella (2004) examine the contingencies of COO presence in 404 firms in 21 industries (1987–1996). They find that CEOs who lack experience in operational activities and in managing the focal firm, as well as those who are also the chairperson of the board, are relatively likely to have COOs. Also from a contingency perspective, Menz and Scheef (2014) explore the drivers of the presence of the CSO role in TMTs in a sample of 147 S&P 500 firms over five years (2004–2008). Their results indicate that diversification, acquisition activity, and TMT role interdependence are positively associated with CSO presence.

Lastly, the previously discussed study by Guadalupe et al. (2014) explores the antecedent side of an increased number of functional roles, which they term “functional centralization.” They differentiate between functional roles that are further from the product (administrative functions like finance, law, and human resources) and those that are closer to the product (e.g., marketing and R&D). The increased presence of functional roles is attributed to IT investments (for administrative functions) and firms becoming less diversified (for product functions).

Outcomes of TMT role structure

Several studies are interested in the performance effects of TMT role structures. Only two studies consider the outcomes of TMT structures on the TMT level. The first is the aforementioned study by Beckman and Burton (2008), who examine the breadth and depth of functional structures as an outcome on the TMT level. The second study, by Ma & Seidl (2018), takes a new perspective: CEO–TMT interface and CEO–adviser perspective. With a comparative case study, they explore how new CEOs build their group of immediate collaborators, which they call “strategic leadership constellation”

(p. 606). While they find that all new CEOs face constraints in forming this group, they observe that CEOs in companies with a functional structure face relational and structural constraints in making changes to the TMT more frequently than CEOs in companies with a divisional structure. Ma & Seidl (2018) suppose that functionally structured TMTs are more interdependent (Hambrick et al., 2015); thus, CEOs are confronted with more constraints when they try to change the role relationships among TMT members.

Four studies analyze the outcomes of TMT roles like COO, CSO, and SCOME. First, Hambrick and Cannella (2004) take a contingency perspective to analyze the presence and performance effects of COOs over 10 years across 21 industries (1987–1996). They find that CEOs with COOs demonstrate lower organizational performance than those without a COO. Second, a subsequent study by Marcel (2009) of COOs' performance effects in a sample of 153 firms from five industrial sectors in 1998 reveals some benefits of COO presence. Taking an information-processing perspective, Marcel finds that COOs are positively associated with firm performance, especially for firms with relatively older TMT members. For TMTs with low levels of functional diversity, partial support was found for the benefits of having a COO. No support was found for the performance benefits of COO presence in a TMT with low levels of tenure heterogeneity. As this study shows, taking the moderating role of the TMT context into account is crucial to understanding the benefits of certain roles. Third, Menz and Scheef (2014) find that the structural choice of having a CSO does not significantly influence a firm's financial performance. Fourth, Hendricks et al. (2015) conducted an empirical study of 681 publicly announced SCOME appointments (2001–2011). This study finds positive stock market reactions to SCOME appointments. Differentiating between insiders and outsiders, as well as existing and newly created SCOME roles, they observe the strongest positive reaction for outsiders hired for a newly created SCOME role. These studies show that simply studying the presence of a specific role is unlikely to produce performance results/stock market reactions, whereas taking TMT composition characteristics (e.g., functional diversity, age heterogeneity, insider vs. outsider) into account can be essential in explaining the benefits of having certain roles.

Two studies differentiate between the subgroups of TMT roles and examine their performance effects. In the context of entrepreneurial firms, Eesley et al. (2014) study the effects of the founding TMT's structure on venture performance under the contingencies of the venture's strategy and business environment. They explore the TMT structure in terms of technically focused roles and differentiate between teams that were entirely comprised of technical roles at the company's founding and those that included other roles such as marketing, sales, finance, management, etc. With survey and archival data on 2,067 firms founded between 1931 and 2003, Eesley et al. (2014) conclude that ventures cannot ignore founding team roles and expect a later professionalization of their TMTs to align them with their strategy and environment. Together with the above-mentioned finding by Beckman and Burton (2008), the literature seems to suggest that the initial TMT structure matters.

Bermiss and Murmann (2014) conducted a longitudinal study with observations of 111,899 executives working in 3,288 advertising agencies over 19 observation periods and 8,537 firm years in New York City (1924–1996). From an upper echelons and executive mobility perspective, Bermiss and Murmann (2014) study the question of whether certain top managers matter more than others and how it influences organizational failure. They argue that losing top executives to competing firms is detrimental and that firms will benefit from getting top executives from their competitors. Furthermore, they introduce a new distinction for functional roles: those that govern internal firm routines and those that govern external firm exchanges. The study shows it is generally detrimental to lose top executives. It also finds that losing a top executive whose functional role focuses on internal firm processes is more detrimental to firm survival than losing a top executive whose functional role focuses on managing external exchange relationships.

With respect to firm performance, another interesting element of TMT role structure is TMT colocation. Cannella et al. (2008) study how TMT colocation – the physical proximity of TMT members – affects firm performance, as well as its moderating role for the TMT functional diversity–performance relationship. The results of their study of 207 firms (1990–1996) in 11 industries indicate that TMT colocation

is positively associated with firm performance. Furthermore, the effects of TMT functional diversity on firm performance become more positive as the proportion of TMT members with offices in the same location increases. These results underline the importance of structuring TMTs geographically in such a way that the benefits of functional diversity can be realized through interaction in one location. Again, TMT composition characteristics (functional diversity) help explain the benefits of a TMT structural setup.

TMT role structure as a moderator

Five studies explore the moderating role of different structural TMT setups for a variety of relationships. First, Virany et al. (1992) argue that, in turbulent environments, executive succession coupled with strategic reorientation should improve the organization's ability to adapt and, therefore, also the organization's performance. The measure of strategic reorientation includes one element of interest for this review: the change in the distribution of executive team members' titles, which they coded as functional, product divisional, market divisional, geographical divisional, or hybrid. Concerning the TMT role structure, firms performed a strategic reorientation when they changed from a functional to a divisional structure. The results of their study of 59 minicomputer firms founded between 1968 and 1971 show that executive succession positively influences organization performance, which is accentuated when strategic reorientation (= change in the TMT structure) takes place as well.

Second, the moderating role of TMT interdependence is considered by three studies. Barrick et al. (2007) introduced the concept of TMT interdependence to the TMT literature. They explore the contingencies of TMT interdependence by replicating and extending findings of small group research. The results of a survey of 94 TMTs show that TMT interdependence is an important moderator of the relationships between team mechanisms and outcomes. The most effective TMTs are those that match high interdependence with a high level of team mechanisms or match low interdependence with a low level of team mechanism. Based on the findings of their study, Barrick et al. (2007) conclude that team interdependence and team mechanisms should be treated

separately, and one should be cautious using the meta-construct of behavioral integration if not separating TMT processes from TMT interdependence.

The second study, by Wei and Wu (2013), applies an information–social categorization framework to explore the moderating role of TMT interdependence on TMT cognitive diversity and firm performance relationship. Their study, based on a multi-sourced survey of top managers from 118 Chinese firms, finds that TMT interdependence and TMT cohesion moderate the relationship between TMT cognitive diversity and the elaboration of task-related information. Furthermore, they find that the elaboration of task-related information mediates the interactive effects of TMT cognitive diversity and team interdependence on firm performance, as well as the interactive effects of TMT cognitive diversity and team cohesion on firm performance.

The third study, which investigates TMT interdependence and was carried out by Hambrick et al. (2015), argues that the conflicting results of the TMT composition–organizational outcome relationships may be resolved by considering the interdependence of different structural TMT setups. They introduce and differentiate between three types of structural TMT interdependence: a) horizontal interdependence – the degree to which members’ tasks and responsibilities depend on each other; b) vertical interdependence – the degree to which members are hierarchical peers (TMTs include members of varying ranks); and c) reward interdependence – the degree to which members receive payoffs collectively. Using data collected on 109 firms in the software and hardware industry (2002–2006), they find that the three facets of structural interdependence are important moderators of two relationships: TMT tenure heterogeneity’s effect on both turnover and performance. They conclude that horizontal, vertical, and reward interdependence, which are all elements of structural interdependence, each with distinct characteristics, need to be considered separately. According to the study by Cannella et al. (2008), which explores the moderating role of TMT collocation on the TMT functional diversity–performance relationship, TMT collocation accentuates the positive effects of TMT intrapersonal functional and TMT dominant functional diversity.

Discussion of TMT role structure studies

In summarizing our findings from above, we see several contributions and opportunities for further research. Prior research informs us about the antecedents of some TMT role structures, for example, those of the CSO role (Menz & Scheef, 2014) and COO presence (Hambrick & Cannella, 2004), functional centralization (Guadalupe et al., 2014), and changing the TMT (role and composition) (Ma & Seidl, 2018). On the outcome side, most studies explore organizational performance (Bermiss & Murmann, 2014; Cannella et al., 2008; Eesley et al., 2014; Hambrick & Cannella, 2004; Hendricks et al., 2015; Marcel, 2009; Menz & Scheef, 2014). The main insights from reviewing the TMT role structure literature are: First, TMT composition and structure are interrelated, and previous studies show the benefits of studying TMT structure and composition together. Studies by Beckman and Burton (2008) and Ferguson et al. (2015) demonstrate that simultaneously studying TMT structure and TMT composition advances our knowledge of TMTs' evolution in new firms. Second, studying TMT structural interdependence as a moderator of relationships between a) TMT mechanism (Barrick et al., 2007) and b) TMT composition (Hambrick et al., 2015) and organizational outcomes is key. Third, dividing roles into subgroups is essential for TMT structure studies. The division into subgroups such as product vs. functional roles (Guadalupe et al., 2014), technically focused vs. diverse functional roles (Eesley et al., 2014), and internally vs. externally focused functional roles (Bermiss & Murmann, 2014) has generated significant insights that would be overlooked if all TMT roles were only studied as one group. We will discuss avenues for future research related to those insights in the discussion section.

TMT role hierarchies

As with TMT size and TMT role structure, the hierarchical setup of TMTs can vary greatly. Different hierarchical TMT setups range from “flat” TMTs with only a few hierarchical levels to those that have five and more levels. For example, Emerson Electric's TMT consisted of seven TMT members on five hierarchical levels in 2008 (Emerson Electric, 2008), whereas Starwood Hotels & Resorts with a TMT of

the same size had only two hierarchical levels in the TMT in 2009 (Starwood Hotels & Resorts Worldwide & 2009). It is interesting not only to study the reasons why TMTs differ in their hierarchical structure but also to understand the consequences of this as TMT roles on different hierarchical levels may be an indication of the power of the function or business unit within the organization (Beckman & Burton, 2011). The study of TMT role hierarchies includes TMT roles on higher vs. lower ranks (Walsh, 1988), the departure of more- or less-senior executive roles (Cannella & Hambrick, 1993), power distribution within TMTs (Haleblian & Finkelstein, 1993), stratification defined as the number of levels and the relative size of each level (Keck, 1997), structural power and ownership power (Dunn, 2004), vertical interdependence and reward interdependence (Hambrick et al., 2015), structural power equality (Patel & Cooper, 2015), and CEO and TMT power (measured in titles and ownership) (Ridge et al., 2015).

In our sample of papers, eight studies examine role hierarchies in TMTs as either an outcome or a moderator; no studies have yet explored the antecedent side. The first paper addressing hierarchical role structures in TMTs was published in 1988, and in recent years the interest in TMT hierarchies has increased, as indicated by the number of articles. An overview is provided in

Table 4. TMT hierarchical structure.

Outcomes of TMT hierarchical structures

Studies concerned with the effect of TMT role hierarchies explore outcomes at the TMT and the firm level. TMT level outcomes are studied by Walsh (1988), who explores the effects of a merger and acquisition on an acquired firm's TMT – specifically, on TMT turnover. For our review, the relevant aspect of this study is that the study distinguishes between higher- and lower-ranking TMT members. Based on a survey of 55 parent companies of acquisitions (1975–1979) and archival data, the study finds that executives in higher-ranking roles are the first to turn over following an acquisition.

On the firm level, several studies explore the effects of TMT role hierarchies on firm performance. Taking the results of Walsh a step further, Cannella and Hambrick (1993) study the effects of executive departures on the subsequent performance of 96 acquired firms (1980–1984). Adapting an agency and executive succession theory perspective, they find that the negative effect of executives leaving acquired firms is more severe for the highest-ranking executives (e.g., CEO, president, chairperson). Based on these findings, they suggest that better post-acquisition performance can be achieved by providing one or more executives with TMT status in the new firm. Keck (1997) takes a group theory perspective to explore the relationship between the TMT structure and firm performance in different (stable and unstable) contexts. The study refers to the TMT structure while mostly studying demographical characteristics. However, she explores one element of TMT hierarchical structure, which is stratification: the number of ranks and the relative size of each rank. The results of studying TMTs in 56 cement (1919–1984) and 18 minicomputer firms (1969–1980) show that firm performance increases in stable contexts with greater team stratification. In turbulent contexts, lower stratification precedes higher performance. The study concludes that financially successful firms are the ones that gradually match their team structures to the environmental context.

Patel and Cooper (2014) integrate upper echelons and power theory with family firm literature to study the concept of structural power equality and its effects on interaction in the TMTs of family firms and overall firm performance. They argue that balanced structural power between two subgroups, family and non-family TMT members, increases firm performance in family firms. Their longitudinal study of 231 S&P 1500 (2001–2010) firms finds support for this. More specifically, the study finds that structural power equality between family and non-family TMT members lowers the turnover of non-family members, increases the range of a firm's strategic actions, and improves overall firm performance. As another firm-level outcome, Dunn (2004) studies illegal corporate behavior and how it is influenced by TMT duality and power. Dunn argues that firms with a concentration of a) structural power and b) ownership power in the TMT are more likely to engage in fraudulent financial reporting. The example of 103 firms (1992–1996) shows that firms are more likely to issue fraudulent financial statements when there is a higher concentration of power among insiders, that is, those roles that simultaneously hold a TMT and board of directors position.

TMT hierarchical structures as moderator

Two studies explore the moderating role of different TMT hierarchical structures. The previously discussed study by Hambrick et al. (2015) empirically shows the importance of the moderating effect of three types of structural independence on the relationship between TMT tenure heterogeneity and TMT turnover and firm performance. One of these types of interdependence is connected TMT hierarchical structures: vertical interdependence, which is the degree to which members are hierarchical peers (TMTs include members of varying ranks). As discussed before, this study underlines the importance of structural interdependence for relationships that might otherwise not be significant.

Integrating economic and behavioral theories, a study by Ridge (2015) explores how CEO power (the distance between the CEO and TMT members in terms of both ownership and titles) moderates the relationship between pay disparity and firm performance. The results of studying 227 Fortune 500 firms (2003–2006) demonstrate

a curvilinear relationship between pay disparity and firm performance. More specifically, it shows that high levels of firm performance will be found around either meaningfully low or meaningfully high levels of pay disparity. These effects can be explained by using tournament theory (economic theory) and social comparison theory (behavioral theory): High levels of pay disparity incite tournaments, while low levels of pay disparity do not initiate social comparison. In the relationship between pay disparity and firm performance, tournament effects are inhibited by CEO power. This suggests that firms with large pay disparity patterns may benefit from forgoing powerful CEOs.

Discussion of TMT hierarchical structure studies

In summary, our main insights are: First, while prior research informs us about different outcomes of varying TMT hierarchical structures (e.g. Cannella & Hambrick, 1993; Dunn, 2004; Halebian & Finkelstein, 1993; Keck, 1997) and their moderating role (Hambrick et al., 2015), the antecedent side remains unexplored. Prior research does not inform us why TMTs are hierarchically structured the way they are. Second, we know that TMT hierarchies matter for TMT turnover (Walsh, 1988), but we do not know how different hierarchical setups influence other TMT level processes, such as behavioral integration. Third, as two studies show, it is important to consider the environment (stable vs. unstable) when studying TMT hierarchical structures (Halebian & Finkelstein, 1993; Keck, 1997). Financially successful firms match the TMT's hierarchical structure with its environment (Keck, 1997). Overall, our knowledge of TMT hierarchies is less advanced than that of TMT size and TMT role structures. This offers promising opportunities for further research, which will be discussed in more detail below.

2.4. Overall synthesis and directions for future research

The growing body of research on the TMT structure has the potential to become a new focus area for the study of TMTs and upper echelons research in general. Each sub-stream advances scholars' understanding of the TMT structure and its effects.

However, the joint impact has been limited since each sub-stream has been studied separately (a few exceptions are mentioned above). For TMT structure research to become a focus area and grow its potential, scholars need to direct their attention to the most pressing and promising research topics. In addition, scholars need to build on existing knowledge from the other sub-streams. While research on the three TMT structure aspects is in different development stages, the relatively limited, partly contradictory findings in the sub-streams call for studies that enable us to understand and resolve these issues and will extend the boundaries of this research. Furthermore, we encourage scholars to draw on the cumulative knowledge of the three research sub-streams and to benefit from cross-fertilization. Building on a synthesis of the findings from the review, we identify the major gaps and present a future research agenda.

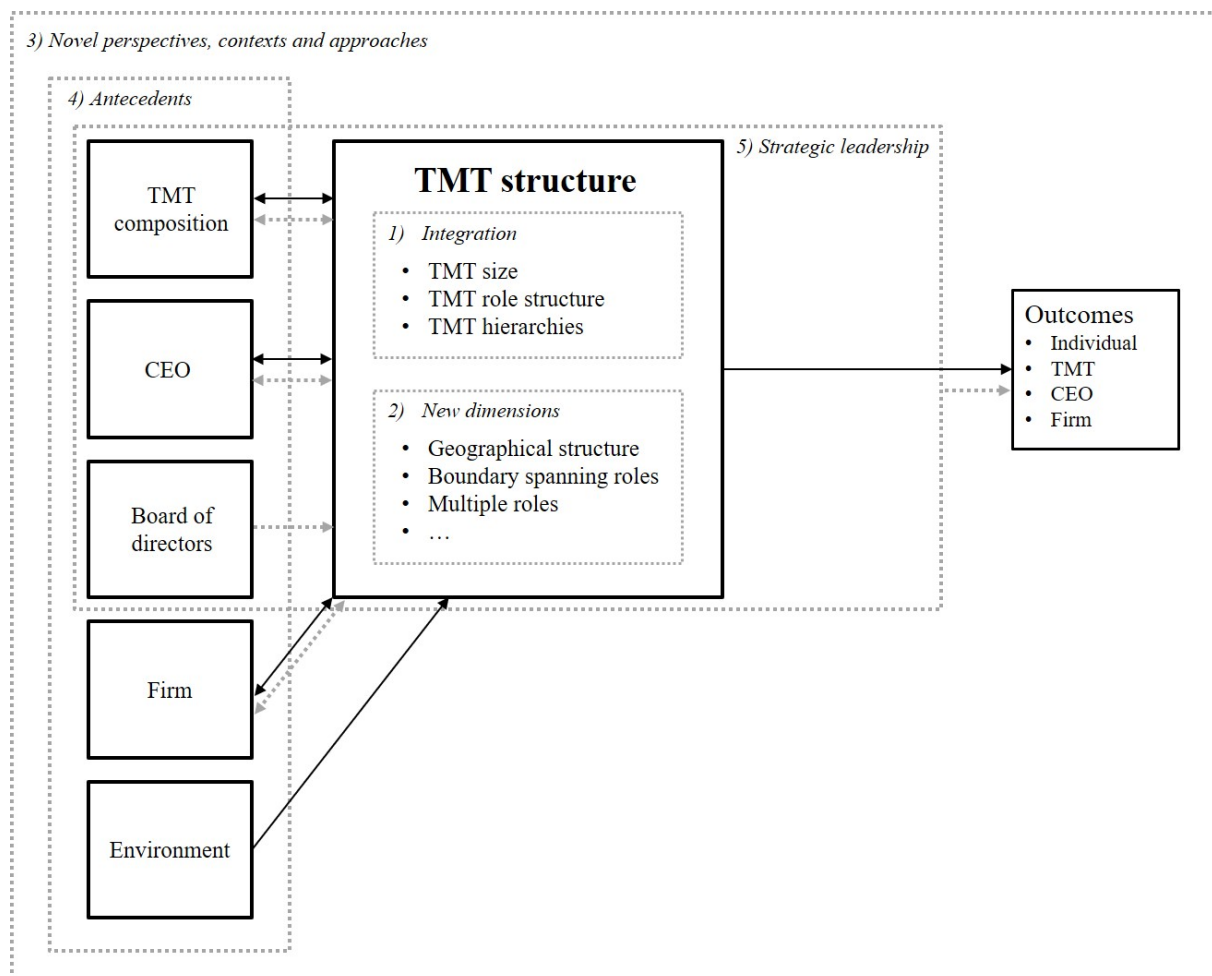


Figure 2. Framework for future TMT structure research

Based on our review, we have developed a framework for future TMT structure research (Figure 2) which we present before enumerating the possible research opportunities. The framework offers an overview of prior research and highlights future research opportunities. The framework intends to visualize new areas of exploration and stimulate future research. In the center of the framework is the TMT structure with its three sub-streams. The first research opportunity incorporates the (1) *integration* of these sub-streams. The second research opportunity suggests the study of (2) *new dimensions* of the TMT structure. The third research opportunity captures the application of (3) *novel perspectives, context, and approaches* to the study of the TMT structure. The fourth research opportunity advocates extending the study of the TMT structure to (4) *antecedents* that have not been studied before (e.g., board of directors) and antecedents that have only been explored within single sub-streams. The fifth research opportunity encourages the connection between the TMT structure and other areas of (5) *strategic leadership*, such as TMT composition, the CEO, and the board of directors. The dotted lines highlight the areas that have not been studied and/or where we see more potential for future research, while the unbroken arrows represent relationships that have been studied before.

Research opportunity 1 – Integration of TMT structures

Our review revealed that structural features of TMTs have largely been studied apart from other structural features. However, three studies (Guadalupe et al., 2014; Haleblan & Finkelstein, 1993; Hambrick et al., 2015) have integrated more than one structural feature. Since these studies have contributed significantly to our understanding of TMT structures and there are clearly causal relationships between the various TMT structural features, we encourage scholars to study TMT structures jointly.

In this vein, researchers have enriched our understanding of individual roles like the SCOME, COO, and CSO (Hendricks et al., 2015; Marcel, 2009; Menz & Scheef, 2014). Since the performance benefits of these roles are ambiguous, it would be enriching to integrate different structural features that could shed more light on the role structures and their benefits. For instance, exploring combinations of roles could show

us whether certain role combinations have performance effects rather than individual roles; roles may complement or substitute each other. We also encourage researchers to study roles and role combinations in different structural contexts (e.g., structural interdependence, power constellations) as this could benefit our understanding of when certain roles are more beneficial to firms and when not. For example, as we know from TMT hierarchy research (Keck, 1997), financially successful firms match the TMT hierarchical structure with the environment. Thus, we suggest that, when studying particular roles, both the environmental context and the hierarchical setup of the TMT be considered. The benefit of having certain roles in the TMT may depend on the context and the hierarchical position these roles have to make use of their resources.

The study by Guadalupe et al. (2014) is an insightful example of studying TMT subgroups – divisional manager roles and different functional roles – and how they influence the change in TMT size. We see interesting research opportunities in studying different subgroups of TMT roles in relation to TMT size and TMT hierarchical structures. For instance, exploring the ability to influence and the potential power differences of subgroups (e.g., divisional vs. functional roles) is a promising avenue for further research.

Another important topic for future research concerns TMT size, TMT hierarchical structures, and TMT processes. We know that large and small TMTs may have negative and positive consequences. Amason and Sapienza (1997) called for enhancing our understanding of how different TMT sizes and the resulting conflicts can be managed to limit the negative effects and unleash the positive ones. Given the power of TMT hierarchical structures to shed light on classical TMT–performance relationships (Hambrick et al., 2015; Ridge, 2015), we find it promising to explore how different TMT structures may influence the advantages and disadvantages of larger TMT sizes. Therefore, we encourage researchers to follow this promising track and study TMT size and TMT processes in the context of different hierarchical setups and with different role structures. Prior research on hierarchical structures informs us mainly of its importance for firm performance (Cannella & Hambrick, 1993; Halebian & Finkelstein, 1993; Keck, 1997). Complementing this research by exploring more

immediate outcomes such as TMT processes is needed. Since TMTs have increased significantly in size and it is necessary to maximize the advantages of larger teams, we believe this topic is highly relevant for practitioners.

Studying TMT structures jointly is not limited to the avenues mentioned above. We see potential in exploring TMT structures jointly for a variety of outcomes and in relation to other factors such as TMT composition, which will be elaborated on in Research opportunity 5.

Research opportunity 2 – New dimensions of the TMT structure

The field of TMT structure research is still in its infancy. Therefore, we encourage future studies to explore new dimensions of the TMT structure. Our review shows that studying new dimensions of the TMT structure has helped to illuminate previously unclear relationships, for example, TMT interdependence by Hambrick et al. (2015) and colocation by Cannella et al. (2008). By building on the work of Cannella et al. (2008) and the concept of colocation, scholars might investigate the geographical structure of TMTs and the effects of geographical TMT subgroups on TMT processes and firm outcomes. For example, whether certain roles or subgroups are located at the corporate headquarters or a subsidiary appears to be central to TMT processes because strategic leadership is a shared activity (Hambrick, 2007). Regarding geographically dispersed TMT roles, an interesting question would be which role do digitization and virtual communication play in overcoming the challenges of not being in one physical location.

Along these lines and informed by the boundary-spanning literature (Aldrich & Herker, 1977; Tushman & Scanlan, 1981), scholars may explore dimensions of boundary-spanning roles in the TMT. The boundary-spanning literature focuses on individuals and roles that span from inside the organization to the environment, treating them as the critical link between the environment and the organizational structure (Aldrich & Herker, 1977). Scholars could explore which roles are boundary spanning and how the TMT structure of boundary spanning roles needs to match the environment of the organization. While the boundary-spanning literature focuses on boundaries

between the firm and the environment, scholars could also explore roles that span units geographically as mentioned above (from headquarters to subsidiaries) or horizontally (across functions and/or business units). In light of firms becoming more international and having complex organizational structures, we believe this avenue for research is relevant to practice.

As the definitions of TMT size have revealed, TMT research generally focuses on studying the number of individuals and their primary role within a team. In reality, however, TMT members often hold multiple roles at the same time. For example, one executive may have two or more roles, like Julie Bushman at 3M Co, who leads both business transformation and information technology (3M, 2020), or Frank D'Amelio at Pfizer Inc., who is both CFO and head of global supply and business operations (Pfizer, 2020). Therefore, we call for studies to account for multiple roles when studying the TMT structure. For instance, by building on power theories (Finkelstein, 1992), researchers could explore potential power differences between executives who hold one or multiple roles and the effect on TMT processes and outcomes.

Research opportunity 3 – Novel perspectives, contexts, and approaches

Our review of the literature reveals that most studies of the TMT structure are rather homogenous with regard to the theoretical perspectives applied (see Table 4), types of firms, geography studied, and methods used. Therefore, we encourage scholars to bring more heterogeneity of theories, empirical contexts, and methods into TMT structure research as we believe this will enable new insights.

Not surprisingly, most studies from our review are housed in the upper echelons literature and the two most frequently applied perspectives are information-processing and contingency. It would be enriching to apply other theories and perspectives besides the two most obvious ones. For example, when studying TMT role structures, role theory could be used to explain the strategic decisions and behavior of executives according to their and others' expectations of the role. The resource-based perspective is applied by one study to predict higher rates of alliance formation (Eisenhardt & Schoonhoven, 1996). We call for more studies to explore the resource-based view. The

number of executives on the TMT determines the resources available (Hambrick & D'Aveni, 1992); however, the number of TMT members alone does not necessarily lead to a competitive advantage. It would be worth exploring who brings unique resources to the TMT and whether certain TMT structures enhance or hinder the potential of these resources. Thus, we consider this perspective to be promising. As our review shows, TMT structures' evolution over time is a highly relevant and little-researched topic (Beckman & Burton, 2008; Guadalupe et al., 2014). We agree with Beckman and Burton (2008) that taking an evolutionary perspective (Aldrich, 1999) would benefit our understanding of how TMT structures have changed and evolved. The emerging CEO–TMT interface perspective (Bromiley & Rau, 2016; Ma & Seidl, 2018), which has not yet been applied to TMT structure studies, also has the potential to explore and explain previously undiscovered relationships. This perspective may help to understand how CEOs and TMTs collaborate in structuring the TMT.

Next, our examination of the literature shows that most studies reviewed here study firms that are mostly larger, older, well-established firms (e.g., S&P 500, see Tables 2–4). Not only in our sample of studies but also in general, there is a trend of studying larger and older firms in the upper echelons literature. Beckman and Burton (2008), who are pioneers in the field of TMT structure research, and Ferguson et al. (2015) are notable exceptions because they study younger and smaller firms. Lubatkin, Simsek, Ling, and Veiga (2006) were the first to note that the focus on large firms is a gap in upper echelons literature. It would be interesting to explore the differences in TMT structures between younger and older, smaller and larger firms. Next, researchers could explore how TMT structures in different firm types may influence TMT processes differently. We call for more studies of younger and smaller firms to broaden the horizon of the field and its applicability for practitioners. Also, there is a clear geographical focus on mostly U.S. firms, except for Wei and Wu (2013), who studied top managers in China, and Plambeck and Weber (2010), who surveyed German CEOs. Today, it is widely known that “culture matters” (Hoppe, 2004, p. 73), and we expect that it matters for TMT structure studies as well. Crossland and Hambrick (2007) find empirical evidence that CEOs in various countries – United States, Germany, and Japan

– have different degrees of latitude of action and constraints to affect firm performance. Following this research, we encourage scholars to apply this theory to TMT structures in different countries and explore the role that national values, ownership structures, and board governance play for TMT structures. This is a promising avenue for future research because we expect that, based on the typology by Hofstede (2001), national values such as power distance and acceptance of unequal power distribution play a role in the hierarchical structure of TMTs. Ownership structures and board governance differ widely between countries (Crossland & Hambrick, 2007) and may play a role in the way TMTs are structured (elaborated in Research opportunity 5). We encourage researchers to conduct replication studies in different cultural contexts, as well as cross-national studies.

We see potential in studying TMT structures with different and novel methods to explore the questions presented above and below. Our review shows that most studies use quantitative methods. Qualitative studies are needed to complement quantitative studies that have advanced the field of TMT studies. For instance, qualitative studies have the potential to increase our understanding of who decides about TMT structures and which factors influence the TMT structure and go beyond the proxies that we often rely on. Methods other than regression analysis, such as configurational studies, could advance our understanding of TMT structures, especially for the research questions about roles complementing or substituting each other.

Another important area of future research is TMT structure and time. Three studies demonstrate the importance of considering TMT size and time. We know that TMT size has doubled over the past few decades (Guadalupe et al., 2014), that the effects of TMT size may gradually increase (Eisenhardt & Schoonhoven, 1990), and that the TMT size of failing firms decreases over time. While TMT size has changed, Marcel (2009) notes that TMT structures appear to be rather stable. Exploring whether, when, and how TMT structures (all three sub-streams) change through longitudinal studies is a promising avenue for future research. Following Guadalupe et al. (2014), it would be interesting to discover trends in changing TMT role structures. For instance, such research may examine whether the presence of rather new TMT roles (e.g., CSO)

occurs first in the United States and later in other countries. Longitudinal studies could shed light on changes in the divisional and functional structures of TMTs. Moreover, longitudinal studies would allow us to understand whether and how TMT hierarchical structures have changed and what the reasons and performance effects might be.

Including heterogeneous TMT size definitions – multiple, established, and new ones – is critical to our understanding of TMT structures. For example, the conflicting results about the performance effects of TMT size are a strong motivation to conduct replication studies that incorporate multiple TMT conceptualizations. As we can see from the tables (see **APPENDIX**).

Table 2. TMT size Table 2 to 4), TMTs are defined in different ways, and sometimes no definitions are given, for example, when the focus is on one role (Cannella & Hambrick, 1993; Hambrick & Cannella, 2004; Marcel, 2009; Menz & Scheef, 2014). Clearly, different TMT definitions lead to different TMT size counts and, therefore, might lead to different results. We call on all TMT researchers to report TMT size in the future. Generally, TMT size is conceptualized as the count of TMT members while it could be worthwhile to study different conceptualizations of TMTs, like the total costs of TMT members (e.g., amount of compensation for a TMT). Considering the remarkable cost of each TMT role, it would be interesting to have a better understanding of the added value of additional roles. Also, different TMT definitions may be needed depending on the phenomena in focus, for example, studies focused on roles may define TMT size based on the number of roles.

Research opportunity 4 – Antecedents of the TMT structure

To substantiate our knowledge of TMT structures, scholars need to expand studies on TMT structure determinants. Pettigrew already pointed out the need for treating TMT characteristics as a dependent variable and understanding “why [...] teams look the way they do” (Pettigrew, 1992, p. 176). Bromiley and Rau (2016) stress that “the structure of the top management team depends on purposeful choices” (p. 198) and call on researchers to explore these choices. As our review shows, research on TMT structure antecedents is in different developmental stages. We know much more about

the drivers of TMT structural roles than we do about TMT size, and even less about TMT hierarchy antecedents.

First, there is limited empirical research and development of theory on the antecedents of TMT size, with two exceptions (Guadalupe et al., 2014; Sanders & Carpenter, 1998). Prior research informs us that TMTs have grown significantly over the past 30 years; however, we know relatively little about what drives TMT size. To gain a more accurate understanding of what determines TMT size, future studies may consider drivers on multiple levels, such as environmental (e.g., environmental instability, growth, and competitive environment), organizational (e.g., size, growth, diversification), CEO (e.g., power variables), as well as ownership structures and board governance.

We know more about the antecedents of role structures, specifically about those of COOs (Hambrick & Cannella, 2004), CSOs (Menz & Scheef, 2014), and how young firms arrive at more complete functional TMT structures, that is, a broad range of functional roles (Beckman & Burton, 2008). It would be worth exploring what determines the role structures of older, larger, and more-established firms (e.g., S&P 500) and what leads to more complete role structures in this organizational context. Furthermore, Ferguson et al. (2015) observe changes in TMT structures due to TMT misfit, which is TMT over- and underqualification. The concept of misfit shows the overarching effects on changes that it has on the TMT structure, but as Ferguson et al. (2015) remark, it does not explore the influences in an isolated way (e.g., need vs. opportunity vs. resources). Exploring how and why TMT structures are changed with a focus on need, opportunities, and the resources available would substantially enhance our understanding of TMT structures.

Regarding TMT hierarchical setups, no study has yet explored the antecedents of TMT hierarchical structures. Considering how important hierarchical structures are (i.e., influencing different outcomes and solving previously conflicting findings as a moderator (Hambrick et al., 2015)), it is essential to understand what influences different hierarchical setups.

Overall, the question of who decides about TMT structures and how these decisions are made is seldom investigated. Exploring a broader set of possible antecedents and with different methods, as mentioned above, could advance our understanding of this important question, for example, through more qualitative research and/or mixed methods (e.g., interviews, content analysis of press releases of new TMT member announcements). This kind of research could also shed light on the issue of the two-way causality between TMT structures and other variables (e.g., environment, firm, CEO), which is also largely unresolved in TMT composition research (Nielsen, 2009).

Research opportunity 5 – TMT structure and strategic leadership

Our review and the previously outlined research avenues reveal that we need to deepen our understanding of the TMT structure as it relates to other dimensions of strategic leadership (see Figure 2). Strategic leadership involves TMTs, CEOs, and boards of directors (Samimi, Cortes, Anderson, & Herrmann, 2020). Promising research opportunities exist in exploring the relationships between the TMT structure and research on TMT composition, CEOs, and boards of directors.

First, turning to TMT structure and composition, we know that controlling for TMT size has become a standard practice for most TMT composition studies (Bantel & Jackson, 1989). However, only a few recent studies have addressed how the TMT's structural and compositional factors interrelate, co-evolve over time, and affect outcomes (Beckman & Burton, 2008; Ferguson et al., 2015; Hambrick et al., 2015; Marcel, 2009). These studies have contributed significantly to our understanding; therefore, we encourage more research in this direction. For instance, while Beckman and Burton (2008) find some support for the notion that the founding team members' experience shapes the initial functional structure of a startup's TMT, there is great potential for studies to explore how TMT structure and composition interrelate. One such study explores the idea of TMT misfit, that is, TMT over- and underqualification in the context of entrepreneurial firms. We do not know how TMT structures and TMT compositions co-evolve in more mature firms. Important questions include: What are

the effects of misalignment of TMT roles and TMT composition for TMT processes and eventually firm performance? How are decisions about changes in TMT roles and TMT composition made? And are roles created because of the firm's need or because of the reshuffling of existing executives (Ferguson et al., 2015)?

The importance of jointly studying TMT composition and structure is demonstrated by Hambrick et al. (2015): TMT structural interdependence sheds light on the previously equivocal relationship between TMT heterogeneity (composition) and firm performance. Future researchers are further encouraged to consider the structural setup of TMTs when studying TMT composition and its effect on TMT processes and performance (Hambrick et al., 2015) and vice versa, including TMT composition in the study of the TMT structure.

Second, our knowledge about the interplay between the CEO and the TMT structures is limited, and we encourage scholars to explore this important field in greater depth. Only one study (Hambrick & Cannella, 2004) has examined how CEO characteristics might influence decisions about TMT structures and finds support for the position that CEOs who lack experience in operational activities are more likely to have a COO. Also informed by the CEO–TMT interface perspective (Bromiley & Rau, 2016; Ma & Seidl, 2018), which focuses on the role of the CEO in configuring the TMT, we see many opportunities in studying such relationships. Researchers could focus on questions like: Why do CEOs opt for certain role structures? What is the CEO's role in deciding about role structures? What makes a CEO more powerful in such decisions? And how do certain TMT structures benefit the CEO and his/her performance?

Third, to our surprise, no prior research has studied the role that boards of directors play in decisions about the TMT structure. In their study, Westphal and Fredrickson (2001) show that boards of directors, which are powerful, have influence over CEO succession and selection and indirectly influence strategy and TMT characteristics. Therefore, it seems promising to investigate the role these boards play when it comes to TMT structures.

Finally, future studies should seek to contribute to the debate on whether the organization is a reflection of the TMT, as Hambrick and Mason (1984) and numerous

studies on TMT composition suggest, or whether organizational characteristics determine the TMT setup, as the executive selection literature and TMT structure studies often conclude.

2.5. Conclusion

The goal of this article was to review and synthesize the emerging topic of the TMT structure and suggest avenues for future research. The three sub-streams – size, role structure, and hierarchical structures – have mostly been studied separately in the past. However, this review shows the importance of studying them together and in the context of strategic leadership research. We highlight the largely untapped potential of joint study to resolve previously conflicting results in the upper echelons literature. We encourage studying new dimensions of TMT structures, bringing more heterogeneity to TMT structure studies, and further exploring why TMTs are structured the way they are. We hope this review motivates scholars to pursue those research opportunities and enhance our understanding of TMT structures within the broader context of strategic leadership.

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APPENDIX

Table 2. TMT size

Study (author/s, year)	Theoretical perspective/literature stream	Empirical context	TMT definition	TMT average size (SD)	Key findings related to TMT size
Eisenhardt and Schoonhoven (1990)	Founding team literature, chaos theory, organizational growth	Interviews, 92 firms from U.S. semiconductor industry founded 1978–1985, data from 10-K forms and annual reports.	Individuals designated by the company respondents as founders, who worked full-time for the firm in executive positions at its inception.	n/a	Larger teams are better equipped to process diverse information and are, therefore, associated with higher growth in new firms. The positive effect of TMT size on growth increases over time.
Hambrick and D'Aveni (1992)	Corporate failure, upper echelons	Archival data on 57 large bankruptcies and 57 matched survivors.	Officers (vice presidents and higher).	10 (n/a)	In year one of the study, the TMT size of the failing firms was much smaller than the survivor firms and continued to shrink in the final years of their existence.
Haleblian and Finkelstein (1993)	Information processing, social psychology	47 firms (26 computer and 21 natural gas distribution companies), 1978–1982.	All corporate officers who were also board members.	3.39 (1.46)	Large teams and teams with less dominant CEOs were more profitable in a turbulent environment (the computer industry) than in a stable environment (natural gas distribution).
Smith et al. (1994)	Upper echelons theory, social psychology	Interviews with 53 CEOs from high-velocity firms, 230 surveys of CEOs and TMTs, archival data.	Identified by the CEO.	5.19 (2.1)	TMT size has a negative relationship with social integration and informal communication. Team size indirectly detracts from performance through negative effects on informal communication and social integration.
Eisenhardt and Schoonhoven (1996)	Resource-based view, alliance formation	Interviews with CEOs of 98 U.S. semiconductor firms, founded 1978–1985.	Individuals who were designated by the company respondent in the structured interview as members of top management.	3 (n/a)	Firms with larger founding TMTs, whose members had previously worked for many semiconductor firms in high management positions, have significantly higher rates of alliance formation.
Henderson and Fredrickson (1996)	Information processing	Archival data on 189 firms from four industries: chemicals, high-tech equipment, natural resources, conglomerates; 1985 and 1990.	Corporate officers.	19.11 (12.17)	No significant effect of TMT size on CEO compensation, but in conglomerate diversifiers, TMT size has a positive relationship with CEO compensation. The industry group-by-TMT-size interaction was negative and significant for both cash and total compensation for each of the related-diversifier categories.

Amason and Sapienza (1997)	Cognitive conflict, social judgment theory, social identity theory	Survey of 48 TMTs from the food processing industry.	CEOs named TMT members who participated in strategic decisions.	3.44 (n/a)	TMT size is positively related to both cognitive and affective conflict.
Boeker (1997)	Upper echelons, strategic choice	67 semiconductor producers from Silicon Valley, 1976–1993.	Individuals who report to the CEO.	n/a	Smaller TMTs and teams with shorter tenures demonstrate a stronger relationship between executive migration and strategic change. Moderated by TMT size, the relationship between executive migration and product-market entry is stronger in smaller TMTs.
Iaquinto and Fredrickson (1997)	Uncertainty reduction theory, TMT agreement	Scenario-questionnaire, 57 firms in two industries: highly unstable and stable.	TMT was defined through discussions with the CEO.	4.29 (1.4)	TMT size is inversely related to TMT agreement about comprehensiveness. TMT size was significantly correlated with firm size.
Sanders and Carpenter (1998)	Information-processing and agency theory	258 S&P 500 firms in 1992.	1) total number of officers in a firm; 2) number of executives in the top two tiers of executive management.	18.3 (11.39) 6.47 (3.19)	The degree of internationalization was positively and significantly associated with TMT size with both broad (number of officers) and narrow (number of officers of the top two tiers of management) TMT measurement.
Simsek et al. (2005)	Upper echelons, TMT behavioral integration	Survey data, 402 firms.	Reported by the CEO.	4.75 (1.68)	TMT size is negatively related with to behavioral integration. Even though average TMT size was relatively small (4.75), TMT size still mattered.
Certo et al. (2006)	Upper echelons, strategic leadership, information processing	Meta-analysis of 27 empirical studies and 150 Fortune 500 firms, 2002.	Four TMT size variables: 1) top tier, 2) top two tiers; 3) top three tiers; 4) executives who are also inside directors.	2.88 (1.32) 7.88 (3.48) 10.43 (4.24) 1.59 (0.77)	No significant relationship between TMT size and ROA or ROE. Positive significant relationship between TMT size and sales growth, firm diversification, R&D, and internationalization. Different TMT size definitions may account for mixed results in TMT literature.
Plambeck and Weber (2010)	Ambidexterity, strategic sensemaking	Survey of 220 CEOs and secondary data.	According to Hoppenstedt 2004 database and validated with heads of 39 companies.	0.97 (logged)	Larger TMTs were not positively associated with ambivalent issue evaluation by the CEO.
Kirca et al. (2012)	Upper echelons theory, interaction paradigm	Meta-analysis of 154 independent samples reported in 145 studies.	No definition.	n/a	A positive effect of TMT size on firm multinationality was found. TMT size was not significant after the inclusion of TMT international experience in the model.
Guadalupe et al. (2014)	Information-processing theory, theories of centralization	300 large U.S. firms, 1987–2006.	Direct reports to the CEO.	1987: 4.98 2006: 10	From the mid-1980s to mid-2000s, TMT size doubled from five to 10, with approximately three-quarters of the increase attributed to functional managers rather than general managers.

Table 3. TMT role structure

Study (author/s, year)	Theoretical perspective/literature stream	Empirical context	TMT definition	TMT average size (SD)	Construct of interest	Key findings related to TMT role structure
Virany et al. (1992)	Executive succession, organizational learning	Archival data on 59 minicomputer firms founded between 1968 and 1971.	All executives down through the vice-presidential level included as members of the executive team.	n/a	Strategic reorientations (change in strategy, TMT structure, power distributions, and control practices)	Strategic reorientations have a significantly positive association with subsequent organization performance in turbulent environments.
Hambrick and Cannella (2004)	Contingency theory	404 firms in 21 industries, 1987–1996, 3,168 firm years.	No definition.	n/a	COO presence	CEOs who lack experience in operational activities and in managing the focal firm are relatively likely to have COOs. No support found for the contingency view in explaining when COOs are most beneficial. CEOs with COOs show lower organizational performance than those without a COO.
Barrick et al. (2007)	Contingency theory	Survey of 94 TMTs from credit union industry.	CEOs identified TMT members.	6.39 (1.91)	TMT interdependence	TMT interdependence is an important moderator of the relationships between team mechanisms and outcomes. The most effective TMTs are those that match either high interdependence with a high level of team mechanisms or low interdependence with a low level of team mechanism.
Beckman and Burton (2008)	Life cycle theory and path-dependent theory, homophily	1,485 executives in 167 firms holding 1,940 positions from entrepreneurial high-technology firms in Silicon Valley, 1994–1996.	Individuals ranked as a vice president or higher (e.g., senior vice president, CTO, CIO, COO).	4.42 (n/a)	Functional role structure	Firms starting with a limited range of functional positions are less likely to develop complete functional structures. Important milestones are reached faster by firms with broadly experienced founding teams that build an early team with a full range of functional positions. Functional structure and functional experience are not interchangeable.
Cannella et al. (2008)	Upper echelons, TMT diversity	207 firms in 11 industries from Ward's 50,000 Largest Corporations, Compustat, and Dun & Bradstreet's Reference Book of Corporate Management, 1990–1996.	All executives with titles above the rank of vice president or serving on the firm's board of directors.	5.41 (2.65)	TMT member colocation	They introduce the concept of TMT colocation. The effects of TMT functional diversity on firm performance become more positive as the proportion of TMT members with offices in the same location increases.

Marcel (2009)	Information processing, contingency, upper echelons	Sample of 153 firms with sales greater than \$500 million from five industrial sectors in 1998.	CEO, chairman, CFO, COO/president, and the next tier of the management hierarchy.	n/a	COO presence	The presence of a COO is positively related to subsequent firm performance, especially for those firms with relatively older TMT members. For TMTs with low levels of functional diversity, partial support was found for the benefit of having a COO. No support was found for performance benefits of COO presence in a TMT with low levels of tenure heterogeneity.
Wei and Wu (2013)	Information processing, TMT diversity	Multi-sourced survey of top managers from 118 Chinese firms.	No definition.	6.95 (1.23)	TMT interdependence	Team interdependence and team cohesion moderate the relationship between TMT cognitive diversity and elaboration of task-related information. The elaboration of task-related information mediates the interactive effects of TMT cognitive diversity and team interdependence on firm performance, as well as the interactive effects of TMT cognitive diversity and team cohesion on firm performance.
Eesley et al. (2014)	Contingency theory, founder imprinting, upper echelons	Survey of 2,067 ventures founded 1931–2003, matched with complementary data sources through 2006 via archival data.	The first founding team.	1.22 (1.35)	Diverse functional roles and technically focused roles	In general, diverse teams are positively associated with venture performance but less beneficial when pursuing an innovator strategy. In case of an innovation strategy, technically focused teams are positively associated with performance. Technically focused teams are aligned with a cooperative commercialization environment and when using an innovation strategy, while diverse teams perform better in a competitive commercialization environment.
Guadalupe et al. (2014)	Information-processing theory, theories of centralization	300 large U.S. firms, 1987–2006.	Direct reports to the CEO.	1987: 4.98 2006: 10	Functional vs. general management roles	The TMT size doubled (mid-1980s to mid-2000s), and approximately three-quarters of the increase are attributable to functional managers rather than general managers. Firms that become less diversified centralize product functions but not administrative functions. Firms that invest more in IT centralize administrative functions, but they only centralize product functions if they operate in related businesses.
Menz and Scheef (2014)	Contingency theory	147 S&P 500 firms, 2004–2008.	Executives identified by their firms as strategically important and included in the firm's Form 10-Ks.	n/a	CSO presence	Diversification, acquisition activity, and TMT role interdependence are positively associated with CSO presence. The structural choice of having a CSO in the TMT does not significantly affect a firm's financial performance.

Hambrick et al. (2015)	Upper echelons, TMT interdependence	109 firms from the software and hardware industries, 365 firm years, 2002–2006.	Executives who are senior vice presidents or higher.	8.58 (3.88)	TMT horizontal interdependence	Three facets of structural interdependence are important moderators of two classic predictions: the positive association between TMT heterogeneity and member departures and between TMT heterogeneity and firm performance. Horizontal, vertical, and reward interdependence, which are all elements of structural interdependence, have distinct characteristics and each kind of interdependence needs to be considered separately.
Bermiss and Murmann (2014)	Upper echelons, executive mobility	Data on 111,899 executives working in 3,288 advertising agencies over 19 observation periods and 8,537 firm years in New York City, 1924–1996, as listed in “The Red Books.”	Top executives as listed in an industry directory.	n/a	Functional roles focused on external vs. internal processes	While it is generally damaging to lose any top executive, the loss of a top executive whose functional role focuses on internal firm processes is more detrimental to firm survival than losing a top executive whose functional role focuses on managing external exchange relationships.
Hendricks et al. (2015)	No explicit theory	681 public announcements of SCOME appointments, 2001–2011.	No definition.	n/a	Creation of new supply chain and operations management role	The stock market reacts positively to newly created SCOME roles. The strongest positive reactions are observed for outsiders hired in a newly created SCOME role.
Ferguson et al. (2015)	Entrepreneurship, organizational role structures, and upper echelons theory	Database with 1,452 executives holding and 1,918 TMT roles in 167 high-technology entrepreneurial firms in a single region. Longitudinal.	Vice president or higher.	4.40 (lag of 12 months)	New TMT roles (i.e., structural elaboration)	TMT misfits (TMT overqualification or underqualification, according to discrepancies between composition and role structure) catalyze role changes and changes of people. The effects depend upon the type of misfit and the level of firm development. Overqualified TMTs elaborate their role structure when developmental milestones are hit, while underqualified TMTs hire new people.
Ma and Seidl (2018)	Upper echelons, CEO–TMT interface perspective, CEO–adviser perspective	Longitudinal qualitative study of eight firms with newly appointed CEOs, archival data, informal interviews.	Vice president or higher.	n/a	TMT configuration, new TMT roles	While all CEOs face constraints in making changes to the TMT, those with a functional structure faced them more frequently than CEOs in companies with a divisional structure.

Table 4. TMT hierarchical structure

Study (author/s, year)	Theoretical perspective/literature stream	Empirical context	TMT definition	TMT average size (SD)	Construct of interest	Key findings related to TMT hierarchical structure
Walsh (1988)	No explicit theory; M&A, TMT turnover literature	Survey of parent companies of 55 acquisitions, 1975–1979, archival data.	10-K or proxy statement.	8.93 (3.11)	TMT members with higher rank vs. TMT members with lower rank	The authors examine the effects of a merger or an acquisition on an acquired company's TMT and find that the turnover in acquired TMTs is significantly higher than regular turnover rates. TMT members with president titles left sooner than those with the title of vice president, showing that very senior executives are the first to leave following an acquisition.
Cannella and Hambrick (1993)	Agency theory, executive succession	96 very large acquisitions made in the 1980–1984 interval.	Officers of the acquired firm, title above vice president, inside directors, or both.	n/a	Departure of more-senior (chairman, vice-chairman, president, CEO, and COO) and less-senior (remainder) executives	The study finds that the departure of executives from acquired firms has negative effects on post-acquisition performance. Executive departures are more harmful to the highest-ranking executives (such as CEOs, presidents, and chairpersons). Providing one or more executives with TMT status in the newly combined firm leads to better post-acquisition performance.
Haleblian and Finkelstein (1993)	Information processing, social psychology	47 firms (26 computer and 21 natural gas distribution companies), 1978–1982.	All corporate officers who were also board members.	3.39 (1.46)	CEO dominance/distribution of power within TMT	CEO dominance (= high concentration of power within the TMT) is an important information-processing variable, as it influences firm profitability depending on the stability (low discretion) or turbulence (high discretion) of the environment.
Keck (1997)	Group theory, social psychology	Sample of TMTs in 56 cement (1919–1984) and 18 minicomputer firms (1969–1980).	Executives with the title of vice president or higher.	5.27 (3.6) 7.8 (4.9)	Stratification (the number of ranks and relative size of each rank)	In stable contexts, ROA growth increases with greater team stratification. In turbulent contexts, lower stratification leads to higher performance. Financially successful firms are the ones that gradually match their team structures to the environmental context.
Dunn (2004)	Power theory, agency theory, TMT duality	103 firms that were convicted of issuing fraudulent financial statements in the period from 1992–1996.	Five highest-paid executives.	6.88 (4.18)	Structural power and ownership power	Illegal corporate behavior is more likely to occur when there is a concentration of power in the hands of insiders. Insiders who occupy a large percentage of the board seats have small TMTs.

Hambrick et al. (2015)	Upper echelons, TMT interdependence	109 firms from the software and hardware industry, 365 firm years, 2002–2006.	Executives who are senior vice presidents or higher.	8.58 (3.88)	Vertical interdependence; reward interdependence	Three facets of structural interdependence are important moderators of two classic predictions: the positive association between TMT heterogeneity and member departures and between TMT heterogeneity and firm performance. Horizontal, vertical, and reward interdependence, which are all elements of structural interdependence, have distinct characteristics and each kind of interdependence needs to be considered separately.
Patel and Cooper (2014)	Upper echelons, power theory, family firm literature	Archival data, 231 S&P 1500 firms, 2001–2010.	Top five executives reported in ExecuComp.	n/a	Structural power equality	Balanced structural power between family and non-family TMT members improves interaction processes in family firm TMTs: It lowers the turnover of non-family members, increases the range of the firm's strategic actions, and improves overall firm performance.
Ridge (2015)	Behavioral and economic perspectives, tournament and social comparison theories	Archival data, 227 Fortune 500 firms, 2003–2006.	Five highest-paid executives.	n/a	CEO and TMT power (measured in titles and ownership)	High levels of firm performance are found around either meaningfully low or meaningfully high levels of pay disparity. This relationship is moderated by CEO power such that CEO power inhibits tournament effects. This finding suggests that firms with large pay disparity patterns may benefit from forgoing powerful CEOs.

Table 5. Theoretical lenses applied

Upper echelons	15	Life cycle theory	1
Information processing	6	Organizational growth	1
Contingency theory	4	Organizational learning	1
Social psychology	2	Organizational role structures	1
TMT behavioral integration	2	Path-dependent theory	1
Executive succession	2	Resource-based view	1
Agency theory	2	Social comparison	1
Power theory	2	Social identity theory	1
Alliance formation	1	Social judgment theory	1
Ambidexterity	1	Strategic choice	1
Behavioral perspective	1	Strategic leadership	1
Chaos theory	1	Strategic sensemaking	1
Cognitive conflict	1	Theories of centralization	1
Corporate failure	1	TMT agreement	1
Economic perspective	1	TMT diversity	1
Entrepreneurship literature	1	TMT duality	1
Executive mobility	1	TMT interdependence	1
Family firm literature	1	TMT turnover	1
Founder imprinting	1	Tournament theory	1
Founding team literature	1	Uncertainty reduction theory	1
Group theory	1	CEO–TMT interface perspective	1
Homophily	1	CEO–adviser perspective	1
Interaction paradigm	1		

Note: Count data are not mutually exclusive as articles may concurrently use more than one theoretical lens. Some articles did not mention a particular theory and, therefore, are not included here.

3. Article II: Top Management Team Size: An Exploration of Characteristics and Determinants

Elisabeth Radek

Abstract: This article uses an exploratory approach to examine the various characteristics of top management teams (TMTs) of different sizes and what drives TMT size. Although TMTs have been expanding over the past 30 years, we still know relatively little about the drivers. Determining the size of a TMT is a key organizational decision as TMT size influences TMT processes and organizational outcomes. Based on a sample of S&P 500 firms from 2011 to 2014, the results show that TMT size ranges from two to 21 executives and that TMTs of different sizes differ little with regard to TMT composition but strongly in terms of TMT structure. Furthermore, we find that TMT size is influenced by firm size, firm growth, and TMT horizontal interdependence. It is not influenced by the environmental conditions and CEO characteristics that were tested. We contribute to the TMT literature by highlighting the characteristics of different TMT sizes and providing new insights into the determinants of TMT size. Our study exposes the power of information-processing theory to explain these determinants.

Keywords: Top management teams, TMT size, TMT structure, upper echelons

3.1. Introduction

Along with the chief executive officer (CEO), the top management team (TMT) bears “overall responsibility for the organization” (Mintzberg, 1979, p. 24) and is responsible for formulating and implementing strategy (Finkelstein, Hambrick, & Cannella, 2009). TMTs differ in composition and structure, and over the past 30 years, the rich body of upper echelons research has demonstrated that these characteristics matter when it comes to organizational outcomes (Hambrick, 2007). The size of TMTs is an important structural feature and a key organizational design choice (Beckman & Burton, 2008; Guadalupe, Li, & Wulf, 2014). Prior research has focused on the outcomes of TMT size or used it as a control variable (Bantel & Jackson, 1989). This stream of research has shown that TMT size matters for outcomes on an individual executive level (Boeker, 1997; Henderson & Fredrickson, 1996; Plambeck & Weber, 2010), as well as team processes like TMT conflict (Amason & Sapienza, 1997), TMT agreement (Iaquinto & Fredrickson, 1997), and behavioral integration (Simsek, Veiga, Lubatkin, & Dino, 2005), and organizational outcomes such as growth (Eisenhardt & Schoonhoven, 1990), profitability (Haleblian & Finkelstein, 1993), and strategic change (Boeker, 1997). Much less attention has been devoted to the drivers of TMT size. Two prior studies have contributed to our knowledge of TMT size determinants: Sanders & Carpenter (1998) show that TMT size relates to complexity arising from internationalization, while Guadalupe et al. (2014) focus on exploring the phenomena of changed TMT structures, information technology investments, and changes in firm diversification and find that the latter influences TMT size. However, neither of the studies center their research on understanding the characteristics of different TMT sizes and their drivers. Thus, there is a need to develop a more comprehensive understanding of TMT size and its antecedents. This paper aims to explore – for the very first time, to the best of our knowledge – a broad spectrum of different factors that might be related to TMT size on three levels: environment, firm, and CEO.

Determining TMT size is not straightforward as large and small TMTs have benefits and disadvantages that need to be weighed against each other. First, on the positive side, larger TMTs are referred to as being richer in resources and competencies, thereby supporting information processing and leading to better decision-making (Haleblian & Finkelstein, 1993). This is in line with Hambrick and D'Aveni's (1992)

argument that “at a basic level, the resources available on a team result from how many people are on it. Just as a sports team is at some disadvantage if it has fewer than the allowed number of players on the field, so may an organization be at a disadvantage if it has a smaller top management team than other firms in the same industry” (p. 1449). Second, larger teams with higher cognitive capabilities are likely to experience greater cognitive conflict. Cognitive conflict is positively regarded as facilitating the exchange of information and improving strategic decision-making (Amason & Sapienza, 1997).

On the negative side, however, several disadvantages of larger TMTs have been observed. First, adding one more person to a team does not necessarily result in better group performance, as described by the Ringelmann effect: In an experiment in which men were asked to pull on a rope, tug-of-war style, group performance gradually decreased as more individuals were added to the group. This reduced individual effort resulted in decreased group performance, a phenomenon later dubbed “social loafing” (Karau & Williams, 1993). Second, larger teams are associated with more coordination and communication problems (Haleblian & Finkelstein, 1993). While cognitive conflict has positive effects, larger teams are also associated with more affective conflict (Amason & Sapienza, 1997). Affective conflict relates to suspicion, distrust, and hostility and leads to obstructed information exchange and poorer decision-making (Amason & Sapienza, 1997). Third, top executives can be both valuable and expensive resources. For example, a Tripadvisor executive who was added to the team in 2014 earns almost \$1 million a year in cash and more than \$3 million in total compensation (Tripadvisor, 2015). The cost can be substantial, especially when a firm adds several executive roles to the top, as Procter & Gamble did in 2013 when it added 10 top executives (Procter&Gamble, 2013, 2014). The cost and benefits of adding top executives need to be considered carefully.

Given the previous evidence that TMT size matters for organizational outcomes and that large and small teams come with costs and benefits, we are interested in knowing what drives TMT size and what characterizes TMTs of different sizes. Besides the importance of TMT size for TMT processes and organizational outcomes, it is a phenomenon worth exploring for two reasons. First, TMT size varies significantly across firms, and second, it has changed over time. For example, in S&P 500 firms, the smallest firm has a TMT of only two members, while the largest has a TMT of 21

members. One study shows that TMT size has changed significantly as the average TMT size has doubled over 20 years from an average of five in 1986 to an average of 10 in 2006 (Guadalupe et al., 2014). However, there are also circumstances where TMTs are decreasing, as Hambrick & D'Aveni (1992) show with failing firms that abruptly shrink their TMTs.

Because little is known about the phenomenon of varying TMT size, we heed Helfat's (2007) call to empirically explore phenomena first before testing theory. We chose an exploratory, abductive approach to expand our knowledge of the phenomenon. This approach aims to identify facts and patterns instead of relying on formal hypothesis testing (Helfat, 2007; Menz & Barnbeck, 2017; Oxley, Rivkin, & Ryall, 2010). This study's goal is to surface the phenomenon of varying TMT size and shed light on the drivers of TMT size. We do this by providing rich descriptions of different TMT size types and empirically analyzing possible antecedents of TMT size. Integrating descriptive and analytical results expands our knowledge and understanding of the phenomenon. With an archival dataset of S&P 500 firms covering four years and 767 firm-year observations, this study explores the extent to which environment-, firm-, and CEO-level factors determine TMT size. We complement prior studies on the determinants of TMT size (Guadalupe et al., 2014; Sanders & Carpenter, 1998) and contribute to the understanding of varying TMT size. Our hope is for this work to motivate further empirical and theory-testing studies on TMT size and, more broadly, on TMT structure and composition.

The structure of our paper follows prior exploratory work (Menz & Barnbeck, 2017; Oxley et al., 2010). Following an introduction, we describe the method of our study and explain the variables. Next, we present the results of the descriptive analysis of TMT characteristics and the regression results of TMT size determinants. We conclude by discussing our findings and opportunities for future research on the size of top management teams.

3.2. Method

This study's empirical research design is a fact-based research approach (Hambrick, 2007; Lyngsie & Foss, 2017; Menz & Barnbeck, 2017) with two empirical parts: a descriptive analysis to enhance our understanding of TMT size heterogeneity

and a regression analysis to explore the drivers of TMT size. We chose this abductive, data-exploring approach because, to the best of our knowledge, no other study has extensively explored TMT size antecedents on different levels. TMT size is generally used as a control variable in TMT studies and has been studied as an outcome variable. While focused on other topics, two prior studies address TMT size antecedents (Amason & Sapienza, 1997; Guadalupe et al., 2014) but not on multiple levels as we do. Contrary to deductive approaches, this fact-based research approach does not specify hypotheses. Abductive studies reason from data to increase our understanding and aim to provide initial suggestions and possibly even mechanisms attempting to explain observed patterns (Robinson, 2019). We chose this approach because it allows us to include a wide array of possible determinants and does not limit us to one theoretical perspective. To identify variables that influence TMT size, we reviewed prior literature on TMT size (Guadalupe et al., 2014; Sanders & Carpenter, 1998) and other TMT structural features (see Article I of this dissertation). Furthermore, we not only studied firms from our sample whose TMT size had changed during our observation period but also analyzed press releases for the reasons behind the change in TMT size. We follow Menz & Barnbeck's (2017) approach going beyond describing the data and measuring the variables included in the regression by explaining the reasons for including the variables in our study and elaborate on how each variable³ may be associated with TMT size. The empirical part of our paper consists of two sections: first, the descriptive section of TMT characteristics of different TMT size groups, and second, the regression analysis of the determinants of TMT size.

Sample and Data

The study's sample consists of S&P 500 firms⁴, between 2011 and 2014. Following prior research, we obtained information on the TMT from Form 10-Ks, firm proxy statements, and annual reports (Marcel, 2009; Menz & Scheef, 2014). Financial data and other firm information were collected from the Thomson Financial database.

³ For a complete list of variables, including the descriptive section, please see APPENDIX.

⁴ Financial service firms were excluded because this industry has different revenue reporting standards.

Industry concentration data was collected from the U.S. Census Bureau's Economic Census.⁵ Our sample consists of 1,409 firm-year observations for the descriptive results and 767 firm-year observations for the regression results.⁶

Measures

We follow Menz & Barnbeck (2017) in their approach of explaining the rationale of variables, although this is not typical for fact-based, explorative studies. We chose to explore TMT size determinants on three levels – environment, firm, and CEO – by making use of extensive literature research (see Article I of this dissertation) and examining firms' press releases. All measures and their variables are summarized in Appendix 1. The measures for the regression analysis are discussed and described in detail in the next section.

TMT size. Prior research has defined top management teams and their size in various ways. Smaller and survey studies often let CEOs define their TMT members (e.g. Amason & Sapienza, 1997; Barrick, Bradley, Kristof-Brown, & Colbert, 2007; Iaquinto & Fredrickson, 1997; Ling, Simsek, Lubatkin, & Veiga, 2008; Simsek et al., 2005; Smith et al., 1994). Other studies include everyone who reports directly to the CEO in their TMT definition (e.g. Boeker, 1997; Guadalupe et al., 2014). Probably the narrowest definition of TMTs, which is mostly used for compensation studies, is “the five highest-paid executives” (e.g. Dunn, 2004; Patel & Cooper, 2014; Ridge, 2015). However, this definition is less feasible for our study of determinants of TMT size and does not reflect the growing number of TMT members (Guadalupe et al., 2014). To allow for variance in TMT size, we use the frequently used definition of TMT size in the field of TMT structure and composition, which defines TMTs as all executives with a vice president title or above as reported in the firm's Form 10-K (Beckman & Burton, 2008; Cannella & Hambrick, 1993; Ferguson, Cohen, Burton, & Beckman, 2015; Hambrick & D'Aveni, 1992; Hambrick, Humphrey, & Gupta, 2015; Keck, 1997;

⁵ We also tested all models without industry concentration, which yielded a larger sample of 1,020 firm observations. The results were similar.

⁶ The number of observations is reduced for the regression analysis as we lagged our independent variables by one year.

Virany, Tushman, & Romanelli, 1992). We measure TMT size at the end of each year. A practical example demonstrates how multiple factors can affect TMT size. When a new CEO joined Air Products in 2014, he reduced the TMT's size from seven to five and restructured it "with the goal of regaining industry leadership" (AirProducts, 2014). There can be multiple reasons why firms lose industry leadership (e.g., environmental level due to increased competition; firm level due to decreasing sales or firm performance). The example demonstrates that CEO characteristics (e.g. CEO succession) also matter when it comes to initiating changes in TMT size.

Environmental factors. The TMT is located at firms' strategic apex (Mintzberg, 1973) and faces the challenges and opportunities of the environment that the firm is directly exposed to. The TMT needs to process information and react accordingly (Henderson & Fredrickson, 1996; Sanders & Carpenter, 1998; Tushman & Nadler, 1978). A large TMT may be beneficial for absorbing and processing large amounts of information. However, a large TMT may be an obstacle to good and fast decision-making. By contrast, the implementation of decisions made and strategies agreed upon by a large team can benefit the entire organization. We considered three environmental factors that may influence TMT size: (1) industry sales instability (also referred to as industry dynamism), (2) industry sales growth (also referred to as munificence), and (3) industry concentration (Dess & Beard, 1984). We chose these three environmental factors because they recurrently appear in prior top management research (e.g. Haynes & Hillman, 2010; Wiersema & Bantel, 1992).

Industry sales instability. Firms operating in unstable, dynamic industries face more uncertainty, and their TMTs have a higher load of information to process and more decisions to make. Increased uncertainty and higher loads of information that have to be processed will affect organizational structure (Dess & Beard, 1984; Galbraith, 1973) and TMT structures, specifically the size. If the environment is stable, TMTs can develop standard procedures and rules to deal with the environment. In contrast, in an unstable environment, the development of standard procedures is not feasible because TMTs will experience uncertainty, and it is challenging for administrators to plan accordingly. The greater the uncertainty, the greater the requirements for processing information (Tushman & Nadler, 1978) by the TMT. Thus, industry sales instability

may influence decisions about the number of resources in the TMT necessary to process information. Industry sales instability was calculated as the standard deviation of the median sales growth of the respective three-digit SIC industry in the years $t-1$ and t (Hambrick & Cannella, 2004).

Industry sales growth. Firms active in growing industries face higher levels of task complexity, which may affect the number of top executives needed to absorb and process information (Eisenhardt & Bourgeois III, 1988). Also, firms in growing industries may have the abundance of resources (Dess & Beard, 1984) to afford a larger TMT. By contrast, firms in declining industries often have fewer resources and may opt to have smaller TMTs. This is in line with Hambrick & D'Aveni's (1992) finding that failing firms have smaller TMTs. *Industry sales growth* is the mean sales growth of the three-digit SIC industry over the past three years (Hambrick & Cannella, 2004).

Industry concentration. Whether firms are active in industries with few competitors (high concentration) or many competitors (low concentration) may influence TMT size. Industries with more competitors usually have a more complex environment. Firms in industries with a low concentration and many competitors may need a larger TMT because larger TMTs may bring more diverse skills and perspectives to cope with complex environments. In such competitive industries, however, competition for suitable top executives might be higher, and it might be more challenging for firms to fill the TMT roles that are needed (Hendricks, Hora, & Singhal, 2015). Therefore, TMTs could be smaller, too. In less competitive industries, firms might not need large TMTs because there are lower information-processing demands. *Industry concentration* is measured as the four-firm market concentration ratio (Nath & Mahajan, 2008) with each three-digit SIC code segment in $t-1$.

Firm level factors. We examine several firm characteristics that are likely to determine the necessity and means for a certain TMT size. Since numerous firm level factors may influence TMT size, we explore classical firm characteristics like size and performance, as well as firm strategy characteristics, such as diversification and firm structure.

Firm size. Firm size is likely to influence the size of a firm's TMT. Larger firms require more complex processes and have higher information-processing demands

(Henderson & Fredrickson, 1996; Sanders & Carpenter, 1998). Larger and more complex firms may require task division and specialization on the executive level (Hambrick & Cannella, 2004). Besides, larger firms can probably afford more high-paid executives. Thus, firm size is expected to matter for TMT size. Following prior research, we measure firm size as the logarithm number of employees (Guadalupe et al., 2014; Sanders & Carpenter, 1998).

Prior firm performance. Prior firm performance may influence decisions on TMT size. Recalling the high costs of top managers, firm profitability is likely connected to the ability to sustain a certain TMT size. Also, we know that failing firms decrease their TMT size (Hambrick & D'Aveni, 1992). Thus, it is likely that the prior performance determines the size of its TMT. To measure prior firm performance, we used return on assets (ROA) in t-1.

Firm sales growth. Firm sales growth is likely to influence TMT size because TMT tasks in firms with growing sales are more complex. Firms with growing sales face a wider variety of markets, customers and products, which results in a need for larger TMTs to deal with this complexity. As firms grow, they might decide to divide tasks on the TMT level and split roles, which increases TMT size. For example, after Adobe's digital marketing revenue had been growing, the TMT size increased through the addition of a new role responsible for the growing product lines in digital marketing (Adobe, 2013). We measure sales growth as the percentage change in sales from year t-1 to year t (Crossland & Hambrick, 2007).

Firm diversification. A firm's corporate diversification strategy is likely to influence its TMT size as task demands, task complexity, and information-processing needs differ according to a firm's level of diversification. *Diversification (total)* indicates how many businesses a firm is active in (Ramanujam & Varadarajan, 1989). We may expect that the more diversified firms are, the larger their TMT will be because the firm is active in more businesses that need to be managed. When a firm's *diversification is unrelated*, TMT task demands and task complexity are lower, and information processing happens more on the business unit level. When a firm's diversification is unrelated, TMT task requirements are mostly financial and performance monitoring (Michel & Hambrick, 1992). This means fewer resources are needed on the corporate level to absorb and process information. However, if businesses

are related, task demands are high (Hambrick & Cannella, 2004) and the need for executives to process information at the corporate level is higher (Tushman & Nadler, 1978). When task complexity and interdependence for the corporation are minor due to unrelated diversification, and synergies are mainly financial, we may expect smaller top teams. We calculated both unrelated and total diversification by using Palepu's (1985) entropy measure in t-1 (Hambrick & Cannella, 2004; Wiersema & Bantel, 1992)

Organizational design. Different organizational design structures will likely influence the size of the TMT. Since the "executive team is a reflection of the organization" (Guadalupe et al., 2014, p. 1), our study follows prior research in using TMT structural characteristics as proxies for the organizational design (Beckman & Burton, 2011; Nath & Mahajan, 2008, 2011). Practical examples show that TMT structures, a proxy of organizational design, 1) vary significantly and 2) are not constant. For example, in 2013, Procter & Gamble "reorganized [its] Global Business Unit (GBU) structure, which resulted in changes to [its] reporting segments" and, thus, also changed the TMT structure (Procter&Gamble, 2014, p. 73). In 2012, Procter & Gamble had a TMT of 10 executives and a purely functional structure. By 2014, it had added 10 general managers and an additional functional manager, thereby increasing its TMT size to 21 (Procter&Gamble, 2012, 2013). The case demonstrates how TMT structures reflect the organizational structure and that both are subject to change.

TMT horizontal interdependence reflects the extent to which top executives' tasks and responsibilities bear on each other (Hambrick et al., 2015). Essentially, this measure indicates the degree of the functional structure of the TMT and, more broadly, of the organization. Taking this to the organizational level, it indicates how centralized or divisionalized a firm is. The functional or divisional structure of a firm is likely connected to its TMT size. More functionally structured firms might have larger TMTs, as found in the study by Guadalupe et al. (2014), which attributed the growth of TMT size to the addition of more functional managers (functional centralization). However, more divisionally structured firms also give us reason to expect a larger TMT size. Firms with multiple regions and/or business units are likely to have larger TMTs. TMT horizontal interdependence is computed by standardizing and averaging (1) the proportion of executives with titles that indicate primarily a functional role and (2) a dummy variable coded as 1 when the TMT consists only of functional executives and

0 otherwise (Hambrick et al., 2015). We chose the measure introduced by Hambrick et al. (2015) over TMT divisionalization⁷ (Nath & Mahajan, 2008, 2011) because it indicates the degree of functionalization with greater precision.

TMT vertical interdependence reflects the extent to which top executives are hierarchical peers. Essentially, this indicates how hierarchical a TMT is. Since the TMT is a reflection of the firm, we take this measure as a proxy for how hierarchical a firm is. Some TMTs, like Apple (Apple, 2014) and Alphabet (Google, 2014), have as few as two hierarchical levels, while others have many more. Nike, for example, has five hierarchical levels (Nike, 2014). TMT vertical interdependence also indicates whether the TMT has a chief operating officer (COO). The presence of a COO often indicates an additional hierarchical level, and several top executives report to the COO rather than the CEO. We expect vertical interdependence to matter for TMT size. Intuitively, one would expect TMTs with multiple hierarchical levels to be larger; however, an example like Apple demonstrates that medium-sized TMTs may have few hierarchical levels. Thus, this relationship needs further exploration. TMT vertical interdependence is created by standardizing and averaging two indicators for each year and then reversing them: (1) The number of distinct hierarchical levels was created by counting the number of title gradations in the TMT each year (always including a CEO, a TMT could also include a COO, executive vice presidents (EVPs), senior vice president (SVPs), and possibly even vice presidents (VPs)), and (2) the presence of a COO reflected whether there was this additional level in the TMT (Hambrick et al., 2015). Instead of simply measuring the number of hierarchical levels, we chose this measure because it entails the presence of a COO, which is important in reflecting the hierarchical complexity of firms.

CEO-level factors. Lastly, we examine the extent to which CEO characteristics matter for TMT size. Decisions about the size of a TMT fall under the purview of the CEO; therefore, we examine several CEO characteristics that may influence decisions about TMT size. Several studies have shown that new CEOs usually change both the composition and the structure of their TMTs (Hutzschenreuter & Horstkotte, 2013; Ma

⁷ We tested both measures in our regression analysis and the results were similar.

& Seidl, 2018; Ma, Seidl, & Guérard, 2015). Knowing that CEOs make changes to their TMTs, we explore the following CEO variables that may influence decisions about TMT size.

CEO duality. CEO duality is when a CEO also acts as chair of the board (COB) (Dalton, Hitt, Certo, & Dalton, 2007). Scholars agree that CEO duality reflects higher CEO power (Finkelstein et al., 2009; Krause, Semadeni, & Cannella, 2013). Also, CEO duality indicates higher task demands and more information-processing needs for the CEO (Sanders & Carpenter, 1998). There are two reasons why CEO duality is likely connected to TMT size. First, a CEO who is also the COB may choose a larger TMT as a symbol of power. By contrast, they may also opt for a smaller TMT because they do not want to share power. Second, a CEO who is also the COB may need a larger team to support CEO tasks and information-processing so that the CEO can fulfill both roles. A CEO who is also the COB may need a larger TMT to cope with the complexity of their dual role (Sanders & Carpenter, 1998). For example, a CEO who is also the COB may add a COO or chief strategy officer (CSO) for support. On the other hand, having a larger team likely means more coordination work (Smith et al., 1994), which is why a CEO who is also the COB chair of the board may opt for a smaller team. We measure CEO duality as a dummy variable coded as 1 if the CEO is also the COB and as 0 otherwise (Zhang & Rajagopalan, 2003).

CEO position tenure. CEO tenure is commonly used as an indicator and measure for CEO power (Miller, 1991; Zhang & Rajagopalan, 2003). Thus, CEO position tenure and TMT size might be linked in a similar way as in the case of CEO duality. CEOs with a longer position tenure may choose to have a larger TMT because they have the power to do so. However, prior research (Hambrick, Geletkanycz, & Fredrickson, 1993) finds CEO tenure linked to top management's commitment to the status quo. Therefore, it might be more difficult for a CEO with a long position tenure to add new roles or remove roles from their TMT when the team holds onto the status quo. Thus, we expect CEO tenure and TMT size to be associated, but we do not predict a direction. We also controlled for CEO age, which is likely to matter for TMT size in a similar way.

CEO succession. Anecdotal evidence and research show that CEO succession is often followed by TMT turnover (Barron, Chulkov, & Waddell, 2011; Coyne & Coyne, 2007; Keck, 1997; Shen & Cannella, 2002) and a change in TMT composition (Wagner,

Pfeffer, & O'Reilly III, 1984). Different scenarios related to CEO succession may affect TMT size. For example, when a CEO leaves a firm, other top executives also leave (Barron et al., 2011); when a CEO is promoted from inside the firm, their previous position needs to be filled, and TMT size may change temporarily; when a CEO comes from outside the firm, they often bring new top executives with them (Shen & Cannella, 2002) and may decide to add or remove certain roles. While there can be multiple reasons for TMT turnover following CEO succession, the bottom line is that CEO succession may influence TMT size. We measure CEO succession as a dummy variable coded as 1 if the CEO changed in a given year and 0 otherwise.

CEO outsiders. The origin of the CEO – i.e., whether they come from inside or outside the firm – has been proposed as an important antecedent (Shen & Cannella, 2002). CEOs from outside the firm are usually hired when firms performing poorly and there is a need for strategic change (Brady & Helmich, 1984). Thus, outside CEOs are likely to initiate a change in the way the TMT is structured and composed. For example, if a CEO used to have a CSO on their previous TMT and is expected to bring strategic change, they may add this role to the TMT. By contrast, outside CEOs rely more heavily on firm-specific information, which is why they may want to retain TMT members from the previous team. CEO outsiders are likely to affect TMT size; however, they can influence TMT size in different directions. The example of Bed, Bath & Beyond illustrates this. When new CEO Mark Tritton was an external hire, he not only restructured the TMT and combined previously separated roles, which decreased the size of the TMT (Bed Bath & Beyond, 2019), but five top executives left the company. CEO outsider is coded as 1 if the CEO is an outsider and as 0 otherwise. Following prior research, CEOs are considered outsiders if they joined the firm within two years before becoming CEO (Hambrick & Cannella, 2004).

3.3. Results

Descriptive results

To better understand different types of top management team sizes, we split the TMTs into three size categories, as shown in Table 6. As a robustness check, we also compared the results of different possible TMT categorization (e.g., based on terciles, quartiles) with each other.

Table 6. TMT size categories

TMT size	Number of executives	% of total sample
Small TMTs	< 5	14.60
Medium TMTs	5 to 10	64.24
Large TMTs	> 10	21.16

The results are similar across different categorizations. The majority of S&P 500 firms have medium-sized TMTs with five to 10 executives, as Figure 3 also shows. Figure 3, which depicts TMT size against firm size, further demonstrates the variance in TMT size, ranging from two to 21 TMT members.

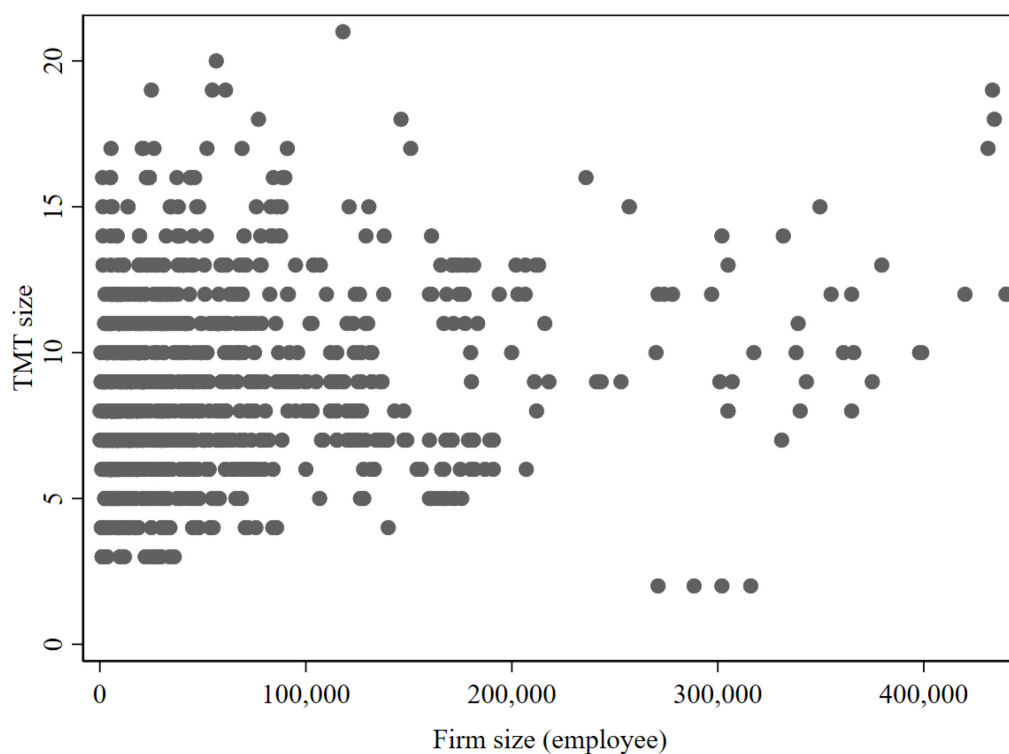
**Figure 3. Scatter plot of TMT size against firm size (employees)**

Table 7 shows the differences in TMT size (in absolute values, per 1,000 employees and per \$1 billion in sales) across different firm sizes. Overall, the average TMT size in our sample is 8.32 top executives per team. The average TMT size shows only small differences across different firm sizes, increasing slightly with firm size (7.48 for small firms, 8.05 for medium firms, and 9.16 for large firms). However, when looking at TMT size per 1,000 employees, we observe considerable differences between different firm sizes. TMT size per 1,000 employees is 17 times larger for small than for

large firms (TMT size per 1,000 employees: 2.44 TMT members for small firms, 0.48 for medium firms, and 0.14 TMT members for large firms). When looking at TMT size in absolute numbers, TMT size increases with firm size; when looking at TMT size per 1,000 employees, it decreases. Analyzing TMT size per \$1 billion in sales yields similar results as with firm size (per 1,000 employees): Small firms have bigger TMTs with 2.56 top executives per \$1 billion in sales, whereas large firms have only 0.52 TMT members per \$1 billion in sales. In a subsequent analysis (not displayed in the tables to save space), we controlled for the number of employees (TMT size per 1,000 employees) and found that, in large firms, one top executive is responsible for significantly more employees and sales volume (7,143 employees \$1.78 billion in sales) than their counterparts in small firms (410 employees and \$0.4 billion in sales).

In Table 7, we also distinguish between different industries based on two-digit SIC codes: mining, utilities & construction; manufacturing; wholesale trade & retail trade; services; others. We also compare absolute TMT size, TMT size per 1,000 employees, and TMT size per \$1 billion in sales. The differences in TMT size (in absolute numbers) are relatively small (ranging from 7.54 top executives, on average, in mining, utilities & construction to 8.87 in manufacturing). Again, when comparing different industries with each other, the number of TMT members per 1,000 employees and \$1 billion in sales differs substantially. The largest TMT size, both per 1,000 employees and per \$1 billion in sales, is found in mining, utilities & construction, followed by services, then manufacturing, others, and wholesale trade & retail trade (for details, see Table 7).

Table 8 displays the differences in TMT size (in absolute values, per 1,000 employees and per \$1 billion in sales) across firms with different levels of profitability (return on assets/ROA), as well as for diversification (total and unrelated). The average TMT size (absolute) increases slightly with higher levels of ROA and with higher levels of diversification. However, our results show that when controlling for firm size (number of employees) and sales volumes, we see that non-diversified firms have larger TMTs than highly diversified firms, which have smaller TMTs.

Table 7. Descriptive information on TMT size for different firm size and industries

	Firm size*				Industry				
	All	Fewer than 10,000	10,000 - 30,000	More than 30,000	Mining, Utilities, Construction	Manufacturing	Wholesale Trade & Retail Trade	Services*	Others**
<i>TMT size</i>									
Number of observations	1409	432	412	565	228	660	175	266	80
Arithmetic mean	8.32	7.48	8.05	9.16	7.54	8.87	8.12	7.85	7.99
Minimum	2	3	3	2	3	3	2	3	4
Maximum	21	17	19	21	17	21	20	19	15
Percentiles 10%	5	5	5	5	4	5	5	5	6
50%	8	7	8	9	7	8	8	7	8
90%	12	11	12	13	11	13	12	12	11
<i>TMT size per 1,000 employees</i>									
Number of observations	1409	432	412	565	228	660	175	266	80
Arithmetic mean	0.94	2.44	0.48	0.14	2.77	0.65	0.27	0.67	0.51
Minimum	0.00	0.31	0.10	0.00	0.03	0.03	0.00	0.03	0.03
Maximum	101.27	101.27	1.17	0.44	101.27	6.94	1.43	4.69	2.94
Percentiles 10%	0.07	0.71	0.24	0.04	0.21	0.08	0.03	0.05	0.08
50%	0.40	1.21	0.45	0.12	0.91	0.37	0.19	0.41	0.19
90%	1.71	3.91	0.73	0.27	6.01	1.47	0.70	1.47	1.50
<i>TMT size per \$1 billion in sales</i>									
Number of observations	1409	432	412	565	228	660	175	266	80
Arithmetic mean	1.36	2.56	1.23	0.52	1.57	1.32	0.71	1.69	1.32
Minimum	0.01	0.09	0.03	0.01	0.10	0.01	0.01	0.06	0.17
Maximum	17.94	17.94	4.30	6.86	10.21	12.06	3.57	17.94	12.95
Percentiles 10%	0.16	0.69	0.37	0.09	0.35	0.17	0.08	0.17	0.19
50%	0.89	2.03	1.07	0.39	1.02	0.97	0.37	1.27	0.68
90%	3.09	4.98	2.38	1.14	3.68	2.87	2.13	3.57	2.47

* Firm size was divided into three groups based on terciles.

** "Services" includes: Information; Finance and Insurance; Professional, Scientific, and Technical Services; Administrative and Support and Waste Management and Remediation Services; and Arts, Entertainment, and Recreation; Educational Services; Accommodation and Food Services and Other Services.

** "Others" includes: Agriculture, Forestry, Fishing and Hunting; Transportation and Warehousing; and Health Care and Social Assistance.

Table 8. Descriptive information on TMT size and different return on investment and diversification categories

	ROA*				Diversification total**			Diversification unrelated***		
	All	Low	Med	High	Zero	Low	High	Zero	Low	High
<i>TMT size</i>										
Number of observations	1409	356	814	398	447	385	823	1007	263	471
Arithmetic mean	8.29	8.11	8.28	8.47	8.06	8.16	8.44	8.18	8.17	8.47
Minimum	2	2	2	3	3	3	2	3	3	2
Maximum	21	19	21	19	17	20	21	18	20	21
Percentiles 10%	5	5	5	5	5	5	5	5	5	5
50%	8	8	8	8	7	8	8	8	8	8
90%	12	12	12	13	12	12	12	12	12	15
<i>TMT size per 1,000 employees</i>										
Number of observations	1409	349	89	382	430	380	804	984	248	455
Arithmetic mean	1.08	2.15	0.72	0.85	2.35	0.66	0.86	1.42	1.55	1.01
Minimum	0.00	0.01	0.00	0.02	0.02	0.01	0.00	0.01	0.00	0.01
Maximum	101.27	101.27	13.16	11.58	101.27	9.15	98.77	101.27	98.77	98.77
Percentiles 10%	0.07	0.08	0.07	0.06	0.08	0.06	0.07	0.08	0.07	0.06
50%	0.40	0.59	0.32	0.46	0.59	0.42	0.34	0.50	0.37	0.28
90%	1.74	2.04	1.48	2.40	3.65	1.38	1.25	2.44	1.59	1.19
<i>TMT size per \$1 billion in sales</i>										
Number of observations	1409	341	811	383	432	382	795	978	250	454
Arithmetic mean	1.37	1.47	1.20	1.65	2.00	1.30	1.09	1.59	1.13	1.12
Minimum	0.01	0.01	0.01	0.01	0.06	0.02	0.01	0.02	0.02	0.01
Maximum	17.94	17.94	11.12	12.95	17.94	7.21	7.83	17.94	7.83	7.83
Percentiles 10%	0.16	0.23	0.14	0.22	0.26	0.13	0.16	0.25	0.09	0.13
50%	0.92	0.94	0.84	1.13	1.15	1.09	0.74	1.06	0.76	0.80
90%	3.11	2.96	2.80	3.68	4.66	2.64	2.47	3.63	2.60	2.48

*ROA: categorization along quartiles. Low < 25%, medium 25–75% and high > 75%

**Diversification – total: low and high were split along the median of diversification.

*** Diversification – unrelated: low and high were split along the 75th percentile (median was still zero).

Table 9. Descriptive information on TMT composition for different TMT size categories

	<i>TMT outsider (%)</i>				<i>TMT outsider no.</i>			
	All	Small TMT	Medium TMT	Large TMT	All	Small TMT	Medium TMT	Large TMT
	1,409	204	903	302	1,409	204	903	302
Mean	0.27	0.35	0.27	0.23	2.14	1.53	2.05	2.86
Minimum	0.00	0.00	0.00	0.00	0	0	0	0
Maximum	1.00	1.00	1.00	1.00	11	4	11	9
Percentiles 10%	0.00	0.00	0.00	0.00	0	0	0	0
50%	0.23	0.29	0.22	0.18	2	1	2	2
90%	0.60	0.75	0.57	0.50	5	3	5	6
	<i>TMT female (%)</i>				<i>TMT female no.</i>			
	All	Small TMT	Medium TMT	Large TMT	All	Small TMT	Medium TMT	Large TMT
	1,409	204	903	302	1,409	204	903	302
Mean	0.13	0.10	0.13	0.16	1.18	0.44	1.04	2.11
Minimum	0.00	0.00	0.00	0.00	0	0	0	0
Maximum	0.67	0.50	0.67	0.67	8	2	8	6
Percentiles 10%	0.00	0.00	0.00	0.00	0	0	0	0
50%	0.13	0.00	0.13	0.15	1	0	1	2
90%	0.30	0.25	0.30	0.31	3	1	2	4
	<i>TMT age heterogeneity</i>				<i>TMT age average</i>			
	All	Small TMT	Medium TMT	Large TMT	All	Small TMT	Medium TMT	Large TMT
	1,409	204	903	302	1,409	204	903	302
Mean	0.10	0.11	0.10	0.10	53.46	53.87	53.42	53.33
Minimum	0.01	0.01	0.03	0.03	39.5	40.25	39.9	47
Maximum	0.23	0.23	0.23	0.18	74.5	74.5	62.5	61.36
Percentiles 10%	0.06	0.05	0.07	0.07	49.78	48.80	49.70	50.33
50%	0.10	0.10	0.10	0.10	53.44	53.40	53.50	53.37
90%	0.14	0.18	0.14	0.13	57.20	59.00	56.89	56.31
	<i>TMT position tenure heterogeneity</i>				<i>TMT position tenure average</i>			
	All	Small TMT	Medium TMT	Large TMT	All	Small TMT	Medium TMT	Large TMT
	1,409	204	903	302	1,409	204	903	302
Mean	1.01	0.89	1.03	1.03	3.66	5.45	3.43	3.14
Minimum	0.00	0.00	0.00	0.00	0.11	0.20	0.11	0.23
Maximum	3.61	2.24	3	3.61	33.00	33.00	13.71	13.36
Percentiles 10%	0.52	0.32	0.54	0.65	1.17	1.25	1.167	1.15
50%	0.94	0.83	0.95	0.97	3.14	4.00	3.14	2.87
90%	1.56	1.48	1.65	1.45	6.33	10.80	5.89	5.55
	<i>TMT firm tenure heterogeneity</i>				<i>TMT firm tenure average</i>			
	All	Small TMT	Medium TMT	Large TMT	All	Small TMT	Medium TMT	Large TMT
	1,409	204	903	302	1,409	204	903	302
Mean	0.64	0.60	0.64	0.66	14.33	13.85	13.97	15.72
Minimum	0.00	0.05	0.00	0.00	1.00	1.00	1.00	1.00
Maximum	1.80	1.32	1.80	1.80	35.50	35.50	35.50	35.50
Percentiles 10%	0.31	0.28	0.30	0.37	6.66	6.50	6.33	8.33
50%	0.61	0.57	0.61	0.63	13.33	12.40	13.00	15.43
90%	1.01	0.99	1.03	0.99	24.00	23.40	23.88	24.18

Table 10. Descriptive information on TMT structure measures for different TMT size categories

	<i>Ratio general managers</i>				<i>General managers per TMT in no.</i>			
	All	Small TMT	Medium TMT	Large TMT	All	Small TMT	Medium TMT	Large TMT
	1,409	204	903	302	1,409	204	903	302
Mean	0.29	0.13	0.30	0.38	2.35	0.49	2.03	4.54
Minimum	0	0	0	0	0	0	0	0
Maximum	1.00	0.75	1.00	1.00	16	3	7	16
Percentiles 10%	0.00	0.00	0.00	0.18	0	0	0	2
50%	0.30	0.00	0.33	0.36	2	0	2	4
90%	0.60	0.50	0.60	0.60	5	2	4	8
	<i>Ratio functional managers</i>				<i>Functional managers per TMT in no.</i>			
	All	Small TMT	Medium TMT	Large TMT	All	Small TMT	Medium TMT	Large TMT
	1,409	204	903	302	1,409	204	903	302
Mean	0.71	0.87	0.70	0.62	5.97	3.98	5.67	8.24
Minimum	0.00	0.25	0.00	0.00	1	2	1	1
Maximum	1.00	1.00	1.00	1.00	14	5	10	14
Percentiles 10%	0.40	0.50	0.40	0.40	3	3	4	6
50%	0.70	1.00	0.67	0.64	6	4	6	8
90%	1.00	1.00	1.00	0.82	9	5	8	11
	<i>TMT hierarchical levels</i>							
	All	Small TMT	Medium TMT	Large TMT				
	1,409	204	903	302				
Mean	3.2	2.9	3.2	3.4				
Minimum	2	2	2	2				
Maximum	5	5	5	5				
Percentiles 10%	2	2	2	2				
50%	3	3	3	3				
90%	4	4	4	4				

To better understand the characteristics of different TMT size groups, we included several classical TMT composition characteristics in our descriptive analysis, as shown in Table 9: outsider executives, female executives, age heterogeneity and average, position tenure heterogeneity and average, and firm tenure heterogeneity and average. *TMT outsider (%)* indicates the percentage of top executives on the TMT from outside the firm and *TMT outsider average* is the average number of top executives on the TMT from outside the firm. The descriptive results show that small TMTs have, on average, a higher percentage of outsiders (35%) than medium (27%) and large (23%) teams, which translates into around 1.53 outsiders for small, 2.05 for medium, and 2.86 for large TMTs. The *percentage of female top executives* is low across all sizes and ranges from 10% for small TMTs to 13% for medium and 16% for large TMTs, which translates into 1.18 female top executives on average per TMT. Concerning average age, we see that TMTs have similar average ages (53.5 years). Position tenures differ across TMT size, with managers staying longer in their positions in smaller teams (5.45

years) than in medium (3.43 years) and large (3.14 years) teams. Regarding firm tenures managers have worked longer in the firm when they are in larger teams (15.72 years) than in medium (13.97 years) and small teams (13.85 years).

To improve our understanding of the characteristics of different TMT size categories, we include the following TMT structural characteristics in Table 10: ratios of general manager roles (GM) and functional manager roles (FM), as well as the number of hierarchical levels. The *ratio general manager* indicates how many general managers are on the team, while *general managers per TMT in numbers* indicates the average number of general managers on the team. The *ratio functional managers per TMT* indicates how many functional managers are on the team, while *functional manager per TMT in numbers* shows the average number of functional managers on the executive team. Regarding the ratios of GMs per TMT, small TMTs have only 13% general managers on their team, which means they are largely functionally structured (FM: 87%). However, medium-sized TMTs have fewer general managers (GM: 30%) and more functional managers (FM: 70%), similarly to large TMTs – 38% of which consist of general managers, with functional managers making up 62%. *TMT hierarchical levels* measures the average number of hierarchical levels based on the titles of top executives. We also learn that larger TMTs have more hierarchical levels. On average, TMTs have 3.2 hierarchical levels, ranging from 2.9 for small TMTs, 3.2 for medium, and 3.4 for large teams. Table 11. Characteristics of small, medium, and large TMTs summarizes the main findings of the descriptive analysis.

Table 11. Characteristics of small, medium, and large TMTs.

Small TMTs (2–5 top executives)	Medium TMTs (6–10 top executives)	Large TMTs (11–21 top executives)
• 1.5 outsiders (35%) • 0.5 women (10%) • 53.9 years average age • 5.5 average position tenure • 13.9 years average firm tenure • 0.5 general managers (13%) • 4 functional managers (87%) • 2.9 hierarchical levels • Examples: Tripadvisor and Alphabet	• 2 outsiders (27%) • 1 woman (13%) • 53.4 years average age • 3.4 average position tenure • 14 years average firm tenure • 2 general managers (30%) • 5.7 functional managers (70%) • 3.2 hierarchical levels • Examples: Nike and Walmart	• 2.9 outsiders (23%) • 2 women (16%) • 53.3 years average age • 3.1 average position tenure • 15.7 years average firm tenure • 4.6 general managers (38%) • 8.1 functional managers (62%) • 3.4 hierarchical levels • Examples: 3M and Procter & Gamble

Determinants of TMT size

To explore the antecedents of TMT size, we used random-effects GLS regression, and to verify our analysis, we calculated fixed-effect regressions. We tested for normal distribution, which was supported. To support causality, all independent variables are lagged by one year. Table 12 summarizes correlations of all variables and shows that all correlations are below 0.44, indicating that multicollinearity was not a problem in our analysis. Table 13 shows the results of the analysis of TMT size determinants. Model 1 contains determinants on the environmental level, Model 2 on the firm level, and Model 3 adds variables on the CEO level and is the complete model. We find consistent results if we put the set of variables individually or collectively into the regression. Below, betas and p-values are reported for the full model (Model 3).

First, the environmental variables – industry sales, industry sales instability, and industry concentration – are not significant across all models. Second, on the firm level, we find a significant positive effect on firm size across all models (Model 3: $\beta = 0.623$; $p < 0.001$). Prior firm performance (in terms of ROA) does not have a significant effect on TMT size. We find a significant positive effect for firm sales growth across all models (Model 3: $\beta = 0.167$; $p < 0.05$). Firm diversification (total and unrelated) does not have a significant effect on TMT size. TMT horizontal interdependence, an indicator for functional structure, is strongly negatively related to TMT size (Model 3: $\beta = -0.59$; $p < 0.001$). This means the more functionally structured a TMT/firm is, the smaller the TMT size will be. TMT vertical interdependence, which indicates a firm's hierarchical structure, does not have a significant effect on TMT size. Third, at the CEO level we find no significant effects for CEO duality, CEO position tenure, CEO outsider, and CEO succession.

Table 12. Correlation table coefficients TMT size

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1.00														
2	-0.03	1.00													
3	-0.05	0.61***	1.00												
4	0.01	-0.07*	-0.02	1.00											
5	0.24***	-0.11***	-0.04	0.25***	1.00										
6	0.02	0.00	0.07*	-0.09**	-0.01	1.00									
7	-0.05	0.07*	0.02	-0.01	-0.08**	0.12***	1.00								
8	0.09**	0.01	-0.05	-0.03	0.19***	-0.06*	-0.07*	1.00							
9	0.06+	0.08*	0.03	-0.01	0.19***	-0.09**	-0.08**	0.37***	1.00						
10	-0.39***	0.02	0.09**	0.08**	-0.12***	0.04	0.09**	-0.17***	-0.13***	1.00					
11	-0.08**	0.14***	0.04	0.01	-0.04	-0.08**	-0.02	-0.05	0.03	-0.04	1.00				
12	0.10***	-0.03	-0.10**	0.00	0.13***	-0.03	-0.01	0.10***	0.10**	-0.09**	-0.08**	1.00			
13	-0.16***	-0.04	0.01	-0.01	0.01	0.10**	0.04	0.03	0.04	0.06*	-0.13***	0.19***	1.00		
14	-0.02	-0.07*	-0.01	0.02	0.07*	0.06+	-0.02	-0.04	-0.02	0.00	-0.01	-0.11***	-0.10***	1.00	
15	-0.11***	0.08**	0.05	-0.03	-0.07*	-0.13***	0.08**	-0.10***	-0.08**	0.11***	0.06*	-0.01	0.26***	-0.10*	1.00
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001															
1	TMT size							6	Prior firm performance					11	TMT vertical interdependence
2	Industry sales instability							7	Firm sales growth					12	CEO duality
3	Industry sales growth							8	Firm diversification (total)					13	CEO position tenure
4	Industry concentration							9	Firm diversification (unrelated)					14	CEO succession
5	Firm size							10	TMT horizontal interdependence					15	CEO outsider

Table 13. Results of random-effects GLS regression analyses for TMT size

	Model 1	Model 2	Model 3
Constant	8.476 *** 0	2.061 -0.11	2.461 -0.054
Industry sales instability	-0.149 -0.912	0.154 -0.908	0.246 -0.857
Industry sales growth	1.317 -0.216	1.108 -0.29	1.047 -0.303
Industry concentration	-0.00147 -0.868	-0.00607 -0.471	-0.00616 -0.453
Firm size (employees)		0.639 *** 0	0.623 *** 0
Prior firm performance (ROA)		0.759 -0.37	0.767 -0.373
Firm sales growth		0.165 * -0.035	0.167 * -0.036
Firm diversification (total)		-0.00707 -0.687	-0.00845 -0.629
Firm diversification (unrelated)		-0.385 -0.18	-0.391 -0.168
TMT horizontal interdependence		-0.583 *** 0	-0.59 *** 0
TMT vertical interdependence		0.0255 -0.815	-0.00599 -0.959
CEO chairman			-0.0361 -0.886
CEO position tenure			-0.0171 -0.436
CEO succession			-0.103 -0.882
CEO outsider			-0.473 -0.193
N	767	767	767
N_g	279	279	279
chi2	1.579	62.21	79.89
p	0.664	1.38E-09	2.96E-11

p-values in parentheses

* p<0.05, ** p<0.01, *** p<0.001

3.4. Discussion

This study set out to explore what characterizes differently sized TMTs and what drives their size. As discussed below, our exploratory study's contribution is mainly empirical. It increases our understanding of the phenomenon of varying TMT size and informs us about the drivers of TMT size. It outlines opportunities for future studies and encourages the next step of theory-testing studies to enhance our knowledge of different aspects of TMT size.

Interpretation of the findings

Our first insights are drawn from the descriptive analysis. We observe that the average TMT size is 8.3 and that almost two-thirds of S&P 500 firms have medium-sized TMTs. The average TMT size in absolute numbers is relatively stable across different firm sizes, industries, profitability, and levels of diversification. However, when controlling for the number of employees (TMT size per 1,000 employees), the TMT size differs significantly depending on firm size, industry, profitability (in terms of ROA), and diversification. Specifically, we find that smaller firms have 20 times more executives per 1,000 employees and four times more executives per \$1 billion in sales (when controlling for sales volume) than larger firms do. This means that in large firms, one TMT member is responsible for considerably more employees than in small firms (one top executive responsible for 7,143 employees in large firms and 352 employees in small firms) and also for larger sales volumes (one top executive responsible for \$1.78 billion in sales volume in large firms and for \$0.4 billion in sales volume in small firms). These results demonstrate that even though top executives in small firms are more expensive in relative terms, in absolute terms firms seem to require a certain number of TMT members to operate successfully. When looking at the industry differences and controlling for firm size, we see that certain industries, like mining, utilities, and construction, have fewer top executives per 1,000 employees than manufacturing, for example. This means that in the more people-intense industries like manufacturing and wholesale trade & retail, a top executive is responsible for many more employees than their counterparts in mining, utilities, and construction.

When looking at TMT size per 1,000 employees and splitting firms across different levels of profitability (in terms of ROA) Table 8), we find that less profitable firms also have larger TMTs (2.15 top managers, on average, per 1,000 employees),

whereas highly profitable firms have less than half (0.85 top managers, on average, per 1,000 employees). Together, these results suggest it is more expensive for small firms to have top executives. Our finding that highly profitable firms (i.e., with a high ROA) have neither the largest nor the smallest number of top executives per 1,000 employees indicates that a larger TMT (TMT per 1,000 employees) is not necessarily performing better. The finding that firms with no diversification have larger TMTs per 1,000 employees than highly diversified ones suggests that tasks in non-diversified firms may be more centralized at the TMT level, whereas highly diversified firms are likely to perform these tasks more on the business unit level (Hambrick & Cannella, 2004; Hill & Hoskisson, 1987).

Controlling for firm size (TMT size per 1,000 employees) and sales volume (TMT size per \$1 billion in sales) shows that TMT size differs depending on firm size, industry, profitability (in terms of ROA), and diversification, albeit less when controlling for sales volume. This finding underlines the importance of controlling for firm size when studying TMT size and suggests that the number of employees can explain differences in TMT size better than sales volume.

While the size of TMT varies significantly (from two to 21 members), we do not find large differences in the demographic composition (number of outsiders, female executives, position and firm tenure heterogeneity, and age heterogeneity and averages), but there are some interesting nuances. Intuitively, we would expect demographic heterogeneity to increase with TMT size. Our findings show, however, that this is not the case in general, but it depends on each demographic aspect. On average, the percentage of outsiders decreases with TMT size, while the absolute number of outsiders increases. This means that larger TMTs recruit more outsiders than smaller TMTs. Larger TMTs with more roles probably need to rely on outsiders because the pool of internal candidates might be limited. While the percentage of female managers is low across all TMT sizes, it increases slightly with TMT size (on average). The ages of top managers in TMTs are relatively widely distributed, with the oldest above 70 and the youngest under 40; however, TMT age heterogeneity and average age do not differ meaningfully across TMT sizes. Our results indicate that 80% of top managers are between 50 and 57 years old, with women comprising an average of 13% of top managers, which is in line with prior research that top management jobs are

mostly performed by older men (Richard & Shelor, 2002). We conclude that gender and age diversity are not a matter of TMT size. This is surprising because one would expect larger TMTs to have more variety with regard to composition as they simply have more “spots” on the team that can be filled by executives with a different demographic profile.

The differences in TMT position tenure heterogeneity and firm tenure heterogeneity are small across TMT sizes, but the averages of position tenure and firm tenure differ depending on TMT size: In smaller TMTs, top executives stay longer in their position than in medium and large TMTs, and in smaller TMTs top executives have shorter firm tenures than in medium and large TMTs. This means that, on average, top executives advance into the top positions sooner in smaller TMTs without needing to stay in the focal firm as long as top executives advancing to larger TMTs. A subsequent analysis (not displayed to save space) shows that, on average, top executives enter their top position in a small TMT after serving 8.5 years in the firm, compared with 10.4 years in medium-sized TMTs, and 12.6 years in large TMTs. A possible explanation for why top executives in small TMTs enter the top position more than four years earlier than in larger TMTs could be that smaller TMTs usually steer smaller firms, and in smaller firms employees face less competition and a smaller talent pool to fill the top positions than in large firms. In large firms, competition for top positions might be higher, and it might be more difficult and take longer for employees to climb the corporate ladder. In smaller TMTs, top executives stay longer in their position than in larger TMTs. This can be explained from a resource-based theory perspective, which assumes that a firm’s strategic decisions and activities are a function of the shared experience of top executives (Kor, 2006; Mahoney, 1995; Penrose, 1959). Since smaller teams have fewer resources on the TMT, it might be more important for them to retain these valuable resources for longer.

Regarding TMT structure, we observe significant differences across TMT sizes. The smaller TMTs are, the more functionally structured they are, whereas larger TMTs have higher numbers and ratios of general managers. The number of hierarchical levels also increases with size. These findings show that TMT structure matters for TMT size and suggest that, depending on their size, TMTs need to be structured differently. Notably, we observe more differences in the structure of TMTs than in their demographic composition when analyzing different TMT sizes.

The next insight refers to the determinants of TMT size. The regression results indicate that when deciding about TMT size, environmental conditions seem to matter less than firm characteristics. The environmental variables tested in our study – industry instability, industry sales growth, and industry concentration – do not determine TMT size. These environmental factors are frequently used in prior research; however, since all were non-significant, it would be worthwhile for future studies to further investigate whether other environmental conditions matter more for TMT size or whether we can conclude that environmental conditions matter less for structural decisions. Our finding is in line with prior studies of structural and size decisions. For example, Menz and Barnbeck (2017) find that environmental conditions matter less for decisions involving the size of corporate development and strategy function size. Also, Nath and Mahajan (2008) and Hambrick and Cannella (2004) find that industry characteristics do not influence having a chief marketing officer (CMO) or a COO, which are factors that could lead to increased TMT size.

However, our study reveals that firm size and firm sales growth are positively associated with TMT size and suggests that larger firms and growing firms require larger TMTs to cope with their complexity. This finding supports an information-processing perspective for explaining TMT antecedents and is in line with Carpenter and Sander's (1998) findings that firms cope with complexity (resulting from internationalization) by increasing TMT size, along with higher CEO long-term pay and a separation between the roles of CEO and chair of the board. We suggested that larger firms may be able to afford larger TMTs. However, prior firm performance does not have a significant effect on TMT size, which indicates that firm performance does not influence decisions about TMT size in general. Hambrick & D'Aveni (1992) find that failing firms abruptly shrank their TMTs, so in the extreme case of failing, firms could be forced to decrease the size of their TMTs. For the firms in our sample, the substantial costs of top executives do not seem to play a big role, unlike in failing firms.

Furthermore, the results of our study show that firm diversification (total and unrelated) is not related to TMT size. Interestingly, Guadalupe et al. (2014) find firm diversification (unrelated) to positively influence TMT size change overall (positive effect on general managers, negative effect on product functional managers, and no effect on admin functional). The fact that we explore TMT size overall, while

Guadalupe et al. (2014) explore the change of TMT size and differentiate roles, might explain our different findings. Other reasons might be the differences in TMT size definition,⁸ different sample, and different time of study. The time period of the sample of Guadalupe et al. was characterized by corporate restructuring (Ruigrok, Pettigrew, Peck, & Whittington, 1999) – specifically, a major reduction in firm diversification. Informed by prior research (Menz, 2012) that TMTs are affected by changes in organizational structure, this could be another reason why Guadalupe et al. (2014) find a positive relationship between diversification and TMT size change.

Our study discovers that TMT horizontal interdependence, which essentially reflects the degree of functional structure, is negatively related to TMT size. This means that the more horizontally interdependent or functionally structured TMTs are, the smaller they will be (also shown in our descriptive data). Guadalupe et al. (2014), by contrast, explain the growth of TMT size with the phenomenon of firms adding functional roles to the TMT, which they call “functional centralization.” Again, Guadalupe et al. (2014) and our study explore differing constructs, namely TMT size vs. TMT size change. But it is still important to consider both studies together. A comparison between these studies shows that the drivers for TMT size and the change in TMT size need to be explored separately because their drivers are different and time periods play an important role. Furthermore, these findings show it is worthwhile not only to consider diversification, which reflects a firm’s strategy, but also to explore TMT structures as proxies for organizational design. Diversification and horizontal and vertical interdependence are important variables for TMT studies, and studying them can help to answer open questions.

Our study does not find support for CEO characteristics influencing TMT size. Based on a power-theory perspective, we expected that CEOs who are also COB and have been in their position for a long time would be able to influence TMT size. Power-theory arguments are not supported, and our study shows that CEOs considered to be more powerful are limited in how much they can influence TMT size. Also, despite our expectation that CEO successions and CEO outsiders would influence TMT size, we

⁸ Our study defines TMT size as “executives with vice president title or above.” Guadalupe et al. (2014) define it as the team that “reports directly to the CEO.”

did not identify a significant relationship. This can be explained, at least in part, by the observations of Ma and Seidl (2018), who find that new CEOs are initially often constrained in reconfiguring their TMT. The study shows that CEOs may lack the power to change both TMT composition (e.g., a focal TMT member may have a powerful relationship with a board member, and the CEO cannot change that TMT member's position) and TMT structure (e.g., the board prohibits the creation of new roles). For studies focusing on the change of TMT composition and TMT structure, both our findings and the study of Ma and Seidl (2018) underline CEOs' limitations and the importance of the board. Overall, our study demonstrates that the information-processing perspective mostly explains the differences and determinants of TMT size, while power-theory arguments are not supported.

Contributions

Scholarly interest in changing top management team structures has increased recently (see Article I of this dissertation). Presumably, the reason is that TMT structures, specifically regarding size, have changed significantly over the past few decades (Guadalupe et al., 2014). Our study's contribution is mainly empirical as it increases our understanding of the characteristics of different TMT sizes and the factors that influence TMT size.

Our study contributes to upper echelons theory and, more specifically, to the literature on TMT size, which has focused on the outcomes of TMT size in the past (Amason & Sapienza, 1997; Boeker, 1997; Eisenhardt & Schoonhoven, 1990; Halebian & Finkelstein, 1993; Henderson & Fredrickson, 1996; Iaquinto & Fredrickson, 1997; Plambeck & Weber, 2010; Simsek et al., 2005). We complement this research by increasing our knowledge and understanding of how TMTs of different sizes are designed and by demonstrating what drives TMT size. As the first study to analyze the determinants of TMT size on three levels (environment, firm, and CEO), our study establishes that firm size, firm sales growth, and TMT horizontal interdependence determine TMT size.

Specifically, we add to the study of Sander and Carpenter (1998), who find support for their arguments that TMTs deal with complexity arising from internationalization and firm governance by increasing TMT size. Our study supports this information-processing perspective since we find that firm size and firm sales growth, which bring

complexity, are related to TMT size. However, the environmental conditions, which matter from an information-processing perspective, are not supported. Also, we contribute more to our understanding of diversification and TMT size. Guadalupe et al. (2014) find that diversification influences TMT size change positively, but we find no effect on TMT size. While several factors may explain this, the time observed in their study was characterized by a “significant reduction in firm diversification” (Guadalupe et al., 2014, p. 2). This underlines that firm diversification strategies and TMT structures go through periods of change.

We also contribute to the CEO literature – specifically, to CEO duality and succession literature. The lack of support for any CEO-level variable appears to show that CEO characteristics do not play such a big role in decisions about TMT size. We had expected that new CEOs (outsiders and insiders) would influence TMT size, but that was not the case, a finding that is in line with Ma and Seidl (2018), who wrote that new CEOs face constraints in changing TMT structures (Ma & Seidl, 2018).

Given that there are more differences in TMT structural characteristics than in TMT composition when comparing different TMT sizes with each other, our study confirms the importance of distinguishing between TMT structure and composition and the potential explanatory power of TMT structures as highlighted by Hambrick et al. (2015).

The design of our study did not focus on one theoretical lens and, therefore, did not limit our choice of variables and explanations for the determinants of TMT size. Beyond the empirical findings, our study also contributes by emphasizing multiple approaches explaining the determinants of TMT size. As discussed above, we provide explanations for our findings and non-findings from two different theoretical perspectives: information processing and power theory. We contribute to each of these theories and encourage further research with formal hypothesis testing by using one or competing theoretical lenses, as well as other research methods. Specifically, our study contributes to information-processing theory as it shows that for TMT size, the complexity arising from organizational design and firm characteristics seems to matter more than environmental complexity.

Practical implications

The results of our study offer guidance to business practitioners – particularly CEOs – designing their TMT and deciding about its size. Our study informs business practitioners that TMTs need to have a certain number of top executives. While environmental conditions do not seem to matter for the size of the TMT, certain firm characteristics do: large and growing firms require large TMTs. Through our, and prior TMT size research, practitioners may recognize and acknowledge that “TMT size matters”. Furthermore, it encourages and enables CEOs to benchmark their TMTs with firms of similar characteristics and conditions and with competitors. Through this benchmarking, CEOs may realize whether their TMTs are structured the same way as competitors or whether they might have unique, possibly advantageous TMT structures. Business practitioners and CEOs may reflect about how they have adjusted TMT size, or more generally TMT structure, in the past. They may ask themselves who and what triggered decisions about TMT size (e.g., environmental conditions, change in firm characteristics or change in firm strategy) and compare it to our findings. For example, CEOs may reflect how dynamically they may or may not have reacted to changes of the environment or to adjustments of corporate strategy. Based on this benchmarking, business practitioners and CEOs can evaluate the decisions and processes retrospectively and thus learn for the future.

Furthermore, our findings may help CEOs who intend to change the TMT structure, in particular its size. While we expected that the characteristics of a CEO would play a role in their ability to influence TMT size, we did not find significant effects for any of the CEO variables. Our findings suggest that being a chair of the board, holding a position for a long time, or being an external hire does not make it easier or more difficult to change the TMT structure. This means that CEOs who are not chair of the board and do not have a long tenure at the firm, or are not external hires, must not be discouraged to influence TMT structures. Their influence over TMT structures seems to be no different from that of CEOs who have these putatively powerful characteristics.

For individuals aiming to reach top executive positions, it might be useful to know that executives reach these positions sooner in firms with smaller TMTs than in firms with large TMTs. Also, on average, executives in small TMTs remain longer in their

positions. Aware of these findings, it is important for CEOs to avoid undesirable outcomes such as TMT members keeping the size of the TMT artificially small by opposing TMT size increase in order to keep their positions longer.

Limitations and future research

The findings of our study need to be viewed in the context of its limitations, which offer fruitful avenues for future research. First, we acknowledge that the main point of concern regarding our study is potential issues with endogeneity caused by reverse causality or simultaneity between our dependent and independent variable (Wooldridge, 2003). For example, firms that perform well might be able to afford a larger TMT, and firms with a larger TMT might perform better. As recommended by the literature, we addressed this concern by lagging independent variables (Boppel, 2013; Greene, 1997). Endogeneity is also a concern for the TMT variables; however, solving this issue is beyond the scope of our study and leaves room for future research.

Second, the list of antecedents our study explores is non-exhaustive and offers several opportunities for future research. For example, our study did not find support for several CEO characteristics; informed by the work of Ma and Seidl (2018) regarding the obstacles new CEOs face, we find it a promising avenue for future research to study how boards of directors influence TMT size. Our study did not find support for environmental measures having an impact on TMT size. Even though we tested two common and established environmental dimensions, for future studies it is worth exploring other environmental conditions that may play a role in TMT size – both as antecedents and as moderators. This would enable us to conclude whether or not environmental conditions play a role in TMT size or – more broadly – TMT structures. Furthermore, it would be interesting to explore additional firm characteristics, like the ownership and legal structures, as well as the organizational structures. Exploring Mintzberg's five organizational structure types and TMT size is a promising avenue for future research and highly relevant for practitioners to benchmark their organization (Mintzberg, 1993). Furthermore, firms' strategic engagement, like acquisition and alliance activities, might also have an impact on TMT size. Firms that have acquired other firms and merged may increase the TMT to manage the newly merged firms.

Third, additional research methods would certainly enrich and develop our understanding of TMTs. Future research may use other methods like surveys and interviews to explore the dimensions playing into decision-making that are not easily observed. Interviews, in particular, would allow moving beyond the proxies our study relied on, namely observable CEO and TMT characteristics. Furthermore, since regression analysis is limited to two- or (at most) three-way interactions and TMT size decisions might be more complex than direct effects or interactions, configurational analysis may offer promising research methods to explore the phenomenon further. Studying the constellation of multiple variables will explain decisions about TMT size more comprehensively.

Fourth, the next step after an exploratory study is replication studies and theory testing (Helfat, 2007). Our study introduced a categorization of different TMT sizes. Future studies may contribute by further validating these categories and studying the performance effects of different TMT size groups. Also, since our study is limited to the context of large US firms, replication studies in other cultural and firm contexts (e.g., smaller firms, younger firms) would enrich our knowledge.

In light of the exploratory character of our study, the concerns regarding potential endogeneity, and the limitations of our sample, we recommend taking our results and interpretations as suggestions and hope to motivate future research. Both for researchers and practitioners, the most important question is how the optimal TMT size can be determined. Our study and the outlined research opportunities will contribute to answering this question.

3.5. Conclusion

In conclusion, this study suggests that TMT and CEO characteristics seem to matter in TMT size decisions, while environmental factors do not. Furthermore, it proposes that TMTs of different sizes vary more in their structure than in their composition. Our study indicates that firms require a certain number of TMT members. We hope our study will help managers design and benchmark their TMTs for others of the same size and that it enhances CEOs' understanding of the conditions when and how to (re)design the structure of their TMT. We are confident that our study will motivate further research in this field.

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APPENDIX

Variable overview.

- 1 **TMT size.** Measured as all executives with a vice president title or above as reported in the firm's Form 10-K.

Environment

- 2 **Industry sales instability.** Calculated as the standard deviation of the median sales growth of the respective three-digit SIC industry in years t-1 and t.
- 3 **Industry sales growth.** Calculated as the average sales growth of the three-digit SIC industry over the past three years.
- 4 **Industry concentration.** Calculated as the four-firm market concentration ratio with each three-digit SIC code segment in t-1.

Firm

- 5 **Firm size.** Measured as the logarithm number of employees.
- 6 **Prior firm performance.** Measured as return on assets (ROA) in t-1.
- 7 **Firm sales growth.** Measured as the percentage change in sales from year t-1 to year t.
- 8 **Firm diversification (total).** Calculated using SIC codes based on Palepu's (1985) entropy measure.
- 9 **Firm diversification (unrelated).** Calculated using SIC codes based on Palepu's (1985) entropy measure.
- 10 **TMT horizontal interdependence.** Calculated by standardizing and averaging (1) the proportion of executives with titles that indicate primarily a functional role and (2) a dummy variable coded as 1 when the TMT consists only of functional executives and 0 otherwise.
- 11 **TMT vertical interdependence.** Calculated by standardizing and averaging two indicators for each year and then reversing them: (1) The number of distinct hierarchical levels was created by counting the number of title gradations in the TMT each year (always including a CEO, and a TMT could also include a COO, EVPs, SVPs, and possibly even VPs), and (2) the presence of a COO reflected whether there was this additional level in the TMT.

TMT compositional measure

- 12 **TMT position tenure heterogeneity.** Calculated as the standard deviation of the TMT's position tenure divided by the mean.
- 13 **TMT position tenure average.** Measured as the average position tenure of the TMT members.
- 14 **TMT firm tenure heterogeneity.** Calculated as the standard deviation of the TMT's firm tenure divided by the mean.
- 15 **TMT firm tenure average.** Measured as the average firm tenure of TMT members.
- 16 **TMT age heterogeneity.** Calculated as the standard deviation of the TMT members' ages divided by the mean.
- 17 **TMT age average.** Measured as the average age of TMT members.

TMT structural measures

- 18 **Ratio general managers.** Measured as the number of general managers divided by TMT size.
- 19 **General managers per TMT in numbers.** Measured as the average number of general managers per TMT.
- 20 **Ratio functional managers.** Measured as the number of functional managers divided by TMT size.
- 21 **Functional managers in numbers.** Measured as the average number of functional managers per TMT.

CEO

- 22 **CEO duality.** Calculated using a dummy variable coded as 1 if the CEO was also chair of the board in a given year and 0 otherwise.
- 23 **CEO position tenure.** Measured as the position tenure of CEOs.
- 24 **CEO succession.** Calculated using a dummy variable coded as 1 if the CEO changed in a given year and 0 otherwise.
- 25 **CEO outsiders.** Calculated using a dummy variable coded as 1 if the CEO was an outsider and 0 otherwise.

4. Article III: What Value Do Functional Executives Provide a Firm? The Case of the Chief Strategy Officer

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Abstract: While functional executives have become increasingly prevalent in top management teams, there is a lack of understanding about whether, how, and when they are valuable for their firms. We address this gap by arguing that functional executives' value for firm performance depends on their power within firms and their needs for such functional expertise according to the firm's specific context. In this study, the chief strategy officer (CSO) is used as the focal executive. For firms in need of strategic guidance, for example, when they are facing a decline in growth or a stable environment, we find that powerful CSOs have a positive effect on firm performance. By contrast, powerful CSOs are detrimental to firms in need of greater operational efficiency. These results suggest that whether or not a functional executive's role makes a difference for the firm depends on the context.

Keywords: Top management team, functional executives, chief strategy officer, power, expertise

4.1. Introduction

If, when, and how are functional executives valuable for firms? The emerging literature on functional executives in the top management team (TMT) has started to explore their presence and value, for example, the chief operating officer (COO; Hambrick & Cannella, 2004; Marcel, 2009; Menz & Scheef, 2014), the chief marketing officer (CMO; Nath & Mahajan, 2008), and the chief strategy officer (CSO; Menz & Scheef, 2014). Surprisingly, prior research has found mixed and inconclusive results regarding the value of functional executives for firm performance, even as firms are increasingly adding functional roles to their TMTs (Guadalupe, Li, & Wulf, 2014). These findings demonstrate the need to study this relationship more in depth to understand what value functional executives have for firm performance.

We have identified a gap in previous research on firm performance effects, which motivates our study. Studying the mere presence of a functional executive in the TMT (Hambrick & Cannella, 2004; Menz & Scheef, 2014) ignores the fact that their power within a firm may differ significantly. Whether an executive is a vice president or an executive vice president plays a role in their ability to influence strategic decisions and, ultimately, firm performance. A second motivation for our study is that functional executives are specific resources that need to meet a firm's needs. Research suggests that functional executives assume an expert role for specific functional areas in the TMT; thus, their value might not be universal but context-dependent (Angwin, Paroutis, & Mitson, 2009; Hambrick & Cannella, 2004). For instance, Hambrick and Cannella (2004) find support for the notion that CEOs who lack expertise in operational matters are inclined to have a COO on their TMT. Firms are likely to vary in their strategic or operational needs and, thus, also in their need for specific functional expertise (Krause, Semadeni, & Cannella, 2013). Therefore, we adopt a resource-based view suggesting that a firm's ability to employ certain resources to improve firm performance depends on the firm's particular needs (Brush & Artz, 1999; Wernerfelt, 1984). It is important to consider both the power of the role and the need for specific functional expertise because they are likely to influence each other. For example, when a firm requires strategic expertise, a CSO will likely be given power and it is likely that they will execute their role on a higher hierarchical level.

We address these gaps by studying CSOs as strategy experts. Since CSOs are increasingly prevalent in TMTs and, along with the CEOs, are experts in strategic

matters, their role is worth examining when studying a functional executive's value for firm performance. Furthermore, prior research has found that CSOs do not affect firm performance (Menz & Scheef, 2014). Given that the CSO's core role is the management of the firm's strategy processes, as well as strategy execution, such as business and corporate development (Angwin et al., 2009), a powerful CSO can become a valuable resource by contributing unique strategic expertise and idiosyncratic knowledge to the CEO and the TMT. Because expertise is context-dependent (Krause et al., 2013), we suggest that only firms with strategic needs, such as finding a solution to declining growth, emphasizing long-range strategic planning, and a need to align divisional strategic plans with the corporate strategy, will benefit from having powerful CSOs.

To further test our theoretical framework according to which expertise is a valuable, context-dependent resource, we hypothesize that the opposite relationship holds for firms that have operational needs (e.g., a decrease in operational efficiency) and fall outside the CSO's knowledge domain. In this case, other types of functional expertise will be required, and we suggest that a powerful CSO will not be able to capitalize on their expert knowledge and may even divert attention from the firm's other, more urgent needs. In sum, we argue that functional executives' value depends on their hierarchical position and the firm's context requiring the functional expertise they would bring. We test our framework with a sample of S&P 500 firms from 2008.

This study contributes to the functional TMT literature in several ways. First, by establishing a link between the CSO's and the firm's performance, it expands the functional executive literature. Specifically, we find that powerful CSOs have a positive impact on firm performance when firms need strategic guidance such as during declining sales or M&A activity or in stable environments. We also find that firms with declining operational efficiency exhibit the opposite relationship, as a powerful CSO can harm firm performance in such an environment. These findings suggest that the value of functional executives depends on their hierarchical position and the firm's context requiring their particular functional expertise. Second, our study reveals that it is important to consider structural power instead of the mere presence of a functional executive in the TMT. We show that the link between functional executives and firm performance is more complex and that research should consider the functional executive's structural power to account for varying levels of influence on strategic decisions.

Third, we introduce the view of functional executives as a critical resource for firms in specific contexts. Our study suggests that, when empowering functional executives, CEOs should consider which expertise the firm needs most and continuously review this decision as the needs are likely to change over time. Our study also complements research on the CSO (Menz & Scheef, 2014). By exploring the consequences of CSO power, we show that not all CSOs are equally empowered to affect firm performance. Lastly, building on the resource-based view of the firm, we support research on the importance of human capital to firm outcomes and add contingencies that make functional expertise a valuable resource (Brush & Artz, 1999; Hitt, Bierman, Shimizu, & Kochhar, 2001; Lepak & Snell, 1999).

4.2. Theory and Hypotheses

The functional executive as a source of competitive advantage

Over the past few decades, TMTs have increased in size, particularly due to an increase in the number of specialist functional executives in the TMT (Guadalupe et al., 2014). Functional TMT members can be defined as “senior executives in the TMT responsible for one or more functional areas in their organizations” (Menz, 2012: 45), such as human resources, marketing, operations, and strategy. Along with the rise in the number of functional C-suite members, an emerging research stream has started to explore the presence and effects of functional executives, including the COO (Hambrick & Cannella, 2004; Marcel, 2009), the CMO (Germann, Ebbes, & Grewal, 2015; Nath & Mahajan, 2011, 2017), the CSO (Menz & Scheef, 2014), and the chief supply chain officer (Roh, Krause, & Swink, 2016) (for a recent review, see Menz, 2012).

Even though scholars have considered the value that functional executives bring to a firm’s performance, their studies’ findings have been inconsistent and far from conclusive. For example, research finds that CMO presence (Nath & Mahajan, 2008) and CSO presence (Menz & Scheef, 2014) have no significant effect on firm performance. Hambrick and Cannella (2004) find that COO presence results in lower performance, whereas Marcel’s (2009) study of 153 U.S. industrial firms reveals a positive relationship between COO presence and firm performance. In light of these conflicting findings, there is a need to understand the circumstances under which functional executives benefit their firms.

While prior research has predominantly viewed functional executives on the TMT as a structural response to contingencies facing firms, these new functional executives can also be considered valuable, rare, hard-to-imitate, and difficult-to-substitute resources (Barney, 1991). Because much of a firm's knowledge resides in its human capital (Hitt, Bierman, et al., 2001), expertise/knowledge are intangible resources that can meet these criteria (Grant, 1996). Thus, firms can create value by carefully selecting human capital and functional executives (Lepak & Snell, 1999). While functional executives have formal education, such as an MBA degree, that is mostly articulable knowledge that can be codified and easily transferred (Liebeskind, 1996), they build up considerable but often tacit function-specific expertise knowledge through "learning-by-doing" and thanks to experiences in their professional careers (Pisano, 1994; Szulanski, 1996). By the time functional executives advance to the C-suite, they have built up human capital in the form of individual skills and knowledge (Hitt, Bierman, et al., 2001) that are their most important resource. As the career paths of functional executives can vary significantly, the specific expertise and idiosyncratic knowledge that they have accumulated over the years constitute a difficult-to-imitate resource. This form of tacit knowledge is also embedded in individual skills and, in part, in collaborative working relationships within the firm (Szulanski, 1996). Therefore, it constitutes a hard-to-imitate resource. Lastly, only a few managers make it to the top of their functional area and into the C-suite. Many large organizations even hire executive search firms to fill positions at the top of the company, which implies that functional executives constitute a scarce resource.

However, it is more difficult to determine when exactly the functional executive constitutes a valuable resource for the firm. Following resource-based logic (Wernerfelt, 1984), we suggest that a firm's ability to employ functional executives as resources to improve firm performance depends on both the functional executive's structural position and the firm's context-specific needs.

Functional executive's power and firm's particular needs

To be beneficial to their firm, functional executives must be able to contribute their expertise to TMT decisions and critical functional activities, which requires influence within the TMT. However, the influence of a specific functional executive may vary

greatly across firms. For example, whether a functional executive is one of several vice presidents or one of a few executive vice presidents and, thus, perhaps part of the CEO's "inner circle" is likely to affect the executive's means of influencing a firm's strategic decision-making and ultimately, of having an impact on firm performance. Research on TMT power concentration, for instance, supports this reasoning by showing that formal power concentration in the TMT affects the change in corporate diversification (Greve & Mitsuhashi, 2007); however, most studies on functional executives examine the mere presence of a functional executive in the TMT (a notable exception is the work of Nath & Mahajan, 2011), which makes their influence on TMT decisions less clear.

A study of the effect of functional executives in light of their power within the TMT makes it possible to distinguish between different functional executives' levels of influence and identify their ability to contribute to the firm's performance. An executive's structural power, defined as their hierarchical position (Finkelstein, 1992), is considered one of the most important sources of power (Brass & Burkhardt, 1993; Finkelstein, 1992). By using the structural approach to power, we exclude the behavioral perspective that focuses on actual power over specific decisions and influencing strategies (Brass & Burkhardt, 1993; French, Raven, & Cartwright, 1959). The structural perspective suits our research question well for several reasons. Since structural power stems from the hierarchical position, it is not decision-specific and, thus, is suitable to study the general value of functional executives. Furthermore, the findings are relevant for functional executives, regardless of their characteristics, specific decisions, and influence strategies (Nath & Mahajan, 2011).

While the functional executive's influence within the TMT may affect the extent to which their expertise is valuable for decision making, its benefits will likely depend on the firm's specific context. Prior research on the contingencies of valuable resources suggests that a firm's success at employing certain resources to improve firm performance depends on the firm's particular needs (Brush & Artz, 1999; Wernerfelt, 1984). That is, some executives might be more instrumental in creating a competitive advantage in certain situations than in others (Lepak & Snell, 1999).

Matching human resources to firms' particular needs also finds support in the governance literature showing that firms with a high need for operational expertise benefit from having an external COO/president on the board (Krause et al., 2013). Operational needs arise, for example, when the firm's operational efficiency decreases,

that is, if there is a decline in productivity or overhead efficiency. However, when the operational need is low, the expertise of an external COO/president harms firm performance. The authors hypothesize that, in such a context, a CEO might be more valuable (than a COO) as an independent director contributing their strategy expertise to the firm when the strategic need is high.

In sum, we argue that a functional executive's structural power should match the firm's specific needs to render a functional executive valuable as a resource.

The need for a powerful strategy executive

Among the many functional executives in contemporary firms' C-suite, the CSO offers a suitable setting for studying the conditions under which a powerful functional executive is needed. CSOs are executives in the TMT who are explicitly responsible for a firm's strategy (Breene, Nunes, & Shill, 2007). The CSO's core role is to manage the firm's strategy process, as well as strategy execution activities, such as business and corporate development (Menz & Scheef, 2014). Specifically, a powerful CSO can constitute a source of competitive advantage by contributing unique strategy expertise, providing guidance on strategic matters for the CEO and the TMT, and having unique access to coordinate across divisions and functions. CSOs are not only increasingly prevalent in TMTs but also considered, together with the CEOs, experts in strategic matters. While this would suggest that a CSO has the potential to affect both the strategy and the performance of a firm, prior research has not found the presence of a CSO to have an effect on firm performance (Menz & Scheef, 2014).

We expect the CSO's value to depend on their structural power and the firm's need for strategy expertise in the TMT. Specifically, the need for strategic expertise arises, for example, when a firm lags behind its growth potential, struggles to implement its corporate strategy, or faces a challenging business environment. In this context, when an executive can help a firm enact its strategies, exploit opportunities, and neutralize threats in the market environment, they become a valuable resource for the firm (Barney, 1991; Lepak & Snell, 1999). We focus on four conditions that represent particularly challenging strategic conditions or strategic needs for firms where we argue the CSO can be beneficial: The need for (1) organic growth when sales decrease; (2) corporate development when M&A activity decreases; (3) coordination when product market

diversification increases; and (4) long-term planning when the environment is stable over time.⁹

It is important to note that, in line with Krause et al. (2013), we argue that the strategic need is not per se given to firms through its status quo but that the trajectory – for example, the change in conditions – is critical for a need to arise, which will be elaborated on in more detail below. This approach differentiates our paper from prior studies of functional executives' effects on firm performance, which have mostly examined the status quo or a moment in time to define structural complexity, such as firm diversification in a given year. By contrast, we argue that the change in diversification is more important and that it is important to look at the trajectory.

We argue that powerful CSOs can benefit firms when the firm diverts from its growth trajectory. In situations of declining growth, firms may need a strategy expert who can become a valuable resource. Indeed, human resources are essential for the implementation of growth strategies (Lee & Miller, 1999); in particular, executives in higher hierarchical positions will have more legitimacy to foster such implementation (Breene et al., 2007). We consider both organic and inorganic growth in the following.

Declining sales. The first strategic need arises when a firm experiences declining sales. Human resources can be valuable when they enable a firm to exploit opportunities or neutralize threats in its business environment (Barney, 1991; Lepak & Snell, 1999). This becomes particularly relevant when a firm diverts from its growth trajectory; for instance, the firm is struggling to hold or capture more market share, has missed a market opportunity in fast-developing markets, or is too slow to adapt to industry changes. CSOs' core strengths include their deep knowledge of and ability to analyze markets and to turn market opportunities into strategic initiatives so that the firm can capitalize on them (Angwin et al., 2009). Thus, we argue that in a situation of declining sales, a powerful CSO can be instrumental in discovering and exploiting new growth stimuli and, therefore, constitute a valuable resource.

However, resources may also be a weakness for the firm (Wernerfelt, 1984). Functional executives are experts in a narrow knowledge domain as it takes time and persistence to build up expertise throughout one's career (Hitt, Bierman, et al., 2001).

⁹ We acknowledge that firms might have additional strategic needs; however, for the scope of this paper, we limit the needs to these four and leave the rest to future research.

While those functional executives make good decisions within their domains of expertise, in other knowledge domains they often make worse decisions than novices (Dreyfus, Dreyfus, & Athanasiou, 1986). For instance, when the firm's sales are growing, the TMT may focus its attention on other functional domains. Therefore, we expect that when a firm's sales are growing, the CSO will be less useful to the firm. In sum:

H1: CSO power will be positively associated with firm performance when the firm's sales growth is on the decline.

Declining M&A activity. The second strategic need arises when a firm experiences a decline in M&A activity. Generally, M&A activity constitutes a means for growth and creates additional complexity for the firm's senior management (Hambrick & Cannella, 2004). Firms that frequently engage in acquisitions or have established an acquisition program usually develop appropriate structures and processes to handle the acquisition process and post-merger integration (Laamanen & Keil, 2008). These firms also tend to have a relatively stable level of acquisitions over the years. In this case, the firm has built up strong M&A competence, which constitutes a valuable resource. In such a case, there is a less specific need for a powerful CSO's expertise, which is often in the area of corporate and business development, such as strategic initiatives or M&A (Angwin et al., 2009; Menz & Scheef, 2014).

However, stagnating or declining M&A activity signals that the firm needs growth stimuli. Powerful CSOs can be a valuable resource in this context by enabling the firm to discover and exploit new opportunities or targeting firms and helping to neutralize potential threats. These activities are at the core of the CSO's role and expertise. In sum:

H2: CSO power will be positively associated with firm performance when the firm's M&A activity is on the decline.

Increasing product market diversification. The third strategic need arises when a firm increases the diversification of its business portfolio. Generally, firms struggle to create value at the corporate level by aligning their divisional strategic plans with the corporate strategy. However, adding additional products or markets increases the firm's strategic complexity, which is where the skills of a strategy expert are needed. While product divisions that have historically existed have likely established procedures and expertise in how to interpret and implement the corporate strategy, new divisions likely struggle more. We argue that, in the latter context, the CSO constitutes a more critical

resource. Aligning the product divisions' strategic plans with the corporate level and providing guidance and support to divisions to implement and clarify the firm's corporate strategy constitutes a core field of expertise for the CSO (Angwin et al., 2009; Menz & Scheef, 2014). By sharing their expertise as a strategy professional with new product divisions and by ensuring that the business and corporate strategy are aligned, the CSO can make a critical contribution to the firm and, thus, benefit firm performance.

By contrast, when a firm has the same number of product divisions over the years or becomes more focused, there is a less specific need for the CSO's expertise, and the assorted skills of other functional executives may be more salient to the firm. Thus, we argue that:

H3: CSO power will be positively associated with firm performance when the firm's product market diversification is on the rise.

Environmental stability. The fourth strategic need arises when a firm's industry environment is stable over time and requires a long-term view of strategy. Environmental (in)stability refers to the extent of uncertainty faced by firms (Carpenter & Westphal, 2001). In uncertain industries with unstable sales growth over the years, long-term strategic planning becomes less feasible for firms. For instance, strategic planning departments have faced significant downsizing in turbulent environments (Whittington, Yakis-Douglas, Ahn, & Cailluet, 2016). In a more stable environment, however, strategic planning and a long-term view of strategy are crucial components of a firm's success. We argue that, specifically in this context, the CSO can capitalize on their unique strategy expertise, guide the firm's strategy development, and, therefore, benefit the firm's performance. For instance, the typical activities of a CSO's job profile include competitive and market analysis, strategy development, and long-range planning. Many CSOs also have a background in strategy consulting (Angwin et al., 2009).

In more unstable and dynamic environments, the firm will likely need different skill sets and types of expertise to react on time to changing market conditions. It has been argued that the underlying reason for unstable environments is shifts in customer preferences (Grewal & Tansuhaj, 2001) or bound to factors such as technological viability and distribution/service infrastructure (Hambrick & Cannella, 2004). The CSO, as a functional executive in an administrative (non-product) function (Guadalupe et al., 2014), is not as close to the markets and customers. For this reason, they may not pick up on shifts in customer preferences or technology (Hambrick & Cannella, 2004) as quickly

as functional executives in the front office, such as the COO or CMO. These functional executives are better positioned to guide the firm in unstable environments, whereas the CSO's long-term strategy focus will divert attention from the firm's more immediate needs stemming from the changing market conditions. In sum:

H4: CSO power will be positively associated with firm performance when the firm's environment is stable over time.

When the firm does not need a strategy executive

Functional executives with expert knowledge have many benefits and can constitute a valuable resource for the firm, as discussed above. However, they also represent costs for the firm. Functional executives in high executive positions, such as executive vice presidents, are also among the highest-paid executives in the firm. Therefore, functional executives (as human resources) need to meet the firm's business needs at a reasonable cost and offer good quality; if not, they may negatively affect firm performance (Barney & Wright, 1998). To further develop our theoretical framework according to which a functional executive's value is a context-dependent valuable resource, we consider firm contexts where the CSO does not meet business needs and may harm firm performance.

Concerning the CSO, we argue that firms facing operational issues, such as declining efficiency, need operational rather than strategy expertise. The CSO's field of expertise helps to provide long-term perspectives for the firm and focuses more on externally oriented activities such as the identification of business opportunities in the environment (Menz & Scheef, 2014). In the context of declining efficiency, a short-term and internally oriented view is crucial but falls outside the CSO's expertise domain. While experts are good decision-makers within their domain of expertise, outside their knowledge domain they can be worse decision-makers than inexperienced persons (Dreyfus et al., 1986). In such a context, a CSO who has a strong influence over the firm's strategic agenda may not be able to add value and meet the firm's business needs and may even divert attention from the firm's more pressing operational issues. In such a context, if a functional executive has a less positive impact on the firm's performance, the CSO's relative cost may outweigh the benefits resulting in diminishing firm performance. In sum:

H5: CSO power will be negatively associated with firm performance when the firm's operational efficiency is on the decline.

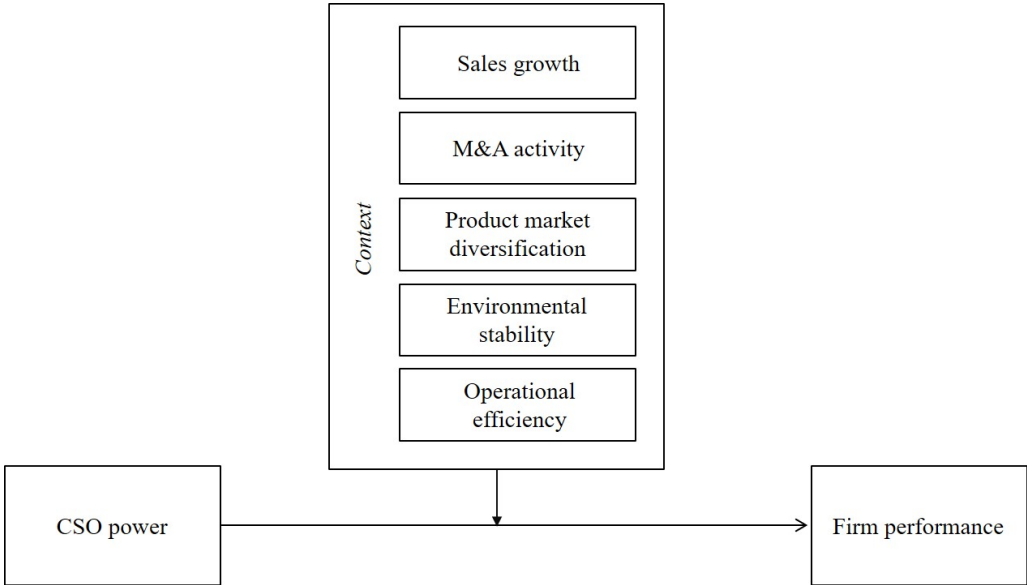


Figure 4. Conceptual model CSO power

4.3. Method

Sample and Data

The study's sample consists of S&P 500 firms at the end of 2008. Following the approach by Menz and Scheef (2014), we define the TMT as the executives included on the firm's Form 10-K. In the TMT, we identify as the CSOs those executives who have a title related to strategy (e.g., chief strategy officer, executive vice president for corporate development, senior vice president for strategy and business development). Similarly to existing research on other functional TMT members (Marcel, 2009), we obtained data on CSOs and other TMT members from Form 10-Ks, firm proxy statements, and annual reports. We collected financial and other firm information from the Thomson Financial databases. After excluding missing data and firms from three-digit SIC groups with fewer than three firms, the final sample comprised 305 firms.

Measures

Firm performance. To analyze the combined effect of CSO power and firm context on firm performance, we chose Tobin's Q as a market-based measure of firm performance (Carpenter, 2002; Nath & Mahajan, 2008). We measured performance as

the firm's industry-adjusted Tobin's Q in $t+1$, calculated as the ratio of the firm's market value of the assets to its replacement costs, minus the average Tobin's Q of the firm's industry (Chung & Pruitt, 1994). We used the firm's three-digit SIC code, as well as all the U.S. firms included in the Thomson Reuters databases in the same primary three-digit SIC code segment, to calculate an industry's Tobin's Q. We focus on market-based performance as it includes investors' perceptions, and the effects of a functional executive as an expert are likely to be visible much faster in the market-based performance. The effects of functional executives' expertise might only become visible in accounting-based performance after several years (Ndofor, Sirmon, & He, 2015).

CSO power. To measure CSO power, we relied on Finkelstein's (1992) measure of structural power at the end of 2008, which considers the hierarchical level of the executive and the total number of hierarchical levels in the TMT. A focal TMT member's structural power is measured as the percentage of the other TMT members with higher titles. As suggested by Finkelstein (1992), we used the firms' official reporting documents, such as Form 10-Ks, as the primary source of information on the TMT member titles. We subtracted the fraction with higher titles than the CSO from 1, which ensures that higher values of the measure indicate higher CSO influence. For the CEO, this measure produces a value of 1, as there are no levels above the CEO. Put formally, the measure is calculated as $1 - (\text{number of levels above the CSO} / \text{number of levels in the TMT})$. For example, a CSO on level two in a TMT with four levels would get a value of $1 - (1/4) = 0.75$. To account for differing TMT sizes, we divided CSO power by the total power of the TMT, measured as the sum of the power of all TMT members. For the firms that did not have a CSO on the TMT, we coded the variable as 0. However, this does not mean that these firms do not have a strategy head and strategy function at all, but that the strategy head is not a formal TMT member. Indeed, based on our research, almost all S&P 500 firms have a strategy head.

Firm context. We used five measures to capture the strategic need for a powerful CSO and, thus, the firm's context. First, we calculated the firm's change in sales growth from $t-1$ to t . Second, we considered a firm's change in M&A activity from $t-1$ to t . M&A activity was measured as the total value of all acquisitions conducted in a given year divided by the firm's total sales in the same year (Zhu & Chen, 2014). Third, by using Palepu's (1985) entropy measure of total diversification, we calculated the firm's change in product market diversification from $t-1$ to t (Bigley & Wiersema, 2002). Fourth, we

calculated the firm's industry instability as the standard deviation of the median sales growth of the respective three-digit SIC industry in the years $t-1$ and t (Hambrick & Cannella, 2004). Fifth, we measured the firm's operational needs in two ways following Krause et al. (2013): We calculated the change in the firm's overhead efficiency as the difference between the one-year growth rate in the firm's selling, general, and administrative expenses and subtracted the one-year growth rate in employment. And next, we calculated the change in the firm's productivity as the growth rate of employees' productivity defined as the ratio of firm sales to the number of employees.

Control variables. Our study's control variables follow prior research. We accounted for the firm's current industry-adjusted performance, measured as the firm's Tobin's Q in t minus the average Tobin's Q of the firm's three-digit SIC industry in t . We measured firm size in t , computed as the logarithm of the firm's employees. We controlled for TMT size, measured as the total number of executives in a firm's TMT in t . We accounted for TMT tenure heterogeneity by dividing the standard deviation of the TMT members' team tenures in t by the mean (Marcel, 2009). We also considered the TMT structure, specifically TMT horizontal interdependence, by standardizing and averaging (1) the proportion of executives with titles that indicate primarily a functional role and (2) a dummy variable coded as 1 when the TMT consisted entirely of functional executives and 0 otherwise (Hambrick, Humphrey, & Gupta, 2015). In addition, we controlled for CEO duality, coded as 1 if the CEO was also chairman of the board and as 0 otherwise. Finally, we accounted for COO power, calculating it in the same way as CSO power.

4.4. Analysis and Results

To test our hypotheses, we applied an ordinary least squares (OLS) regression analysis. The variance inflation factors are all below 3, indicating that multicollinearity is not an issue. Table 14 shows the descriptive statistics and correlations. About 40% of the firms had a CSO in the TMT at the end of 2008.

Table 15 shows the results of our hypothesis tests. Model 1 adds the study's controls and independent variables, and Models 2 to 5 the interaction terms of Hypotheses 1 to 5, respectively. As we expected, CSO power alone does not significantly affect firm performance.

Table 14. Correlation table coefficients

	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13
1 Current industry-adjusted performance	-1.18	1.35	1.00												
2 Change in sales growth	0.11	0.22	0.12	1.00											
3 Change in M&A	3.43	14.51	-0.06	0.06	1.00										
4 Change in diversification	0.05	0.51	0.13	0.04	-0.04	1.00									
5 Industry stability	0.11	0.06	0.18 *	0.26 **	-0.04	0.04	1.00								
6 Change in overhead efficiency	0.03	0.16	0.19 *	-0.07	-0.33 ***	-0.07	0.02	1.00							
7 Change in productivity	-6.42	28.59	-0.04	-0.15 +	0.29 ***	0.08	-0.11	-0.26 ***	1.00						
8 Past industry-adjusted performance	11.77	0.96	0.03	-0.08	-0.10	-0.11	-0.08	0.12	-0.19 *	1.00					
9 Firm size	10.07	1.36	0.15 +	-0.10	0.01	0.00	-0.05	0.01	0.16 *	0.01	1.00				
10 TMT size	0.63	0.16	0.17 *	0.01	0.01	-0.12	0.15 +	0.04	-0.05	0.05	-0.06	1.00			
11 TMT horizontal interdependence	0.46	0.27	0.14 +	0.05	-0.06	-0.08	0.21 **	0.10	-0.18 *	0.03	-0.15 +	0.68 ***	1.00		
12 TMT tenure heterogeneity	0.72	0.27	-0.03	-0.12	0.00	-0.07	-0.06	-0.15 +	0.20 *	-0.17 *	0.02	0.04	-0.14 +	1	
13 CEO duality	0.61	0.49	0.04	-0.06	-0.07	0.00	0.16 *	0.14 +	-0.03	0.14 +	0.09	0.17 *	0.17 *	-0.1 +	1
14 COO power	0.06	0.07	0.09	0.12	-0.09	-0.01	0.11	0.18 *	-0.07	0.07	-0.06	0.43 ***	0.42 ***	-0.25 **	0.23 **

+p < 0.10, *p < 0.05, **p < 0.01, ***p < 0.001

Table 15. Results of the OLS regression analysis for Tobin's Q

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Constant	-1.107	-1.146	1.394 *	-2.398	-1.231	-1.500	-1.216
Current industry-adjusted performance	-0.096	-0.094	0.095	-0.004	-0.099	-0.094	-0.095
Firm size	0.106 +	0.107 +	0.022 *	0.086 +	0.124 *	0.147 **	0.112 *
TMT size	-0.066	-0.043	0.189	0.084	-0.063	-0.158	0.138
TMT horizontal interdependence	-0.025	-0.035	-0.034	-0.024	-0.047	0.024	-0.112
TMT tenure heterogeneity	0.121	0.120	0.044	-0.136	0.096	0.147	0.073
CEO duality	-0.363 *	-0.371 *	-0.373 *	-0.093	-0.362 *	-0.311 +	-0.385 *
COO power	1.144	0.384	0.214	1.302	1.316	0.911	1.155
Industry stability	0.301 ***	0.300 ***	0.333 ***	0.238 ***	0.334 ***	0.264 ***	0.315 ***
Change in diversification	0.097	0.090	0.031	-0.127	0.089	0.081	0.099
Change in sales growth	0.325	0.340	0.421	0.559	0.275	0.360	0.305
Change in M&A	0.084	0.084	0.012	0.115	0.073	0.127	0.088
Change in overhead efficiency						0.106	0.131
Change in productivity							0.093
CSO power	0.070	0.067	0.060	0.068	0.063		
CSO power X change in diversification		-0.031					
CSO power X change in sales growth			-0.119 *				
CSO power X change in M&A				-0.286 +			
CSO power X industry stability					-0.147 *		
CSO power X change in overhead efficiency						0.240 *	
CSO power X change in productivity							0.117
N	305	305	305	305	305	291	305
R ²	0.087	0.088	0.102	0.097	0.097	0.100	0.098
Change in R ²	0.002	0.001	0.015	0.01	0.01	0.013	0.011

Standardized beta coefficients. + p < 0.10, * p < 0.05, ** p < 0.01, *** p < 0.001.

Change in R² is related to Model 1

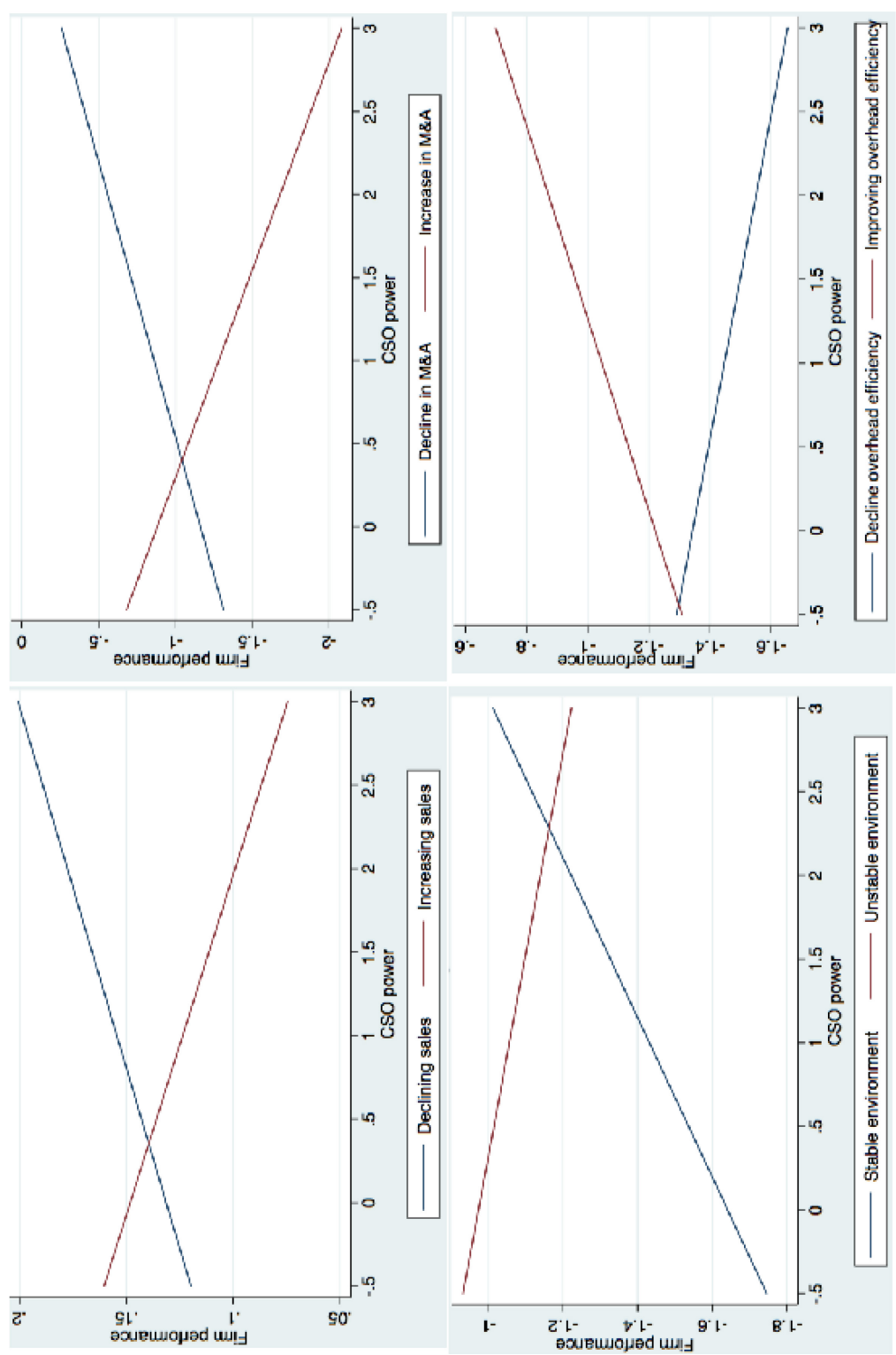


Figure 5. Interaction effects of CSO power and firm context for Tobin's Q

Hypothesis 1, which states that CSO power will be positively related to firm performance when the firm experiences a decline in sales, receives support (sales growth: $\beta = -0.119$; $p < 0.05$; in Model 3).

Hypothesis 2, stating that CSO power will be positively associated with firm performance when the firm experiences a decline in M&A activity, is also supported (M&A emphasis: $\beta = -0.286$; $p < 0.10$, as shown in Model 4). As Figure 5 1 illustrates that the CSO power's effect on firm performance changes direction depending on whether the firm's sales or M&A emphasis increases or decreases.

Hypothesis 3, stating that CSO power will be positively associated with firm performance when the firm's diversification increases, does not find empirical support, as shown in Model 1.

However, we do find support for Hypothesis 4, which states that CSO power will be positively associated with firm performance when the firm's environment is stable over time ($\beta = -0.147$; $p < 0.05$), as shown in Model 5. Figure 5 demonstrates that the CSO power's effect on firm performance changes direction depending on whether the firm operates in a stable or unstable environment. In sum, as hypothesized, we find support for the notion that the benefits of a powerful CSO depend on the strategic need for such a role.

Hypothesis 5, stating that CSO power will be negatively associated with firm performance when the firm's operational efficiency is on the decline, finds support for one of two measures of operational efficiency, as shown in Model 6 and 7: overhead efficiency ($\beta = 0.240$; $p < 0.05$) and productivity ($\beta = 0.117$; $p > 0.10$). As Figure 5 illustrates, CSO power has a negative effect on firm performance when operational efficiency decreases; however, the effect changes direction when the firm's operational efficiency increases.

4.5. Discussion

We initially asked whether, when, and how functional executives might be valuable for firms. Using the example of the CSO as a strategy expert, we contribute to answering these questions. We build on the RBV to understand how functional executives can be a valuable resource and source of a competitive advantage to the firm; we do this by arguing that a firm's ability to employ the CSO and thereby improve its performance depends on the firm's particular business needs (Hitt, Bierman, et al., 2001; Krause et al.,

2013). Specifically, the CSO is valuable for firm performance when the CSO's structural power fits the firm's needs for strategic guidance. Thus, we are the first to establish a link between the CSO and firm performance. However, the CSO is detrimental to firm performance when they have structural power, but the firm actually needs operational expertise. These findings suggest that the CSO's value for the firm depends on the CSO's hierarchical position and the firm's business needs. Thus, we contribute to the functional executive literature in multiple ways.

First, this study adds to the few theoretically driven empirical studies on functional executives' influence on firm performance (Menz, 2012). Building on the RBV (Barney, 1991; Hitt, Biermant, Shimizu, & Kochhar, 2001; Lepak & Snell, 1999), we argue that CSO power should increase firm performance when the CSO (1) has built up human capital throughout their career in the form of individual skills and function-specific, tacit knowledge that is hard to imitate or replace and (2) has the expertise that matches the firm's particular business needs that makes them a valuable and unique resource. We find empirical support for CSO power having a positive impact on firm performance, but this is only true for firms that experience strategic needs in the form of a decline in firm growth or the need for long-range strategic planning. Yet, when a firm experiences operational needs, such as a decline in efficiency, CSO power harms firm performance.

Second, our study reveals the importance of differentiating between the hierarchical levels of functional executives instead of studying these executive's mere presence on the TMT. Prior research has found mixed results regarding the effect that a functional executive's presence in the TMT has on firm performance (Hambrick & Cannella, 2004; Menz & Scheef, 2014; Nath & Mahajan, 2008). In a post-hoc analysis, we could not replicate our findings using the commonly used binary variable for a functional executive's presence in the TMT (Hambrick & Cannella, 2004; Menz & Scheef, 2014; Nath & Mahajan, 2008). Thus, we show that the link between functional executives and firm performance is more complex and that research should consider the functional executive's structural power in order to account for varying levels of influence over strategic decisions when assessing the value of functional executives for firm performance.

Third, our study complements research on the CSO. Menz and Scheef (2014) find that the CSO's presence in the TMT does not affect firm performance. We advance their study by more forcefully putting the CSO into the firm's context. Specifically, CSOs

strongly vary with regard to their hierarchical level in firms. By exploring the consequences of CSO power, we show that not all CSOs are equally empowered to affect firm performance. Furthermore, while prior research has focused on firms' status quo, we argue that the strategic need to have a CSO on the TMT is not per se given to firms but that the trajectory is critical for a need to arise. For example, two firms may have the same level of M&A emphasis in one year, but for one company this means a decline in growth while it means growth for another. Examining the change over time makes it possible to differentiate between the firms' business needs and make a more accurate assessment of when firms need a strategy expert on the TMT.

Lastly, we also contribute to the resource-based view. Building on the RBV, we argue that CSOs can be a resource when the firm needs such expertise. This finding adds to our understanding of how functional executives matter and expands the existing literature, which has mostly focused on contingency theory (Menz, 2012). Functional executives are a critical resource for firms, but their value can only be unfolded when their expertise meets a specific need the firm has and when they are empowered to capitalize on their expertise.

Our study also offers recommendations to CEOs. CEOs are confronted with structural choices related to staffing and configuring the hierarchical levels within a TMT. Research, as well as practical cases, show that TMT structures are not constant (Wiersema & Bantel, 1993), but that new roles are being added and that hierarchical setups are subject to change. Our findings offer guidance for CEOs to use these opportunities to staff and structure their TMTs in order to leverage the functional executive's expertise. They can do this by matching the idiosyncratic knowledge of functional executives with the firm's context and formal positions to achieve a competitive advantage. If a company is suffering from declining growth or needs long-term strategic planning, the CSO might be the right choice for the TMT. However, it is not a universal best practice to add CSOs to the TMT; our results also show that firms with declining operational efficiency are better off without a CSO in their TMT. Therefore, we suggest carefully considering the firm's needs and which expertise is needed in the C-suite.

Our study is not without limitations. For instance, we tested our conceptual framework with the CSO, which is an increasingly present role in the TMT and a logical case when studying the strategic context of firms. This means there is an opportunity for

further research that tests our conceptual framework by examining other functional executives, such as the COO. Following our logic, we hypothesize that powerful COOs will have the opposite effect. We further assume that CSOs on the same hierarchical level are equally capable of leveraging their expertise to influence the firm's strategy. Future research could take the behavioral approach to study CSOs' actual influence on specific strategic decisions such as M&A. Studying CSOs' behavior will help get a more detailed picture of how the CSO influences strategic decisions. In a post-hoc analysis, we also tested several of the CSO's characteristics, such as age, tenure, and functional and educational background, instead of CSO power but did not find any significant (direct or indirect) effects on firm performance. This finding suggests that future research should use first-hand data instead of demographics to study CSOs' actual influence on strategic decisions. To conclude, we hope to stimulate further research on the value of functional executives in the firm.

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Education

2013–2020	University of St. Gallen , St. Gallen, Switzerland Doctorate in Strategic Management
2011–2013	VSE University of Economics , Prague, Czech Republic & University of St. Gallen , Switzerland Master's degree in International Management – CEMS MIM
2007–2011	University of Passau , Germany Bachelor of Arts in European Studies
2009–2010	University of Passau , Germany & State University of Management , Moscow, Russia Certificate Degree in Business Administration and Economics “DSG”
2008–2009	University of Passau , Germany & Masaryk University , Brno, Czech Republic Certificate Degree in Czech Studies “Bohemicum”
2006	B.M.V – Gymnasium Essen , Germany Abitur
2002–2003	Stoneleigh-Burnham School , Massachusetts, USA High school exchange

Professional experience

2013–2016	Institute of Management, University of St. Gallen , St. Gallen, Switzerland Program coordinator of the Master in Business Management and Research Associate
2014–2016	University of St. Gallen , Switzerland Teacher for Academic Writing & Research Methods
2013	Roland Berger Strategy Consultants , Prague, Czech Republic Business analyst
2011	BMW Group , Munich, Germany Intern at the Image, Communication and Retail Market Research department
2010	German Embassy , Prague, Czech Republic Intern at the Economics section

- 2009–2010 **University of Passau, Germany & State University of Management, Moscow, Russia**
Program coordinator of the German Study Program in Business Administration and Economics at the State University of Management, Moscow
- 2009 **Chair of Marketing and Services, University of Passau, Germany**
Student assistant
- 2008 **GfK (Gesellschaft für Konsumforschung) AG, Nuremberg, Germany**
Intern at the Textile Market Research department
- 2007 **Indian Consulate General, Frankfurt, Germany**
Intern at the Economics section
- 2006 **MGB Metro Group Buying HK Ltd., New Delhi, India**
Intern in global trade and sourcing

Honors and awards

- 2011–2013 **German National Merit Foundation (Studienstiftung des deutschen Volkes) & Krupp Foundation**
- 2008 **Forum Alpbach scholarship**
- 2010 **DAAD (German Academic Exchange Service) scholarship** for an internship at the German Embassy, Prague, Czech Republic
- 2010 **DAAD scholarship** for summer school at German-Kazakh University
- 2009–2010 Almaty, Kazakhstan
- 2009 **DAAD scholarship** for studies at the State University of Management Moscow, Russia
- DAAD scholarship** language course at Masaryk University, Brno, Czech Republic
- 2009 **University of Passau**
Scholarship for a language course at the Ivanovo State University, Russia
- Since 2007 **e-fellows.net internet scholarship**
- 2002–2003 **ASSIST (American Secondary Schools for International Students)** scholarship to study at an American private boarding school