

Wrede, Michaela; Dauth, Tobias

**Article — Published Version**

## A temporal perspective on the relationship between top management team internationalization and firms' innovativeness

Managerial and Decision Economics

**Provided in Cooperation with:**

John Wiley & Sons

*Suggested Citation:* Wrede, Michaela; Dauth, Tobias (2020) : A temporal perspective on the relationship between top management team internationalization and firms' innovativeness, Managerial and Decision Economics, ISSN 1099-1468, Wiley, Hoboken, NJ, Vol. 41, Iss. 4, pp. 542-561,  
<https://doi.org/10.1002/mde.3119>

This Version is available at:

<https://hdl.handle.net/10419/230020>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*



<http://creativecommons.org/licenses/by/4.0/>

**RESEARCH ARTICLE**

# A temporal perspective on the relationship between top management team internationalization and firms' innovativeness

Michaela Wrede | Tobias Dauth

Chair of International Management, HHL  
Leipzig Graduate School of Management,  
Leipzig, Germany

**Correspondence**

Michaela Wrede, International Management,  
HHL Leipzig Graduate School of Management  
Jahnallee 59 04109 Leipzig, Germany.  
Email: michaela.wrede@hhl.de

This study examines whether top management team (TMT) internationalization is positively related to firm innovativeness. Besides focusing on the accumulation of top managers' international knowledge and capabilities, we explore the influence of moderators reflecting temporal concerns at three levels: CEO age, TMT tenure, and firm age. Combining upper echelons theory with innovation literature and using a sample of large stock-listed German firms, we demonstrate that TMT internationalization can increase firm innovativeness. This relationship is context-dependent on the age of the CEO. Overall, this paper sheds light on the antecedents of firm innovativeness and the consequences of increasingly international TMTs.

## 1 | INTRODUCTION

The management of firms with international exposure confronts top management teams (TMTs)<sup>1</sup> with growing complexity and requires an understanding of both domestic and global demands (Luo, 2005). In this regard, internationally seasoned top managers are considered to be particularly qualified to cope with the posed challenges (Nielsen & Nielsen, 2011). Consequently, firms have increasingly attempted to internationalize their TMTs (Hartmann, 2015; Staples, 2007) by adding foreign nationals to the TMT and/or appointing TMT members with international experience (Kaczmarek & Ruigrok, 2013). The internationalization of individuals may occur in many ways and comprises the experiences, knowledge, and mental models collected during times of international exposure, such as growing up in a foreign country, education or professional assignments abroad, or board mandates at foreign firms. Next to international operations, firms and their TMTs are also challenged by intensifying global competition and rapid technological advancement, which places heightened demands on firms' innovativeness (Du Plessis, 2007; Hitt, Hoskisson, & Kim, 1997; Prasad & Junni, 2017). According to Lumpkin and Dess (1996), firm innovativeness can be defined as "a firm's tendency to engage in and support new ideas, novelty, experimentation, and creative processes

that may result in new products, services, or technological processes" (p.142). This engagement and support is initially dependent on the TMT, which sets the strategic direction of the firm (Talke, Salomo, & Rost, 2010) and may eventually become visible in the form of resources devoted to innovation initiatives (e.g., research and development [R&D]). Due to the acting competitive forces and changing conditions engendered by the internationalization of firms and TMTs, a solid understanding of the drivers of innovativeness and ways to enhance it are of strategic importance for firms.

Although prior research in the *international business* (IB) literature emphasizes the advantages of top managers' international mind-set and experience for firm-level outcomes, such as performance (Nielsen & Nielsen, 2013) or strategic decision-making (Lee & Park, 2008), empirical evidence about the influence of TMT internationalization on firm innovativeness is largely absent. Since Hambrick and Mason's seminal article, *upper echelons theory* is applied to explore the influence of different TMT characteristics on firm-level outcomes (Carpenter, Geletkanycz, & Sanders, 2004; Hambrick & Mason, 1984). Although the impact of various TMT characteristics has been extensively researched (e.g., age [Barker & Mueller, 2002], tenure [Elenkov, 2008], educational level [Wiersema & Bantel, 1992]), the investigation of antecedents and consequences of TMT internationalization has

This is an open access article under the terms of the Creative Commons Attribution License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

© 2020 The Authors. Managerial and Decision Economics published by John Wiley & Sons Ltd

gained momentum only recently (Schmid & Dauth, 2014). It is suggested that international experiences and nationality significantly shape a top manager's mind-set (Nielsen & Nielsen, 2011; Piaskowska & Trojanowski, 2014) and thus influence strategic decision-making within the TMT (Athanasios & Nigh, 2000; Nielsen, 2010b) as well as firm performance (Carpenter, Sanders, & Gregersen, 2000; Nielsen & Nielsen, 2013). In this context, top managers' international experience and knowledge are considered beneficial for firms as they help TMTs to cope with international complexity and uncertainty and to identify attractive opportunities abroad (Carpenter & Fredrickson, 2001; Tihanyi, Ellstrand, Daily, & Dalton, 2000).

The relevance of TMT characteristics is also acknowledged in the *innovation literature*. Scholars argue that TMTs have a direct influence on innovation (Talke, Salomo, & Kock, 2011) and shape a firm's innovation strategy and performance (Elenkov & Manev, 2005). Different characteristics of top managers are supposed to act favorably toward an enhanced creative capability and innovativeness, such as educational level, functional expertise, or age (Bantel & Jackson, 1989; Barker & Mueller, 2002). On an aggregate level, it is the broad range of explicit and implicit experiences, knowledge, and capabilities *within* TMTs that is considered particularly crucial for innovation (Katila, 2002; Talke et al., 2011).

With this study, we aim to contribute to the IB and innovation literature by acquiring an enhanced understanding of top managers' attributes. In particular, we investigate the relationship between TMT internationalization and firms' innovativeness. Indeed, several scholars stress the scarcity of existent research on this highly relevant characteristic of TMTs and encourage a comprehensive examination of reasons and underlying conditions that make international TMTs valuable for firms (Kaczmarek & Ruigrok, 2013; Sambharya, 1996). Additionally, Talke et al. (2010) highlight the particular value for the innovation literature to examine top managers' impact on innovation strategy and related outcomes from a firm-level standpoint instead of individual projects.

Previous inquiries of the TMT-innovation link have placed a dominant focus on diversity-related concerns (e.g., Nielsen, 2010a; Talke et al., 2010), supporting the notion that variety within the TMT and the existing resource pool of top managers enhances firm innovativeness. We aim to differentiate our study from extant work by bringing another determinant of innovation into the center of analysis: the *accumulation* of resources within a TMT. By accumulation of resources we refer to the entirety of knowledge, experiences, skills, mental models, and social ties available in the TMT. Each TMT member brings its individual resources to the organization, which are then grouped in the TMT and synthesized with those of the other TMT members. The more unique resource elements are available, the greater the resource pool.

Although innovation is created through the combination of new and existing factors (Schumpeter, 1939), it is not only the variety that matters but also the number of available elements that can be combined (Katila, 2002). In fact, a larger resource pool within the TMT can add variety (March, 1991) and increase the chances of finding novel, innovative combinations (Wu, 2014). As top managers are increasingly

involved in firms' international operations (Adler, 2002; Greve, Nielsen, & Ruigrok, 2009; Hartmann, 2015) and participate in TMTs that unite individuals of different nationalities, they are given the chance to broaden their horizon and accumulate a pool of unique information and encounters. More specifically, top managers develop a deeper understanding about foreign markets, obtain global management skills, and establish a network of international contacts. Altogether, these international factors complement and expand the resource base beyond domestic grounds. Assuming that the accumulation of these elements is useful for innovation and may inspire the generation of novel ideas, we focus on the richness of international experiences and knowledge aggregated at the TMT level instead of the members' differences or dispersion of a specific variable within the team.

Numerous scholars emphasize the complexity surrounding the analysis of antecedents and consequences of TMT compositions as well as innovation *per sé* and request a greater attention toward contextual matters (Anderson, Potočnik, & Zhou, 2014; Hambrick & Mason, 1984; Talke et al., 2010). Acknowledging the complexity of the relationship between TMT internationalization and firm innovativeness, we suppose that temporal factors may significantly affect our hypothesized relationship. In fact, behavioral patterns and team dynamics are subject to constant change, reflecting the interplay of the currently present characteristics of individuals (Hambrick & Fukutomi, 1991; Harrison, Price, & Bell, 1998; Tuckman, 1965). Moreover, the advancement of time naturally influences the accumulation and transfer of knowledge, resources, and capabilities in teams and organizations (Peteraf, 1993; Salomon & Shaver, 2005), which impacts innovative capability.

Combining upper echelons theory with innovation literature, we argue that TMTs with international exposure are associated with a raised level of innovativeness at their corresponding firms. To investigate this relationship, we draw on a sample of firms listed on the German HDAX from 2011 to 2015 and 768 top manager profiles belonging to the respective management boards. We find empirical support for our argumentation and infer that favorable conditions toward enhanced firm innovativeness comprise an international TMT's richness of experiences, knowledge, and capabilities from different geographical locations and cultures, a favorable attitude toward risk and change, as well as a supporting network. It is not only the diversity but also the accumulated resources within TMTs that enhance firm innovativeness. Furthermore, our results partly support the notion of temporal aspects as key influencers in the context of TMTs and firm innovativeness and highlight the predominant role of the CEO's age. This way, we complement the growing interest in time-related matters in strategy research with new insights (e.g., Chen & Nadkarni, 2017; Nadkarni & Chen, 2014).

## 2 | THEORY AND HYPOTHESES

### 2.1 | International top managers' influence on firm-level outcomes

The influence of TMTs on a diverse range of firm-level outcomes has been discussed extensively within the upper echelons theory

(Hambrick, 2007; Hambrick & Mason, 1984). The theory posits that the decisions, actions, and judgments TMTs make are influenced by the top managers' individual perceptions (Hambrick & Mason, 1984), which, in turn, are defined by their personal experiences, values, and personalities. Accordingly, top managers' cognitive base and personality are reflected in their firms' strategic actions and performance (Finkelstein, Hambrick, & Cannella, 2009; Hambrick & Mason, 1984).

In this context, top management is particularly regarded as a team instead of separate individuals therein, because it is assumed that strategic decisions in a firm are the result of a *joint* decision process involving multiple actors<sup>2</sup> (Bantel & Jackson, 1989; Carpenter et al., 2004; Cyert & March, 1963). Correspondingly, a TMT unites a broad range of values, experiences, and knowledge. Building on firms' intensifying international involvement, scholars claim that this development should be accompanied by TMTs that possess the skills and cognitive capabilities to cope with the complexity inherent in global markets (Carpenter & Fredrickson, 2001; Kaczmarek & Ruigrok, 2013). International experiences foster such a global skill- and mind-set (e.g., Adler, 2002).

Existing research investigates various factors expressing TMT internationalization and their respective effects on firm-level outcomes. Two principal facets of TMT internationalization that gained particular prominence are top managers' *nationality* and *international experience* (Nielsen, 2010b; Oxelheim, Gregorič, Randøy, & Thomsen, 2013; Schmid & Dauth, 2014). Both are found to significantly influence top managers' mind-sets and decision-making (Nielsen & Nielsen, 2011) as well as firms' strategic positioning (Sambharya, 1996; Tihanyi et al., 2000). More precisely, *nationality* has a strong formative effect on individuals and their psychological attributes and behaviors (Hambrick, Davidson, Snell, & Snow, 1998; Hofstede, 1980). Once established, cultural patterns—and especially those acquired early in life—are deeply ingrained in a person's mind-set, therefore enduring and unlikely to fundamentally change in spite of subsequent experiences (Hofstede & Hofstede, 2005). Besides nationality, *international experiences* collected during studies, professional work, or international board mandates also strongly influence a top manager's perceptions, cognitions, and personality (Herrmann & Datta, 2005). Regarded as an intangible and scarce resource by several scholars (Carpenter et al., 2000; Daily, Certo, & Dalton, 2000), international experiences equip top managers with a deeper understanding of foreign markets and customers (Herrmann & Datta, 2002) and awareness toward cultural differences (Hutzschenreuter & Horstkotte, 2013), which enables them to successfully lead their firms through cross-border operations (Carpenter, Sanders, & Gregersen, 2001).

## 2.2 | (International) top managers' influence on firm innovativeness

Innovation literature regards top managers as key actors in the strategic innovation process (Drucker, 1985; Elenkov, Judge, & Wright, 2005), because they set the strategic direction toward innovation and act as innovation enablers (Daellenbach & McCarthy, 1999; Talke

et al., 2011). Accordingly, innovation scholars widely support upper echelons research by stressing the particular role of top managers' idiosyncrasies and inclinations as well as the TMT's composition for innovation strategy and related outcomes (Hoffman & Hegarty, 1993; Howell & Higgins, 1990; Talke et al., 2011).

Building on Schumpeter's (1939) notion of recombination, various scholars emphasize that innovation is sparked by combining both existing and novel knowledge components or by altering the type of combination of existing components (Ahuja, Lampert, & Tandon, 2008; Fleming & Sorenson, 2001). Considering that a team, such as a TMT, accumulates individual members' explicit and implicit knowledge, skills, and experiences, a rich resource pool is formed, which may build a foundation for innovativeness. The greater this resource pool and the more variety among the resource elements, the higher the likelihood for novel combinations (March, 1991) and subsequent innovative ideas and products (Katila, 2002).

International exposure fundamentally influences an individual's mind-set and personality, resulting in a collection of unique experiences, which in turn may increase the volume of know-how and skills represented in the TMT. Our argumentation regarding the impact of TMT internationalization on firm innovativeness is developed by relying on three key arguments. (a) First, we suggest that international top managers have a broader perspective on a firm's business context due to the knowledge and experiences they collected in different geographical and cultural contexts, which expands the boundaries of imagination and thereby fuels innovativeness. (b) Second, we posit that international top managers are more risk-seeking and thus more open to change and novelties. (c) And third, we argue that the global network international top managers maintain grants access to novel ideas and creative collaborations that are useful for innovativeness.

### 2.2.1 | International top managers have a broad perspective on a firm's business context

International exposure allows individuals to broaden their perspective beyond domestic grounds (Adler, 2002) and to obtain and develop valuable cognitive abilities. A particularly relevant attribute in this context is *nationality*, because the national culture in which a top manager was socialized in from an early age has a considerable and enduring impact on his/her mind-set and values (Nielsen & Nielsen, 2011). Regarded as a shared set of assumptions and socially constructed meanings and preferences (Hofstede & Hofstede, 2005; Schein, 2016), national culture mirrors a society's comprehension of its surroundings, organizations, and interrelations (Geletkanycz, 1997). This cultural imprint becomes apparent in a top manager's interpretation of situations (Schneider & de Meyer, 1991), dealing with uncertainty (Crossland & Hambrick, 2007), openness to change (Geletkanycz, 1997), and strategic decision-making (Hambrick et al., 1998). By uniting insights about both the home and the host countries, a foreign national may bring a different perspective and invaluable knowledge to the organization (Nielsen, 2010b).

Valuable cognitive abilities and experiences are also gained through temporary international exposure, such as *international education*, *international work experience*, and *international linkage*. Overall, *education* is associated with top managers' cognitive orientation, open-mindedness, knowledge base, and information-processing capacity (Cheng, Chan, & Leung, 2010; Hambrick & Mason, 1984; Herrmann & Datta, 2002). When occurring abroad, it offers a unique and advanced learning experience, as it allows individuals to learn about and familiarize themselves with the local conditions next to their formal studies. Norris and Gillespie (2009) even consider studies abroad as one of the best ways to develop cross-cultural communication skills and understanding. A similar effect is created by *international work experience*. Considered to be strongly formative for their careers (Gregersen, Morrison, & Black, 1998), international assignments provide top managers with the opportunity to gather knowledge about foreign markets and local business practices (Daily et al., 2000; Greve et al., 2009) and to obtain a better grasp about their firms' worldwide operations and capabilities (Carpenter et al., 2000). Besides, top managers may develop specialized skills and abilities in dealing with cross-cultural differences and communicating with and managing people from different cultural backgrounds (Adler & Bartholomew, 1992). Another way to gain international exposure is through *international linkage* via board appointments at foreign firms. Even though board mandates may require only limited physical presence, it is critical for serving top managers to gain a comprehensive understanding of the firm's context to make proper judgments. By collaborating with fellow board members, of whom at least some are expected to represent the local firm, it is secured that a cross-border exchange of information occurs. Through these interactions, top managers may acquire critical local knowledge.

Taken together, international experiences provide top managers with the opportunity to acquire comprehensive knowledge about foreign markets (Carpenter et al., 2001; Nielsen & Nielsen, 2011) and to develop an awareness for distinct cultural patterns and potential new business opportunities (Tihanyi et al., 2000). In fact, individuals who lived abroad are found to achieve greater integrative complexity, that is, the capacity to consider and combine multiple perspectives, which stimulates idea generation and creativity (Tadmor, Galinsky, & Maddux, 2012). Having observed diverging business practices and contexts abroad, top managers bring new knowledge and perspectives into the TMT (e.g., insights about alternative technologies and business models, direct and indirect competitors, competitors' commitment to R&D, etc.). These may be combined with existing ones, which establish promising conditions for novel ideas and subsequent innovation (Godart, Maddux, Shipilov, & Galinsky, 2015; March, 1991). To exploit and commercialize these ideas, international top managers may thus invest more aggressively into innovation initiatives (Cohen & Levinthal, 1990). Prior research also suggests that managers compare their organization's performance with their personal aspiration level; gaps are commonly addressed by raising R&D investments (Cyert & March, 1963; Greve, 2003). Having seen the possibilities in foreign markets, it is likely that international top managers identify an aspiration gap, which is to be closed via increased R&D expenditure.

## 2.2.2 | International top managers have a higher propensity to take risk

Our second line of argument is based on the risk perception of international top managers. Prior literature argues that international stints and collaborations involve complexity and uncertainty, due to a potential psychic and geographical distance to the host country (Hutzschenreuter, Kleindienst, & Lange, 2016), which requires individuals to be open and sensitive to the unfamiliar environment and to adapt their behavior (Adler, 2002). Through their track record of international experiences, collected via education abroad, international professional assignments and/or mandates, top managers demonstrate global curiosity and their readiness to immerse themselves into a different cultural context and to take on new challenges (Gregersen et al., 1998). This behavior may be a sign of a more welcoming attitude toward risk and change, which facilitates innovativeness (Damanpour, 1991).

Prior research highlighting the role of experiences for individuals' risk perception supports this notion. More specifically, experiences breed trust in that decision-makers tend to overestimate their abilities in dealing with unforeseen complications and underestimate the actual risk involved in obtaining superior outcomes once their experience levels rise beyond a certain threshold (Jemison & Sitkin, 1986; March & Shapira, 1987). Building on the formative influence of international experiences on top managers (Herrmann & Datta, 2005), Piaskowska and Trojanowski (2014) claim that top managers have gained abilities and self-confidence through international career experiences. In combination with higher core self-evaluations expected among top managers overall (Hiller & Hambrick, 2005), international top managers may perceive themselves to possess superior cross-border management abilities, resulting in a less negative conception of uncertainty and more daring (investment) decisions (Piaskowska & Trojanowski, 2014). Existing studies corroborate this assertion by finding empirical evidence that firms led by internationally experienced individuals are more involved in international operations (Sambharya, 1996) and more inclined toward strategic choices carrying higher levels of risk, such as foreign market entries (Nielsen, 2010b) or international alliances (Lee & Park, 2008). Whereas firms' international involvement reflects international TMTs' intent to seize promising global opportunities (Sambharya, 1996), the higher risk associated with international strategic choices points toward a reduced assessment of involved risks (Nielsen & Nielsen, 2011).

Overall, this lowered perception of risk of internationally seasoned top managers may also be reflected in greater resource allocations toward innovation activities (e.g., R&D<sup>3</sup>), which are assumed to involve substantial risk and uncertainty (Barker & Mueller, 2002; Faleye, Kovacs, & Venkateswaran, 2014). Besides, their grasp of the global competitive landscape may reinforce their promotion of innovation activities to counter competitive pressures from abroad. This reasoning is supported by Schneider and de Meyer (1991), who claim that interpretations of threat may trigger risk-taking (Tversky & Kahneman, 1974) and larger investments of resources, such as money (Dutton, Stumpf, & Wagner, 1990).

## 2.2.3 | International top managers can draw on a global network

Our final line of argument centers on top managers' global network. Indeed, scholars increasingly regard innovation as a distributed process involving the interactions of many actors (Tether, 2002) and stress the merit of global networks and relationships for innovation (Ceci & Lubatti, 2012). By *growing up in a foreign country*, spending time abroad during *international education* and *international work assignments*, and holding *interlocking directorates with foreign firms*, top managers establish a network of personal and professional contacts, for example, with coworkers, business partners, and customers (Herrmann & Datta, 2002; Reuber & Fischer, 1997). This global network eases the access to advice (Athanassiou & Nigh, 1999), information about distant markets (Herrmann & Datta, 2005) and innovation-enabling resources, such as technologies, creativity, and novel ideas (Ahuja & Katila, 2004; Collings, 2014; Leung, Maddux, Galinsky, & Chiu, 2008). External ties may also inspire idea generation (Mihalache, Jansen, Van Den Bosch, & Volberda, 2012), reveal innovation opportunities (Faleye et al., 2014), and induce collaborations with foreign business partners that foster innovation activities (Lasagni, 2012; Sampson, 2007).

To exploit the full potential of these relationships and acquired resources, it is expected that top managers devote more resources toward leveraging inherent innovation opportunities. For instance, Faleye et al. (2014) suggest that better-connected CEOs invest more in R&D and obtain more patents of high quality. The authors attribute this effect to a reduced risk associated with investments into innovation initiatives elicited by personal ties and access to more and superior information. Furthermore, by maintaining relationships with foreign partners, top managers have a chance to learn about best practices and capabilities that make these firms successful and to understand and identify weaknesses in their own firm (Gregersen et al., 1998). To address potential backlogs, top managers may increase their firms' R&D spending in an attempt to enhance innovativeness to eventually catch up with peers (Doraszelski, 2003) and strengthen their firms' global competitive position (Franko, 1989). Besides financial support, international top managers may also leverage their network to connect local and international R&D teams, thereby facilitating the access to and transfer of valuable local knowledge (Ambos & Schlegelmilch, 2004).

Taking into account the previously discussed features of international top managers, these individual characteristics build a rich pool of different kinds of knowledge, capabilities, and perspectives when aggregated at the TMT level, which may act as a hotbed for novel creations and innovativeness. Next to inspiration, the understanding of possibilities and competitors abroad may also alter international TMTs' aspiration levels, resulting in an enhanced commitment toward innovation activities (e.g., R&D expenditure) to eventually catch up. Accordingly, we suggest

**Hypothesis 1.** *There is a positive relationship between TMT internationalization and firm innovativeness.*

## 2.3 | The moderating role of temporal factors

In recent years, researchers increasingly requested a greater consideration of contextual factors when investigating antecedents and consequences of TMT compositions (Carpenter, 2002; Hambrick, 2007). In line with scholars stressing that time matters in teams and business settings (Hall, 1983; Harrison, Mohammed, McGrath, Florey, & Vanderstoep, 2003), we expect that temporal factors may also be effective in our context and may significantly alter our predicted relationship. In fact, the passage of time affects individuals, team dynamics, and the accumulation and transfer of knowledge, resources, and capabilities (Peteraf, 1993; Salomon & Shaver, 2005; Tuckman & Jensen, 1977), which provides reason to believe that temporal concerns may also play a significant role for the relationship between TMT characteristics and innovation. Consequently, moderators following a "time theme" are added at the CEO, TMT, and firm levels. Building on prior research, it is expected that CEO age, TMT tenure, and firm age are particularly relevant factors affecting the relationship between TMT internationalization and firm innovativeness.

### 2.3.1 | CEO age

The CEO is considered the most powerful individual in the TMT and acts not only as a leader but also as an integrator (Buyl, Boone, Hendriks, & Matthyssens, 2011; Carmeli, Schaubroeck, & Tishler, 2011) who identifies and effectively combines the TMT's inherent skills and knowledge (Georgakakis, Greve, & Ruigrok, 2017). Accordingly, the CEO exerts some special influence on the TMT's functioning, output, and performance (Simsek, Heavey, & Fox, 2018). The innovation literature also investigates the particular role of the CEO and regards him/her as an important enabler of innovation (Yadav, Prabhu, & Chandy, 2007), whose cognition influences resource allocations, such as R&D (Ahuja & Katila, 2004; Visser & Faems, 2015). Besides, scholars also pay attention to dispositions with a temporal relation, like the CEO's age and career horizon. In particular, younger CEOs are considered less conservative (Barker & Mueller, 2002; Vroom & Pahl, 1971) and thus more open to embrace change (Wiersema & Bantel, 1992)—an attribute crucial for innovativeness. Additionally, the so called "horizon problem" postulates that CEOs tend to become more short-term focused the closer they approach retirement (Heyden, Reimer, & van Doorn, 2015; Matta & Beamish, 2008). This phenomenon becomes apparent, for instance, by fewer investments that entail greater risk and a long time span to realize potential returns, for example, R&D (Ahuja et al., 2008) or the pursuance of lower growth strategies (Child, 1974). In contrast, younger CEOs are more likely to promote aggressive strategic actions (e.g., acquisitions) in order to accumulate personal and organizational wealth (Yim, 2013). Because innovativeness is considered a rather long-term concern and entails risk (Barker & Mueller, 2002), we expect older CEOs to be less innovative due to their more conservative attitude toward risk and change. Given the CEO's predominant position within the TMT and influence on innovation processes, the



CEO's age may be particularly reflected in TMTs' behavior toward innovations. For instance, an older CEO might impede the unconventional thinking of international TMTs and provide only limited support of innovation-enhancing actions. Consequently, we expect the effect of TMT internationalization on firm innovativeness to decrease with an increasing age of the CEO.

**Hypothesis 2.** *The positive relationship between TMT internationalization and firm innovativeness will be negatively moderated by CEO age.*

### 2.3.2 | TMT tenure

In both theoretical discussions and empirical investigations, TMT tenure is suggested as a particularly influential factor for top managers' decision-making (Elenkov, 2008). In particular, Hambrick and Fukutomi (1991) propose that managers go through different phases during their tenure, which influence their patterns of attention and behavior. Numerous studies support this assertion. For example, scholars claim that long-term belonging to the same firm is accompanied by an individual's narrowed perspective and a disconnection from external sources of information (Katz, 1982; Pfeffer, 1983). Similarly, top managers with long tenure in an organization have developed a greater psychological and tangible investment in the firm (Simsek, 2007), which tends to make them more risk averse (Miller & Shamsie, 2001), as well as less likely to challenge the status quo (Finkelstein & Hambrick, 1990) and advocate change (Finkelstein & Hambrick, 1996). Spending patterns toward innovation-enhancing R&D reflect this phenomenon, too: Long-tenured managers are less pressured to prove themselves and thus employ a more conservative approach to R&D investments (Kor, 2006).

On the TMT-level, this growing conservatism progressing with tenure means a strong effect on the available cognitive resources. In fact, a TMT comprising individuals with long tenure in the organization is expected to possess a more narrowed resource base due to the similar experiences members have made and the common organizational values they share (Bantel & Jackson, 1989; Schmidt & Posner, 1983). Likewise, researchers propose that the longer a team works together, the more it approaches a unified viewpoint and the value of different kinds of knowledge gradually levels off (Finkelstein & Hambrick, 1990). Acknowledging that a broad collection of perspectives and backgrounds is vital for innovativeness (Talke et al., 2011) and innovation is sparked by the combination of existing and novel knowledge and ideas (Heyden, Sidhu, Van Den Bosch, & Volberda, 2012; Schumpeter, 1939), we expect that a longer TMT tenure hampers the optimal recombination of available (international) knowledge elements and thus a firm's innovativeness.

**Hypothesis 3.** *The positive relationship between TMT internationalization and firm innovativeness will be negatively moderated by TMT tenure.*

### 2.3.3 | Firm age

Prior studies suggest that a firm's age affects its innovativeness. For instance, Hansen (1992) finds that firm age is inversely related to the number of new products per dollar of sales. This relationship may be explained by the stable routines and structures firms develop once they grow older, resulting in rising organizational inertia (Hannan & Freeman, 1984) that hampers firms' flexibility and responsiveness to changes in the external environment. Although established organizational know-how becomes obsolete as firms in dynamic environments age (Sørensen & Stuart, 2000; Tushman & Anderson, 1986), their propensity to innovate is reduced in comparison with more agile firms.

Still, stable routines may be considered not only a curse but also a blessing: Over time, more mature firms may have refined their innovation capabilities, raising not only their overall innovativeness level but also the benefits gained from R&D investments (Coad, Segarra, & Teruel, 2016). Consequently, it may be inferred that older firms refrain from aggressive R&D investments to promote innovativeness. This notion is supported by scholars suggesting that innovation activities (e.g., R&D) decline with firm age (Huerger & Jaumandreu, 2004; Withers, Drnevich, & Marino, 2011). Whereas more mature firms tend to exploit existing capabilities (Sørensen & Stuart, 2000), younger firms first need to build innovation capabilities before they are ready to compete on the market. Because R&D investments stimulate a firm's innovation capability (Acs & Audretsch, 1988; Barker & Mueller, 2002), younger firms, or those striving for market entry, may thus devote relatively more resources toward R&D (Coad et al., 2016) in order to get a foothold in the industry and strengthen their competitive position in comparison with older, more established firms. Hence, we expect the effect of TMT internationalization on firm innovativeness to be more pronounced in younger firms, as top managers may have greater leeway in letting their individual ideas unfold and pushing their firms toward enhanced innovativeness. Accordingly, we hypothesize

**Hypothesis 4.** *The positive relationship between TMT internationalization and firm innovativeness will be negatively moderated by firm age.*

## 3 | METHODOLOGY

### 3.1 | Sample and data collection

Our empirical analysis is based on a sample of multinational enterprises listed on the German HDAX<sup>4</sup> index. We consider Germany to be particularly suitable for our study because it is highly ranked in the Global Innovation Index (Cornell University, INSEAD, & WIPO, 2019), and the majority of sales of firms listed on the German stock exchange are generated on an international level (Schmid & Dauth, 2012; Dauth, Pronobis, & Schmid, 2017). These are indications of German firms' innovative capability and their strong international involvement. Internationalization has also particularly progressed in German executive

**TABLE 1** Descriptive statistics

Variable	Mean	Standard Deviation	Min	Max	Observations
RD_intensity	5.434	9.215	0.030	104.400	280
TMT_intl	0.301	0.169	0	0.770	280
CEO_age	54.268	5.634	42	72	280
TMT_tenure	13.850	6.026	2.250	28.800	280
Firm_age	83.636	51.693	5	188	280
TMT_size	4.5357	1.796	2	10	280
TMT_age	52.450	3.269	41.670	61	280
Uncert_avoid	5.097	0.168	4.220	5.220	280
TMT_gen_div	0.055	0.122	0	0.480	280
TMT_age_div	0.101	0.044	0	0.240	280
TMT_foreign	0.206	0.220	0	0.860	280
Ln_employees	9.698	1.789	5.700	13.321	280
Foreign_sales	68.485	18.252	2.490	100	280
ROA	5.351	4.978	-22.310	22.960	280
RD_industry	0.857	0.351	0	1	280

suites, as demonstrated by Hartmann's (2015) comparative study on the internationalization of top managers of the largest firms of Germany, France, Great Britain, United States, Japan, China, Italy, and Spain.

The German corporate governance system prescribes a two-tier board structure for stock-listed corporations ("Aktiengesellschaften"), distinguishing between the management board ("Vorstand") and the supervisory board ("Aufsichtsrat"; Du Plessis et al., 2012). Due to its responsibility for the firm's strategic and operational decision-making (Du Plessis et al., 2012), we base our analysis on the former. Specifically, the management board influences firm innovativeness directly by setting the firm's strategic direction toward innovation (Talke et al., 2010), determining the resources allocated toward innovation actions (Talke et al., 2011) and instilling a culture of innovativeness in the firm (Sperber, 2016).

Our study entailed a rigorous data collection process. Of the 110 HDAX-listed firms in June 2016, we excluded 16 firms belonging to the banking, insurance, and real estate industries, which are considered less research intensive (Rammer et al., 2017) and thus could have distorted our findings. For the remaining firms, we then identified the respective members of the management boards over the years 2011, 2013, and 2015 via the firms' annual reports. Afterwards, we collected demographic information on all top managers by conducting in-depth analyses of respective curriculum vitae, firm websites, and other public profiles online (e.g., LinkedIn, Xing). This reliance on bibliographic data is a common approach in upper echelons research (Nielsen, 2010b; Schmid & Wurster, 2017). Eventually, we compiled information on 256 individuals in 2011, 259 individuals in 2013, and 253 individuals in 2015.<sup>5</sup> These data were matched with corresponding firm-level indicators drawn from the database Thomson ONE Banker. Finally, 38 firms were dropped that had no activity in a research-intensive industry,<sup>6</sup> no R&D investments, and/or that had TMT members with incomplete profiles. The final sample comprises 56 firms,

280 firm-year observations, and demographic information on 358 different TMT members (i.e., 768 "profile years").

### 3.2 | Dependent variable: Firm innovativeness

To operationalize *firm innovativeness*, we employ the measure of R&D intensity—a common proxy for innovativeness (Adams, Bessant, & Phelps, 2006; Daellenbach & McCarthy, 1999). In general, R&D investments are considered to reflect the strategic importance of innovation for firms (Hill & Snell, 1988; Kor, 2006) and to be a critical ingredient for their innovative capability (Ahuja & Katila, 2004; Kumar, 2014). Prior research also claims that firms spending more on R&D are more innovative (Acs & Audretsch, 1987; Lederman, 2010); reductions in R&D may even impair firms' innovative capability and long-term competitiveness (Helfat, 1997; Heyden et al., 2015).

Another argument in support of this operationalization is that scholars assume that R&D investments are influenced by the TMT (Barker & Mueller, 2002). The innovation literature distinguishes between input measures (e.g., R&D intensity) and output measures (e.g., patents) of innovation (Adams et al., 2006; Lin, Lin, Song, & Li, 2011). Because the final innovative output is a product of numerous different actors and actions (Ahuja et al., 2008), we expect that a top management's actual involvement is hard to discern when using an output measure. In contrast, input measures reflect a closer proximity between top management and innovation inputs, as top management is generally assumed to have the discretion to control the level of R&D investment (Barker & Mueller, 2002; Green, 1995).

Overall, R&D intensity is a ratio widely employed in innovation studies (e.g., Hambrick & Macmillan, 1985; Un, 2016). As it puts firms' R&D spending in relation to total sales, it foregoes problems of an artificial relation with firm size (Hitt et al., 1997). Another benefit is that it encompasses an entire firm's R&D expenditure, which matches



**TABLE 2** Pearson correlations among regression variables

Variable	RD_intensity	TMT_intl	CEO_age	TMT_tenure	Firm_age	TMT_size	TMT_age	Uncert_avoid
RD_intensity	1							
TMT_intl	0.051	1						
CEO_age	-0.040	-0.003	1					
TMT_tenure	-0.110	-0.021	0.312*	1				
Firm_age	-0.228*	0.015	0.118*	0.212*	1			
TMT_size	-0.156*	0.233*	0.297*	0.352*	0.176*	1		
TMT_age	-0.097	0.013	0.664*	0.435*	0.151*	0.3723*	1	
Uncert_avoid	-0.008	-0.590*	-0.274*	-0.059	0.157*	-0.267*	-0.219*	1
TMT_gen_div	0.229*	-0.0456	-0.054	0.056	0.044	0.365*	-0.048	0.065
TMT_age_div	-0.093	-0.227*	0.029	0.043	-0.033	-0.033	-0.082	0.036
TMT_foreign	0.051	0.783*	0.058	-0.064	-0.157*	0.159*	0.040	-0.690*
Ln_employees	-0.422*	0.204*	0.382*	0.312*	0.287*	0.705*	0.459*	-0.206*
Foreign_sales	0.252*	0.067	0.194*	0.128*	-0.081	0.066	0.245*	-0.212*
ROA	-0.210*	-0.060	-0.107	0.112	0.149*	0.008	-0.146*	0.020
RD_industry	-0.221*	-0.083	-0.017	0.131*	0.313*	-0.003	0.076	0.156*

our aim of employing a firm-level perspective to investigate senior management's influence on firm innovativeness. We take the average of the values of the year under investigation and the following year to limit the possibility of a potential bias caused by exceptionally high or low values for R&D intensity in one specific year (Daellenbach & McCarthy, 1999). By considering also the following year, we account for the fact that the effects of TMT decision-making may become visible only later and thereby address potential reverse causality concerns.

### 3.3 | Independent variable: Top management team internationalization

The internationalization of individuals can occur in multiple ways. Although often measured through a unidimensional construct in existing studies (Nielsen, 2010b), more recent research recommends employing a more comprehensive approach to counter the potential neglect of other relevant facets of a top manager's internationalization (Carpenter & Reilly, 2006; Oxelheim et al., 2013). To draw a more fine-grained picture of a top manager's internationalization, we calculate an index that accounts for four internationalization indicators: (a) nationality, (b) international education, (c) international work experience, and (d) international board appointments. These elements reflect crucial stages in the life and career of an individual, during which essential international experiences and knowledge are collected (Carpenter & Westphal, 2001; Dickmann & Harris, 2005; Hambrick et al., 1998; Norris & Gillespie, 2009). Based on these elements, an internationalization score is calculated for each top manager. Subsequently, a team-level average of all scores is computed, representing the final values for the index variable *TMT internationalization*. This approach is embodied in the following equation:

$$INT = \frac{1}{n} * \sum_{i=1}^n \left[ \frac{1}{4} \left( F_i + \left( 1 - \frac{1}{E_i + 1} \right) + \left( 1 - \frac{1}{W_i + 1} \right) + \left( 1 - \frac{1}{A_i + 1} \right) \right) \right], \quad (1)$$

$F_i$  represents the foreignness of person  $i$  relative to a firm's home country (i.e.,  $F_i = 0$  if the person's nationality is German;  $F_i = 1$  for any other nationality).  $E_i$  is the number of years of higher education spent abroad.  $W_i$  is the number of years of international work experience.  $A_i$  is the number of appointments to boards of foreign firms.  $n$  is the number of individuals in the TMT.

### 3.4 | Moderating variables

We employ moderators at the CEO, TMT, and firm levels that aim to reflect the temporal influences on team dynamics and the accumulation and transfer of resources. To calculate the *CEO's age*, we deduct the year of birth from the respective year under consideration (i.e., 2011–2015). Moreover, we calculate *TMT tenure* as the mean tenure of TMT members in the particular firm. For the firm-level moderator, we follow Un (2016) and calculate *firm age* by subtracting the founding year from the respective year under consideration.

### 3.5 | Control variables

We also control for several firm and TMT characteristics. Regarding firm-related variables, we consider firm size, measured as the logarithm of the number of employees (Nielsen, 2010b). Because the probability to send employees on foreign assignments and promote those with international experiences is higher for global than for national firms (Baruch & Altman, 2002; Hamori & Koyuncu, 2011), we

**TABLE 2** Pearson correlations among regression variables

Variable	TMT_gen_div	TMT_age_div	TMT_foreign	Ln_employees	Foreign_sales	ROA	RD_industry
RD_intensity							
TMT_intl							
CEO_age							
TMT_tenure							
Firm_age							
TMT_size							
TMT_age							
Uncert_avoid							
TMT_gen_div	1						
TMT_age_div	−0.046	1					
TMT_foreign	−0.087	−0.106	1				
Ln_employees	0.158*	−0.110	0.080	1			
Foreign_sales	0.003	−0.166*	0.144*	0.004	1		
ROA	−0.092	0.109	−0.092	−0.037	−0.055	1	
RD_industry	0.026	−0.129*	−0.122*	0.098	−0.006	0.029	1

\* $p < .05$ .

control for firms' degree of internationalization, proxied by the intensity of *foreign sales* (i.e., the ratio of foreign sales to total sales; Hamori & Koyuncu, 2011). Moreover, we include *return on assets* as proxy for firms' current profitability. Prior research shows that whereas profitability raises managers' confidence to invest in more risky long-term projects (e.g., R&D), the opposite may result in curtailed efforts (Barker & Mueller, 2002; Hundley, Jacobson, & Park, 1996). Finally, we add dummy variables to control for whether a firm's main business focus is based on a research-intensive industry<sup>7</sup> and for the respective HDAX subindex<sup>8</sup> on which a firm is listed. In this way, we account for the heterogeneity of firms in our sample.

Regarding TMT-related variables, we control for *TMT size*, represented by the number of individuals on the TMT as listed in the annual report of the respective year (Tihanyi et al., 2000). The larger a TMT, the higher the likelihood that internationally experienced top managers serve on it and the more resources, in terms of human and social capital, are available (Kaczmarek & Ruigrok, 2013). Moreover, we include *TMT mean age*. Recent studies have demonstrated that younger and older individuals differ in their perception and processing of information (Thomas & Millar, 2012) and attitude toward risk (Herrmann & Datta, 2005). Furthermore, TMT mean age reflects the accumulation of life experiences, beliefs, and generational ideologies of its members (Heyden et al., 2015). Another control variable is *uncertainty avoidance* to capture the extent to which TMT members' cultural backgrounds affect their attitude toward uncertainty and risk and thus openness to change and novelty as reflected in innovativeness (Crossland & Hambrick, 2007). The variable builds on insights from the GLOBE study<sup>9</sup> (House, Dorfman, Javidan, Hanges, & Sully De Luque, 2013), which suggests that cultures differ along certain dimensions and to varying degrees. It is computed by averaging the individual GLOBE uncertainty avoidance scores of all TMT members according to their respective nationalities.

Additionally, we control for diversity-related variables at the TMT level. Prior research stresses the overall merit of diversity for TMTs' creativity, innovation orientation, and performance (Hambrick, 2007; Wiersema & Bantel, 1992), because diversity provides multiple perspectives and resources, resulting in enhanced problem-solving capabilities (Talke et al., 2011). We add *TMT gender diversity*, because women bring distinctive background experiences, knowledge, and viewpoints to the TMT (Huse, 2007), which broaden the TMT's resource base and enhance its capacity to make innovative linkages and combinations (Ruiz-Jiménez, Fuentes-Fuentes, & Ruiz-Arroyo, 2016). TMT gender diversity is operationalized using the Blau (1977) index, calculated as  $(1 - \sum p_i^2)$ , where  $p_i$  is the proportion of TMT members in the  $i$ th category. Another control variable is *TMT age diversity*. Following Allison (1978), we operationalize the variable via the coefficient of variation (i.e., standard deviation divided by the mean) for each TMT. Age diversity brings a broad spectrum of skills, knowledge, and perspectives to the TMT, which may augment creativity and problem-solving (Li, Chu, Lam, & Liao, 2011), resulting in better innovative capabilities. Furthermore, we control for the *TMT's degree of foreignness*, estimated by the percentage of foreign nationals (i.e., non-Germans) on the TMT (Piaskowska & Trojanowski, 2014).

### 3.6 | Analytical approach

We analyzed our dataset comprising 5 years of data per firm using pooled ordinary least squares (OLS) regressions. As suggested by different scholars dealing with this type of data (see Nguyen, Hagedorff, & Eshraghi, 2018; Petersen, 2009; Dauth et al., 2017), we cluster the standard errors along two dimensions—firm and year—to control for temporary time series and cross-sectional dependence in the residuals. Moreover, we include year-fixed effects to control for

**TABLE 3** Results of the analysis with firm innovativeness as dependent variable

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
TMT_intl	13.770*	68.140**	23.470**	17.120*	66.360**
	(7.508)	(28.570)	(10.470)	(9.998)	(29.210)
CEO_age * TMT_intl		-1.001**			-0.882*
		(0.448)			(0.458)
TMT_tenure * TMT_intl			-0.687		-0.276
			(0.418)		(0.451)
Firm_age * TMT_intl				-0.044	-0.010
				(0.065)	(0.062)
CEO_age	0.349**	0.611***	0.376**	0.335**	0.587***
	(0.161)	(0.208)	(0.163)	(0.156)	(0.206)
TMT_tenure	-0.023	-0.003	0.190	-0.018	0.0816
	(0.084)	(0.084)	(0.156)	(0.083)	(0.167)
Firm_age	-0.003	-0.005	-0.001	0.012	-0.001
	(0.015)	(0.015)	(0.015)	(0.026)	(0.024)
TMT_size	0.219	0.131	0.094	0.210	0.089
	(0.431)	(0.434)	(0.458)	(0.434)	(0.455)
TMT_age	0.106	0.164	0.089	0.104	0.150
	(0.203)	(0.217)	(0.194)	(0.199)	(0.215)
Uncert_avoid	5.066	0.700	4.169	6.242	1.134
	(6.508)	(4.960)	(6.157)	(6.597)	(4.892)
TMT_gen_div	20.540	21.630	21.140	20.420	21.710
	(13.900)	(13.890)	(13.950)	(13.960)	(13.930)
TMT_age_div	-19.550**	-16.690	-18.750**	-19.900**	-16.790*
	(9.476)	(10.480)	(9.301)	(9.311)	(10.050)
TMT_foreign	-5.453	-7.969*	-6.443	-5.138	-7.993*
	(4.493)	(4.606)	(4.441)	(4.439)	(4.461)
Ln_employees	-2.982**	-2.840**	-2.804**	-2.907**	-2.768**
	(1.366)	(1.347)	(1.360)	(1.371)	(1.355)
Foreign_sales	0.093**	0.098***	0.095**	0.097**	0.099***
	(0.037)	(0.037)	(0.037)	(0.038)	(0.038)
ROA	-0.232*	-0.197	-0.219	-0.231*	-0.196
	(0.127)	(0.128)	(0.133)	(0.131)	(0.130)
RD_industry	-3.029	-3.328	-3.232	-3.019	-3.372
	(3.472)	(3.480)	(3.473)	(3.488)	(3.488)
Constant	-19.720	-15.980	-20.020	-26.980	-18.690
	(34.360)	(30.220)	(33.420)	(34.840)	(30.930)
Index Effects	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	280	280	280	280	280
F statistic	7.447***	6.929***	7.079***	7.631***	6.390***
R <sup>2</sup>	0.479	0.491	0.484	0.480	0.492
Adj. R <sup>2</sup>	0.439	0.450	0.442	0.438	0.447
ΔR <sup>2</sup>	Baseline	0.012***	0.005***	0.001***	0.013***

Note. Standard errors in parentheses. The beta coefficients are presented in nonstandardized form.

\*\*\* $p < .01$ .

\*\* $p < .05$ .

\* $p < .1$ .

TABLE 4 Robustness checks

Variable	Robustness_Model_2a	Robustness_Model_2b	Robustness_Model_3a	Robustness_Model_3b	Robustness_Model_4a	Robustness_Model_4b	Robustness_Model_5a
TMT_intl	67.440** (28.650)	52.060** (25.020)	17.840* (10.600)	12.540* (6.943)	17.900* (10.390)	17.120** (8.059)	65.920** (29.550)
CEO_age* TMT_intl	-0.993** (0.463)	-0.885* (0.452)					-0.868* (0.477)
TMT_tenure* TMT_intl			-0.263 (0.447)				-0.344 (0.416)
Firm_age* TMT_intl					-0.046 (0.066)		-0.006 (0.063)
CEO_age	0.653*** (0.232)	0.493** (0.198)	0.229 (0.144)	0.246* (0.130)	0.368** (0.165)	0.240 (0.151)	0.625*** (0.237)
TMT_tenure	0.022 (0.084)	0.029 (0.091)	0.095 (0.155)	0.191 (0.169)	-0.039 (0.086)	0.060 (0.091)	0.123 (0.154)
Firm_age	-0.005 (0.015)	0.002 (0.013)	-0.008 (0.016)	0.007 (0.014)	0.007 (0.026)	0.0313 (0.025)	-0.002 (0.026)
TMT_size		0.395 (0.433)			0.252 (0.428)	-0.149 (0.405)	
TMT_age		0.075 (0.215)			0.090 (0.195)	0.106 (0.229)	
Uncert_avoid		2.128 (6.184)			6.318 (6.015)	10.220* (5.662)	
TMT_gen_div	21.820 (13.310)	22.280 (13.660)			20.000 (14.350)		21.790 (13.350)
TMT_age_div	-17.580 (10.700)	-15.060 (11.990)			-17.290*** (6.396)		-17.690* (10.410)
TMT_foreign	-8.043* (4.649)	-6.494 (5.235)			-5.360 (4.140)		-8.321* (4.632)
Diversity						9.520** (4.777)	
Ln_employees	-2.676** (1.249)	-2.410* (1.371)	-3.109*** (0.956)	-2.376* (1.364)	-2.990** (1.510)	-2.825** (1.372)	-2.622** (1.244)
Foreign_sales	0.100*** (0.038)	0.108** (0.052)	0.100*** (0.034)	0.103** (0.052)	0.096** (0.038)	0.104*** (0.038)	0.101*** (0.039)
ROA	-0.207* (0.098)	-0.270** (0.102)	-0.302** (0.118)	-0.296** (0.118)	-0.221* (0.102)	-0.303** (0.118)	-0.206 (0.098)

(Continues)

**TABLE 4** (Continued)

Variable	Robustness_Model_2a	Robustness_Model_2b	Robustness_Model_3a	Robustness_Model_3b	Robustness_Model_4a	Robustness_Model_4b	Robustness_Model_5a
RD_industry	(0.125) -3.317 (3.430)	(0.131) -2.837 (4.149)	(0.137) -4.358 (3.323)	(0.142) -2.735 (4.144)	(0.125) -2.770 (3.341)	(0.132) -2.770 (3.341)	(0.127) -3.375 (3.447)
Constant	-7.482 (11.840)	-2.092 (13.650)	2.495 (34.860)	8.682 (14.320)	-29.930 (32.460)	-45.400 (28.440)	-8.586 (12.030)
Index Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	280	280	280	280	280	280	280
F-statistic	7.460***	8.068***	4.340***	8.539***	7.451***	8.078***	7.058***
R <sup>2</sup>	0.490	0.390	0.448	0.382	0.470	0.490	0.491
Adj. R <sup>2</sup>	0.454	0.355	0.407	0.347	0.429	0.453	0.452

Note. Standard errors in parentheses. The beta coefficients are presented in nonstandardized form.

\*\*\*  $p < .01$ .

\*\*  $p < .05$ .

\*  $p < .1$ .

fixed time-variant characteristics. Before carrying out the analysis, we performed different tests to secure the validity of our regression results. Among others, the variables were tested for the normality condition to prevent specification errors caused by a misspecified functional form. Consequently, most variables are included in their normal form. Besides, we tested for multicollinearity by calculating the variance inflation factors. As the variance inflation factors all score below 10, multicollinearity does not appear to be an issue (Hair, Black, Babin, & Anderson, 2006).

## 4 | RESULTS

### 4.1 | Results of the main analysis

Table 1 illustrates the descriptive statistics for all variables in our regression models. The corresponding correlation coefficients are shown in Table 2.

To analyze the impact of TMT internationalization on firm innovativeness, we estimate five regression models. The results are shown in Table 3.

In Model 1, we test the direct relationship between TMT internationalization and firm innovativeness. In support of Hypothesis 1 and our core argumentation, the results indicate a significant and positive relationship between TMT internationalization and firm innovativeness ( $\beta = 13.77$ ;  $p < .1$ ). Accordingly, Hypothesis 1 is supported. Besides, we find positive influences of CEO age ( $\beta = 0.349$ ,  $p < .05$ ), TMT age diversity ( $\beta = -0.19.55$ ;  $p < .05$ ), firm size ( $\beta = -2.982$ ;  $p < .05$ ), foreign sales ( $\beta = -0.0932$ ;  $p < .05$ ), and return on assets ( $\beta = -0.232$ ;  $p < .1$ ).

The subsequent models build upon Model 1 and refine the direct relationship between TMT internationalization and firm innovativeness through the addition of different moderators with a temporal relation. For Model 2, we add the moderator *CEO age*. Our independent variable TMT internationalization remains significant with the expected sign ( $\beta = 68.14$ ;  $p < .05$ ). Furthermore, CEO age significantly and negatively moderates the relationship between TMT internationalization and firm innovativeness ( $\beta = -1.1001$ ;  $p < .05$ ), which lends support to Hypothesis 2. In Model 3, the moderator *TMT tenure* is included. The coefficient for TMT internationalization is again significant and positive ( $\beta = 23.47$ ;  $p < .05$ ). However, we do not find support for Hypothesis 3, which suggested a negative influence of *TMT tenure* on the relation between TMT internationalization and firm innovativeness ( $\beta = -0.687$ ;  $p > .1$ ). Model 4 includes the moderator *firm age*. Although the coefficient for TMT internationalization remains significant and positive ( $\beta = 17.12$ ;  $p < .1$ ), our results do not substantiate Hypothesis 4, which predicted a negative effect of *firm age* on the relationship between TMT internationalization and firm innovativeness ( $\beta = -0.0443$ ;  $p > .1$ ). Hence, Hypothesis 4 is not supported. Model 5 (the full model) encompasses all variables. By including all variables simultaneously, we assume that an enhanced illustration of the relationship between TMT internationalization and firm innovativeness is achieved. The results mirror those of the

previous models: Significance is indicated for TMT internationalization; of the moderators with a temporal relation, only CEO age is significant. Throughout all models, additional significant effects are found for CEO age as a direct predictor and the firm-related control variables *firm size* and *foreign sales*.<sup>10</sup>

## 4.2 | Robustness checks

To check the robustness of our findings, we perform additional tests by altering the specifications of our models. Even though our theoretical derivation underlines the importance of including the discussed control variables in our analysis, the nonsignificance of several control variables in our main analysis suggests that a potential estimation bias may affect our results. To control for this potential bias, we exclude certain variables from the main models and/or replace them by other variables. The results are reported in Table 4.

For Model 2, we exclude the TMT-related control variables *TMT size*, *TMT mean age*, and *uncertainty avoidance* (Models 2a, b) and the diversity-related control variables *TMT gender diversity*, *TMT age diversity*, and *TMT foreignness* (Model 2b). For Model 3, we exclude the index dummy (Model 3a) and the TMT-related variables *TMT size*, *TMT mean age*, and *uncertainty avoidance* and TMT diversity-related controls (Model 3b). For Model 4, we exclude the *industry* control variable (Model 4a), and the diversity-related controls are replaced by a diversity dummy (Model 4b). The dummy captures the gender diversity and degree of foreignness variables and takes on a value of 1, if both variables show heterogeneity, and 0 otherwise. The age diversity dimension is not included in this composite, because age diversity (operationalized through the coefficient of variation) is typically present in any TMT. Model 5a excludes the TMT-related controls. Essentially, the variables of main interest remain stable to all changes in the model specifications, which confirms the robustness of our results.

## 5 | DISCUSSION AND CONCLUSIONS

Despite the rising presence of internationally seasoned individuals on management boards and an increasing interest in top managers by academia, our empirical understanding about the influence of the characteristics and internationalization of upper echelons is far from complete (Nielsen, 2010a; Oxelheim et al., 2013). With our research, we aim to contribute relevant insights to the IB and innovation literature and respond to two contemporary trends in business: First, TMTs are becoming increasingly international (Hartmann, 2015; Staples, 2007); second, global competitive forces put pressure on firms' innovativeness (Prasad & Junni, 2017). Based on these developments, our study sheds light on the theoretical relationship between TMT internationalization and firm innovativeness.

We argue that international exposure provides top managers with unique learning opportunities about foreign markets, its people, and local business practices. Our findings support the notion that TMTs comprising both nationals and nonnationals as well as individuals with

international experience benefit from a much broader resource base than homogeneous TMTs that are limited to domestic grounds. Because innovation is sparked by the combination of novel and existing resource elements (Schumpeter, 1939), this broader resource pool increases the likelihood for finding new, innovative combinations (Katila, 2002).

Combining upper echelons theory with innovation research, we add to existing literature not only by refining the core tenet of upper echelons research that TMTs influence firm-level outcomes (Hambrick & Mason, 1984) but also by contributing insights about the particular impact international TMTs have on firm innovativeness. In this way, we advance our theoretical understanding about the implications of a relatively understudied characteristic in TMT research (Kaczmarek & Ruigrok, 2013). Our study's results align with prior studies examining TMT internationalization, which predict positive effects on firm-level outcomes, such as enhanced financial performance (Carpenter et al., 2000). Accordingly, they re-emphasize the relevance of international TMTs.

We also extend our comprehension of TMTs' influence on firm innovativeness from a methodological standpoint. By concentrating on the *accumulation* of resources within the TMT, we depart from studies that explain TMTs' influence on firm-level outcomes, and specifically innovation, by means of diversity in TMT members' idiosyncrasies (e.g., Talke et al., 2010). So far, the discussion revolving around the benefits and implications of TMT diversity has remained controversial, resulting in calls for alternative explanations regarding the actual impact that distinct TMT compositions have on firms (Nielsen, 2010a). By focusing on accumulation, we provide an alternative perspective on the TMT-firm decision-making link and suggest that it is not only the heterogeneity across top managers' values, capabilities, and knowledge that matters but also the volume. This argument reinforces the key notion of the knowledge-based view, which builds on the resource-based view and claims that value is mainly generated by tacit, knowledge-based assets (Fey & Furu, 2008; Sveiby, 1997) that are stored within individuals (Grant, 1996). By acquiring knowledge from foreign places as well as global management skills, the resource base may be expanded beyond domestic borders, resulting in a vaster pool of resources based on which innovations can develop. This reasoning aligns with innovation studies that encourage firms striving to increase their innovative output to search for novel components beyond domestic confines (Rosenkopf & Almeida, 2003; Savino, Messeni Petruzzelli, & Albino, 2017). Our study illustrates that international TMTs are valuable human vehicles for collecting and sourcing such foreign knowledge and capabilities. Besides implications for firms' innovation efforts, our focus on accumulation also complements previous diversity research that claims that diversity may introduce separation in TMTs, resulting in greater levels of conflict, behavioral disintegration, and subsequent low performance (Barkema & Shvyrkov, 2007; Nielsen, 2010a). Although firms often feel the urge to encourage diversity ("Diversity fatigue", 2016), our study highlights the merit of the aggregation of knowledge, perspectives, and capabilities for innovativeness.



Striving for a greater resource base may thus represent another option to create value and foregoes the potential problems associated with diversity.

Our study also provides contributions to innovation scholars, who consider top managers as key actors in the innovation process (Elenkov et al., 2005). Accompanying firms' pursuit of augmenting their innovativeness, our findings underline that the *internationalization* of TMTs is an important lever to consider. This insight is particularly useful in a fast-paced, complex environment, in which intensifying competition from national and international players, as well as young firms with disruptive ideas, consistently challenge the status quo (McKinsey Global Institute, 2015). Consequently, firms are forced to constantly question their long-term competitiveness and success, of which innovativeness is a central aspect (Hitt et al., 1997). Making optimal use of available resources (e.g., international human capital) and adapting strategies accordingly are thus of strategic importance.

Besides, we advance research of both TMT and innovation scholars who emphasize the importance of context when investigating the consequences of TMT compositions (Carpenter et al., 2004). Because the passage of time affects human and organizational decision-making, team dynamics, and the accumulation of resources relevant for innovations (Peteraf, 1993; Tuckman, 1965), we devote particular attention to temporal factors at the CEO, TMT, and firm levels. This way, we partake in the emerging discussion in strategy research that attends to temporal concerns of individuals and their implications for firms (e.g., time perceptions of the CEO and the influence of innovation; Nadkarni & Chen, 2014; Yadav et al., 2007). Our findings partly underline the significance of time in the context of TMTs and contribute toward a more nuanced understanding about the implications of TMT internationalization. Of the three variables hypothesized to impact the relation between international TMTs and firm innovativeness, CEO age is found to play a significant role. In line with prior studies (e.g., Hambrick & Fukutomi, 1991; Simsek et al., 2018), this finding particularly stresses the predominant role and superior discretion of the CEO and specifically his/her age. More specifically, our analysis suggests that more elderly CEOs attenuate the gains in firm innovativeness introduced by international TMTs. This result supports prior research claiming that older CEOs are more conservative and thus promote innovations less (Barker & Mueller, 2002).

By paying particular attention to temporal factors, we also contribute to leadership theories (Shamir, 2011). Although our study does not specifically test the changing leadership characteristics over time, it still complements recent claims for a wider consideration of temporal factors in leadership studies (Bluedorn & Jaussi, 2008; Shamir, 2011). So far, leadership studies have widely neglected time-related aspects even though the passage of time fundamentally affects the relationship between leaders and followers (Shamir, 2011). Our findings suggest that CEO age is an aspect to be considered in dynamic leadership studies as the CEO's age obviously changes the dynamics within and decision-making of the TMT. By shedding light on underlying influencing patterns within TMTs, we also add novel insights to research on the CEO-TMT interface—a topic that has attracted

increasing attention within upper echelons research (Georgakakis et al., 2017; Simsek et al., 2018).

Our insights are also of managerial value as the workforce of multinational enterprises is becoming increasingly international and mobile (Fries-Tersch, Tugran, Rossi, & Bradley, 2018; Staples, 2007), and employees have ever more international touchpoints due to firms' intensifying involvement in international activities (Greve et al., 2009). Building on this process of internationalization, it is reasonable for firms to try to understand its consequences and to leverage opportunities. Our findings point to the potential within international TMTs: Internationally seasoned top managers possess a richness of specialized global knowledge, skills, and networks, which may provide valuable insights and impulses to the firm (Carpenter et al., 2001; Nielsen & Nielsen, 2011). When striving to effectively leverage this potential, implications for human resource practices may arise (Stahl, Björkman, & Morris, 2012). For example, targeted actions may be developed to transform the existent (international) human and social capital into innovative outcomes (e.g., expatriate assignments and international short-term assignments). Similarly, recruitment strategies might be adjusted to particularly favor individuals with international backgrounds and experiences.

## 6 | LIMITATIONS AND FUTURE RESEARCH

This study is subject to several limitations that open up avenues for further research. Our study cannot disengage itself from the concerns raised about the use of demographic variables as proxies for top managers' cognition and behavior (see Lawrence, 1997). By relying on demographics, we can only assume that the TMT internationalization variable also captures characteristics that prior studies consider necessary for innovation processes, such as technological and market knowledge as well as capabilities (Smith & Tushman, 2005). Additionally, we disregard potentially existing processes and values inside the TMT that influence team dynamics and, subsequently, firms' innovativeness. Although our findings suggest that TMTs *do* influence firm innovativeness, future studies could refine our understanding about *how* they do so. Interesting factors to be considered could be, for example, team conflict, personalities, or creativity (Prasad & Junni, 2017; Somech & Drach-Zahavy, 2013). Additionally, the role of separate TMT members affecting the team could be explored, such as the CEO's leadership style or the presence of a dedicated Chief Innovation Officer (Menz, 2011).

Our internationalization index does not only bring its strength (i.e., multidimensional depiction of internationalization) but also limitation to this study: The index is not complete and could be enriched by additional internationalization aspects, such as international experiences collected during a position in the home country (Oxelheim et al., 2013). An additional refinement could be introduced by measuring the *intensity* of experiences, thereby distinguishing between the number of different countries and cultures and respective lengths in which experiences were gathered. A promising approach would be to rely on cultural studies, for example, the GLOBE study or Hofstede

(1980). Although we only capture the overall length of foreign experiences and partly control for cultural influences regarding TMT members' nationality, it would be interesting to investigate whether experiences from diverse countries and cultures can help explain the level of firm innovativeness.

The use of R&D intensity as a proxy for firm innovativeness also entails several limitations. In spite of its frequent use in innovation studies, critics stress that R&D only represents the budgeted resources allocated toward innovation activities and does not reflect the final innovation output (Acs & Audretsch, 1988). Similarly, the innovation process involves many different actors and inputs (Adams et al., 2006) so that R&D intensity might not be a suitable proxy. Future studies could thus apply alternative measures of firm innovativeness, such as the number of patents or new products.

## ENDNOTES

- <sup>1</sup> The term "top management team" describes a group of individuals responsible for leading an organization. Although different definitions exist about the specific persons typically representing a TMT, this work refers to the TMT as the individuals belonging to the executive team as indicated in the annual reports.
- <sup>2</sup> Despite the large volume of studies assuming an equal distribution of power among TMT members, we are aware of several studies that single out individual TMT members (e.g., CEO and CFO) and examine these separately (e.g., Holcomb & Cannella, 2005).
- <sup>3</sup> R&D expenditure has been associated with enhanced firm innovativeness (Acs & Audretsch, 1987; Ahuja & Katila, 2004; Lederman, 2010). Please find further details in Section 3.
- <sup>4</sup> The HDAX combines all 110 firms listed on the indices DAX30 (30 firms), MDAX (50 firms), and TecDAX (30 firms) and includes the most liquid and largest firms traded in the prime-standard segment of the Frankfurt Stock Exchange (STOXX Ltd., 2016).
- <sup>5</sup> Because certain TMT members' individual characteristics are not expected to change significantly (e.g., nationality and international education), we filled the "gap years" 2012 and 2014 by calculating the mean scores using the preceding/following data collection periods.
- <sup>6</sup> Industries with a one-digit standard industrial classification code of 2, 3, or 4 are considered research intensive (i.e., manufacturing, transportation, communications, electric, gas, and sanitary services; Rammer et al., 2017).
- <sup>7</sup> The dummy is coded 1 if the firm's primary standard industrial classification code begins with 2, 3, or 4 (i.e., research-intensive industries) and 0 otherwise.
- <sup>8</sup> Our sample comprises 23 DAX30 firms, 18 MDAX firms, and 15 TecDAX firms.
- <sup>9</sup> We deliberately rely on the uncertainty dimension scores of the GLOBE study. Whereas the Hofstede study developed its cultural dimensions at the national level (Minkov & Hofstede, 2011), GLOBE measures culture at both the societal and organizational levels and thereby allows for interpretations at the individual level (Chhokar, Brodbeck, & House, 2012). Additionally, the GLOBE study builds on more recent data.
- <sup>10</sup> Thanks to the thoughtful remark of an anonymous reviewer, we repeated our data analysis and re-estimated our models with *foreign sales* (i.e., the ratio of foreign sales to total sales) added as a moderator variable. The results indicate that *foreign sales* has no significant influence on the relationship between TMT internationalization and firm innovativeness.

## REFERENCES

- Acs, Z. J., & Audretsch, D. B. (1987). Innovation, market structure, and firm size. *Review of Economics & Statistics*, 69(4), 567–574. <https://doi.org/10.2307/1935950>
- Acs, Z. J., & Audretsch, D. B. (1988). Innovation in large and small firms: An empirical analysis. *American Economic Review*, 78(4), 678–690.
- Adams, R., Bessant, J., & Phelps, R. (2006). Innovation management measurement: A review. *International Journal of Management Reviews*, 8(1), 21–47. <https://doi.org/10.1111/j.1468-2370.2006.00119.x>
- Adler, N. J. (2002). *International dimensions of organizational behavior* (4th ed.). Cincinnati, Ohio: South-Western.
- Adler, N. J., & Bartholomew, S. (1992). Managing globally competent people. *Academy of Management Executive*, 6(3), 52–65. <https://doi.org/10.5465/ame.1992.4274189>
- Ahuja, G., & Katila, R. (2004). Where do resources come from? The role of idiosyncratic situations. *Strategic Management Journal*, 25(8–9), 887–907. <https://doi.org/10.1002/smj.401>
- Ahuja, G., Lampert, C. M., & Tandon, V. (2008). Moving beyond Schumpeter: Management research on the determinants of technological innovation. *Academy of Management Annals*, 2(1), 1–98. <https://doi.org/10.1080/19416520802211446>
- Allison, P. D. (1978). Measures of inequality. *American Sociological Review*, 43(6), 865–880. <https://doi.org/10.2307/2094626>
- Ambos, B., & Schlegelmilch, B. B. (2004). The use of international R&D teams: An empirical investigation of selected contingency factors. *Journal of World Business*, 39, 37–48. <https://doi.org/10.1016/j.jwb.2003.08.004>
- Anderson, N., Potočník, K., & Zhou, J. (2014). Innovation and creativity in organizations. *Journal of Management*, 40(5), 1297–1333. <https://doi.org/10.1177/0149206314527128>
- Athanassiou, N., & Nigh, D. (1999). The impact of U.S. company internationalization on top management team advice networks: A tacit knowledge perspective. *Strategic Management Journal*, 20(1), 83–92. [https://doi.org/10.1002/\(sici\)1097-0266\(199901\)20:1<83::aid-smj10>3.0.co;2-y](https://doi.org/10.1002/(sici)1097-0266(199901)20:1<83::aid-smj10>3.0.co;2-y)
- Athanassiou, N., & Nigh, D. (2000). Internationalization, tacit knowledge and the top management teams of MNCs. *Journal of International Business Studies*, 31(3), 471–487. <https://doi.org/10.1057/palgrave.jibs.8490917>
- Bantel, K. A., & Jackson, S. E. (1989). Top management and innovations in banking: Does the composition of the top team make a difference? *Strategic Management Journal*, 10, 107–124. <https://doi.org/10.1002/smj.4250100709>
- Barkema, H. G., & Shvyrykov, O. (2007). Does top management team diversity promote or hamper foreign expansion? *Strategic Management Journal*, 28(7), 663–680. <https://doi.org/10.1002/smj.604>
- Barker, V. L., & Mueller, G. C. (2002). CEO characteristics and firm R&D spending. *Management Science*, 48(6), 782–801. <https://doi.org/10.1287/mnsc.48.6.782.187>
- Baruch, Y., & Altman, Y. (2002). Expatriation and repatriation in MNCs: A taxonomy. *Human Resource Management*, 41(2), 239–259. <https://doi.org/10.1002/hrm.10034>
- Blau, P. (1977). *Inequality and heterogeneity: A primitive theory of social structure*. New York: Free Press.
- Bluedorn, A. C., & Jaussi, K. S. (2008). Leaders, followers, and time. *The Leadership Quarterly*, 19(6), 654–668. <https://doi.org/10.1016/j.leaqua.2008.09.006>
- Buyl, T., Boone, C., Hendriks, W., & Matthyssens, P. (2011). Top management team functional diversity and firm performance: The moderating role of CEO characteristics. *Journal of Management Studies*, 48(1), 151–177. <https://doi.org/10.1111/j.1467-6486.2010.00932.x>
- Carmeli, A., Schaubroeck, J., & Tishler, A. (2011). How CEO empowering leadership shapes top management team processes: Implications for firm performance. *The Leadership Quarterly*, 22(2), 399–411. <https://doi.org/10.1016/j.leaqua.2011.02.013>

- Carpenter, M. A. (2002). The implications of strategy and social context for the relationship between top management team heterogeneity and firm performance. *Strategic Management Journal*, 23(3), 275–284. <https://doi.org/10.1002/smj.226>
- Carpenter, M. A., & Fredrickson, J. W. (2001). Top management teams, global strategic posture, and the moderating role of uncertainty. *The Academy of Management Journal*, 44(3), 533–545. <https://doi.org/10.2307/3069368>
- Carpenter, M. A., Geletkanycz, M. A., & Sanders, W. G. (2004). Upper echelons research revisited: Antecedents, elements, and consequences of top management team composition. *Journal of Management*, 30(6), 749–778. <https://doi.org/10.1016/j.jm.2004.06.001>
- Carpenter, M. A., & Reilly, G. P. (2006). Constructs and construct measurement in upper echelon research. In D. J. Ketchen, & D. D. Bergh (Eds.), *Research methodology in strategy and management* (3rd ed.) (pp. 17–35). Amsterdam: Emerald.
- Carpenter, M. A., Sanders, W. G., & Gregersen, H. B. (2000). International assignment experience at the top can make a bottom-line difference. *Human Resource Management*, 39(2-3), 277–285. [https://doi.org/10.1002/1099-050X\(200022/23\)39:2/3<277::AID-HRM15>3.0.CO;2-0](https://doi.org/10.1002/1099-050X(200022/23)39:2/3<277::AID-HRM15>3.0.CO;2-0)
- Carpenter, M. A., Sanders, W. G., & Gregersen, H. B. (2001). Bundling human capital with organizational context: The impact of international assignment experience on multinational firm performance and CEO pay. *Academy of Management Journal*, 44(3), 493–511. <https://doi.org/10.2307/3069366>
- Carpenter, M. A., & Westphal, J. D. (2001). The strategic context of external network ties: Examining the impact of director appointments on board involvement in strategic decision making. *The Academy of Management Journal*, 4(4), 639–660. <https://doi.org/10.5465/3069408>
- Ceci, F., & Iubatti, D. (2012). Personal relationships and innovation diffusion in SME networks: A content analysis approach. *Research Policy*, 41(3), 565–579. <https://doi.org/10.1016/j.respol.2011.10.003>
- Chen, J., & Nadkarni, S. (2017). It's about time! CEOs' temporal dispositions, temporal leadership, and corporate entrepreneurship. *Administrative Science Quarterly*, 62(1), 31–66. <https://doi.org/10.1177/0001839216663504>
- Cheng, L. T., Chan, R. Y., & Leung, T. Y. (2010). Management demography and corporate performance: Evidence from China. *International Business Review*, 19(3), 261–275. <https://doi.org/10.1016/j.ibusrev.2009.12.007>
- Chhokar, J. S., Brodbeck, F. C., & House, R. J. (Eds.) (2012). *Culture and leadership across the world: The GLOBE book of in-depth studies of 25 societies*. New York: Routledge.
- Child, J. (1974). Managerial and organizational factors associated with company performance—Part I. *Journal of Management Studies*, 11(3), 175–189. <https://doi.org/10.1111/j.1467-6486.1974.tb00693.x>
- Coad, A., Segarra, A., & Teruel, M. (2016). Innovation and firm growth: Does firm age play a role? *Research Policy*, 45(2), 387–400. <https://doi.org/10.1016/j.respol.2015.10.015>
- Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly*, 35(1), 128–152. <https://doi.org/10.2307/2393553>
- Collings, D. G. (2014). Integrating global mobility and global talent management: Exploring the challenges and strategic opportunities. *Journal of World Business*, 49(2), 253–261. <https://doi.org/10.1016/j.jwb.2013.11.009>
- Cornell University, INSEAD, & WIPO (2019). *The global innovation index 2019: Creating healthy lives - The future of medical innovation*. Ithaca, Fontainebleau, and Geneva.
- Crossland, C., & Hambrick, D. C. (2007). How national systems differ in their constraints on corporate executives: A study of CEO effects in three countries. *Strategic Management Journal*, 28(8), 767–789. <https://doi.org/10.1002/smj.610>
- Cyert, R. M., & March, J. G. (1963). *A Behavioral Theory of the Firm* (2nd ed.). Oxford: Blackwell Publishing.
- Daellenbach, U. S., & McCarthy, A. M. (1999). Commitment to innovation: The impact of top management team characteristics. *R&D Management*, 29(3), 199–208. <https://doi.org/10.1111/1467-9310.00130>
- Daily, C. M., Certo, S. T., & Dalton, D. R. (2000). International experience in the executive suite: The path to prosperity? *Strategic Management Journal*, 21(4), 515–523. [https://doi.org/10.1002/\(SICI\)1097-0266\(200004\)21:4<515::AID-SMJ92>3.0.CO;2-1](https://doi.org/10.1002/(SICI)1097-0266(200004)21:4<515::AID-SMJ92>3.0.CO;2-1)
- Damanpour, F. (1991). Organizational innovation: A meta-analysis of effects of determinants and moderators. *Academy of Management Journal*, 34(3), 555–590. <https://doi.org/10.2307/256406>
- Dauth, T., Pronobis, P., & Schmid, S. (2017). Exploring the link between internationalization of top management and accounting quality: The CFO's international experience matters. *International Business Review*, 26(1), 71–88. <https://doi.org/10.1016/j.ibusrev.2016.05.007>
- Dickmann, M., & Harris, H. (2005). Developing career capital for global careers: The role of international assignments. *Journal of World Business*, 40(4), 399–408. <https://doi.org/10.1016/j.jwb.2005.08.007>
- Diversity fatigue: Making the most of workplace diversity requires hard work as well as good intentions (2016, February 13). *The Economist*. Retrieved from <http://www.economist.com/node/21692865/print>
- Doraszelski, U. (2003). An R&D race with knowledge accumulation. *RAND Journal of Economics (RAND Journal of Economics)*, 34(1), 20–42. <https://doi.org/10.2307/3087441>
- Drucker, P. F. (1985). *Innovation and entrepreneurship: Practice and principles*. New York: Harper & Row.
- Du Plessis, J. J., Großfeld, B., Luttermann, C., Saenger, I., Sandrock, O., & Casper, M. (2012). *German corporate governance in international and European context* (2nd ed.). Berlin, Heidelberg: Springer.
- Du Plessis, M. (2007). The role of knowledge management in innovation. *Journal of Knowledge Management*, 11(4), 20–29. <https://doi.org/10.1108/13673270710762684>
- Dutton, J. E., Stumpf, S. A., & Wagner, D. (1990). Diagnosing strategic issues and managerial investment of resources. *Advances in Strategic Management*, 6, 143–167.
- Elenkov, D. S. (2008). Effects of leadership at strategic level and its moderators on innovation: An international empirical study. *International Journal of Business Strategy*, 8(2), 37–47.
- Elenkov, D. S., Judge, W., & Wright, P. (2005). Strategic leadership and executive innovation influence: An international multi-cluster comparative study. *Strategic Management Journal*, 26(7), 665–682. <https://doi.org/10.1002/smj.469>
- Elenkov, D. S., & Manev, I. M. (2005). Top management leadership and influence on innovation: The role of sociocultural context. *Journal of Management*, 31(3), 381–402. <https://doi.org/10.1177/0149206304272151>
- Faleye, O., Kovacs, T., & Venkateswaran, A. (2014). Do better-connected CEOs innovate more? *Journal of Financial and Quantitative Analysis*, 49(5-6), 1201–1225. <https://doi.org/10.1017/S0022109014000714>
- Fey, C. F., & Furu, P. (2008). Top management incentive compensation and knowledge sharing in multinational corporations. *Strategic Management Journal*, 29(12), 1301–1323. <https://doi.org/10.1002/smj.712>
- Finkelstein, S., & Hambrick, D. (1996). *Strategic leadership: Top executives and their effects on organizations*. Saint Paul: West Publishing Company.
- Finkelstein, S., & Hambrick, D. C. (1990). Top-management-team tenure and organizational outcomes: The moderating role of managerial discretion. *Administrative Science Quarterly*, 35(3), 484–503. <https://doi.org/10.2307/2393314>

- Finkelstein, S., Hambrick, D. C., & Cannella, A. A. (2009). *Strategic leadership: Theory and research on executives, top management teams, and boards*. New York: Oxford University Press.
- Fleming, L., & Sorenson, O. (2001). Technology as a complex adaptive system: Evidence from patent data. *Research Policy*, 30(7), 1019–1039. [https://doi.org/10.1016/S0048-7333\(00\)00135-9](https://doi.org/10.1016/S0048-7333(00)00135-9)
- Franko, L. G. (1989). Global corporate competition: Who's winning, who's losing, and the R&D factor as one reason why. *Strategic Management Journal*, 10(5), 449–474. <https://doi.org/10.1002/smj.4250100505>
- Fries-Tersch, E., Tugran, T., Rossi, L., & Bradley, H. (2018). *2017 annual report on intra-EU labour mobility: Final report January 2018*. Luxembourg: European Commission.
- Geletkanycz, M. A. (1997). The salience of 'culture's consequences': The effects of cultural values on top executive commitment to the status quo. *Strategic Management Journal*, 18(8), 615–634. [https://doi.org/10.1002/\(SICI\)1097-0266\(199709\)18:8<615::AID-SMJ889>3.0.CO;2-I](https://doi.org/10.1002/(SICI)1097-0266(199709)18:8<615::AID-SMJ889>3.0.CO;2-I)
- Georgakakis, D., Greve, P., & Ruigrok, W. (2017). Top management team faultlines and firm performance: Examining the CEO–TMT interface. *The Leadership Quarterly*, 28(6), 741–758. <https://doi.org/10.1016/j.leaqua.2017.03.004>
- Godart, F. C., Maddux, W. W., Shipilov, A. V., & Galinsky, A. D. (2015). Fashion with a foreign flair: Professional experiences abroad facilitate the creative innovations of organizations. *Academy of Management Journal*, 58(1), 195–220. <https://doi.org/10.5465/amj.2012.0575>
- Grant, R. M. (1996). Prospering in dynamically-competitive environments: Organizational capability as knowledge integration. *Organization Science*, 7(4), 375–387. <https://doi.org/10.1287/orsc.7.4.375>
- Green, S. G. (1995). Top management support of R&D projects: A strategic leadership perspective. *IEEE Transactions on Engineering Management*, 42(3), 223–232. <https://doi.org/10.1109/17.403740>
- Gregersen, H. B., Morrison, A. J., & Black, J. S. (1998). Developing leaders for the global frontier. *Sloan Management Review*, 40(1), 21–32.
- Greve, H. R. (2003). A behavioral theory of R&D expenditures and innovations: Evidence from shipbuilding. *Academy of Management Journal*, 46(6), 685–702. <https://doi.org/10.2307/30040661>
- Greve, P., Nielsen, S., & Ruigrok, W. (2009). Transcending borders with international top management teams: A study of European financial multinational corporations. *European Management Journal*, 27(3), 213–224. <https://doi.org/10.1016/j.emj.2008.10.001>
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2006). *Multivariate data analysis* (6th ed.). Upper Saddle River, NJ: Pearson Education.
- Hall, E. T. (1983). *The dance of life: The other dimension of time*. Garden City, N.Y.: Anchor Press/Doubleday.
- Hambrick, D. C. (2007). Upper echelons theory: An update. *Academy of Management Review*, 32(2), 334–343. <https://doi.org/10.2307/20159303>
- Hambrick, D. C., Davidson, S. C., Snell, S. A., & Snow, C. C. (1998). When groups consist of multiple nationalities: Towards a new understanding of the implications. *Organization Studies*, 19(2), 181–205. <https://doi.org/10.1177/017084069801900202>
- Hambrick, D. C., & Fukutomi, G. D. S. (1991). The seasons of a CEO's tenure. *Academy of Management Review*, 16(4), 719–742. <https://doi.org/10.2307/258978>
- Hambrick, D. C., & Macmillan, I. C. (1985). Efficiency of product R&D in business units: The role of strategic context. *Academy of Management Journal*, 28(3), 527–547. <https://doi.org/10.2307/256112>
- Hambrick, D. C., & Mason, P. A. (1984). Upper echelons: The organization as a reflection of its top managers. *Academy of Management Review*, 9(2), 193–206. <https://doi.org/10.2307/258434>
- Hamori, M., & Koyuncu, B. (2011). Career advancement in large organizations in Europe and the United States: Do international assignments add value? *International Journal of Human Resource Management*, 22(4), 843–862. <https://doi.org/10.1080/09585192.2011.555128>
- Hannan, M. T., & Freeman, J. (1984). Structural inertia and organizational change. *American Sociological Review*, 49(2), 149–164. <https://doi.org/10.2307/2095567>
- Hansen, J. A. (1992). Innovation, firm size, and firm age. *Small Business Economics*, 4(1), 37–44. <https://doi.org/10.1007/BF00402214>
- Harrison, D. A., Mohammed, S., McGrath, J. E., Florey, A. T., & Vanderstoep, S. W. (2003). Time matters in team performance: Effects of member familiarity, entertainment and task discontinuity on speed and quality. *Personnel Psychology*, 56(3), 633–669. <https://doi.org/10.1111/j.1744-6570.2003.tb00753.x>
- Harrison, D. A., Price, K. H., & Bell, M. P. (1998). Beyond relational demography: Time and the effects of surface- and deep-level diversity on work-group cohesion. *Academy of Management Journal*, 41(1), 96–107. <https://doi.org/10.5465/256901>
- Hartmann, M. (2015). Topmanager 2015. Die transnationale Klasse - Mythos oder Realität revisited. *Soziale Welt*, 66(1), 37–54.
- Helfat, C. E. (1997). Know-how and asset complementarity and dynamic capability accumulation: The case of R&D. *Strategic Management Journal*, 18(5), 339–360. [https://doi.org/10.1002/\(SICI\)1097-0266\(199705\)18:5<339::AID-SMJ883>3.0.CO;2-7](https://doi.org/10.1002/(SICI)1097-0266(199705)18:5<339::AID-SMJ883>3.0.CO;2-7)
- Herrmann, P., & Datta, D. K. (2002). CEO successor characteristics and the choice of foreign market entry mode: An empirical study. *Journal of International Business Studies*, 33(3), 551–569. <https://doi.org/10.1057/palgrave.jibs.8491031>
- Herrmann, P., & Datta, D. K. (2005). Relationships between top management team characteristics and international diversification: An empirical investigation. *British Journal of Management*, 16(1), 69–78. <https://doi.org/10.1111/j.1467-8551.2005.00429.x>
- Heyden, M. L. M., Reimer, M., & van Doorn, S. (2015). Innovating beyond the horizon: CEO career horizon, top management composition, and R&D intensity. *Human Resource Management*, 56(2), 205–224. <https://doi.org/10.1002/hrm.21730>
- Heyden, M. L. M., Sidhu, J. S., Van Den Bosch, F. A. J., & Volberda, H. W. (2012). Top management team search and new knowledge creation. *International Studies of Management and Organization*, 42(4), 27–51. <https://doi.org/10.2753/IMO0020-8825420402>
- Hill, C. W. L., & Snell, S. A. (1988). External control, corporate strategy, and firm performance in research-intensive industries. *Strategic Management Journal*, 9(6), 577–590. <https://doi.org/10.1002/smj.4250090605>
- Hiller, N. J., & Hambrick, D. C. (2005). Conceptualizing executive hubris: The role of (hyper-)core self-evaluations in strategic decision-making. *Strategic Management Journal*, 26(4), 297–319. <https://doi.org/10.1002/smj.455>
- Hitt, M. A., Hoskisson, R. E., & Kim, H. (1997). International diversification: Effects on innovation and firm performance in product-diversified firms. *Academy of Management Journal*, 40(4), 767–798. <https://doi.org/10.2307/256948>
- Hoffman, R. C., & Hegarty, W. H. (1993). Top management influence on innovations: Effects of executive characteristics and social culture. *Journal of Management*, 19(3), 549–574. <https://doi.org/10.1177/014920639301900303>
- Hofstede, G., & Hofstede, G. J. (2005). *Cultures and organizations: Software of the mind* (2nd ed.). New York: McGraw-Hill.
- Hofstede, G. H. (1980). *Culture's consequences: International differences in work-related values*. London and Beverly Hills: SAGE Publications.
- Holcomb, T. R., & Cannella, A. A. (2005). A multi-level analysis of the upper-echelons model. In F. Dansereau, & F. J. Yammarino (Eds.), *Research in multi level issues: Vol. 4. multi-level issues in strategy and methods* (pp. 195–237). Emerald Group Publishing Limited.
- House, R. J., Dorfman, P. W., Javidan, M., Hanges, P. J., & Sully De Luque, M. F. (2013). *Strategic leadership across cultures: The GLOBE study of CEO leadership behavior and effectiveness in 24 countries*. Los Angeles, CA: Sage.



- Howell, J. M., & Higgins, C. A. (1990). Champions of technological innovation. *Administrative Science Quarterly*, 35(2), 317–341. <https://doi.org/10.2307/2393393>
- Huergo, E., & Jaumandreu, J. (2004). How does probability of innovation change with firm age? *Small Business Economics*, 22(3–4), 193–207. <https://doi.org/10.1023/B:SBEJ.0000022220.07366.b5>
- Hundley, G., Jacobson, C. K., & Park, S. H. (1996). Effects of profitability and liquidity on R&D intensity: Japanese and U.S. companies compared. *Academy of Management Journal*, 39(6), 1659–1874. <https://doi.org/10.5465/257073>
- Huse, M. (2007). *Boards, governance and value creation: The human side of corporate governance*. Cambridge: Cambridge University Press.
- Hutzschenreuter, T., & Horstkotte, J. (2013). Performance effects of international expansion processes: The moderating role of top management team experiences. *International Business Review*, 22(1), 259–277. <https://doi.org/10.1016/j.ibusrev.2012.04.006>
- Hutzschenreuter, T., Kleindienst, I., & Lange, S. (2016). The concept of distance in international business research: A review and research agenda. *International Journal of Management Reviews*, 18(2), 160–179. <https://doi.org/10.1111/ijmr.12065>
- Jemison, D. B., & Sitkin, S. B. (1986). Corporate acquisitions: A process perspective. *The Academy of Management Review*, 11(1), 145–163. <https://doi.org/10.2307/258337>
- Kaczmarek, S., & Ruigrok, W. (2013). In at the deep end of firm internationalization: Nationality diversity on top management teams matters. *Management International Review*, 53(4), 513–534. <https://doi.org/10.1007/s11575-012-0159-7>
- Katila, R. (2002). New product search over time: Past ideas in their prime? *Academy of Management Journal*, 45(5), 995–1010. <https://doi.org/10.5465/3069326>
- Katz, R. (1982). The effects of group longevity on project communication and performance. *Administrative Science Quarterly*, 27(1), 81–104. <https://doi.org/10.2307/2392547>
- Kor, Y. Y. (2006). Direct and interaction effects of top management team and board compositions on R&D investment strategy. *Strategic Management Journal*, 27(11), 1081–1099. <https://doi.org/10.1002/smj.554>
- Kumar, V. (2014). Understanding cultural differences in innovation: A conceptual framework and future research directions. *Journal of International Marketing*, 22(3), 1–29. <https://doi.org/10.1509/jim.14.0043>
- Lasagni, A. (2012). How can external relationships enhance innovation in SMEs? New evidence for Europe. *Journal of Small Business Management*, 50(2), 310–339. <https://doi.org/10.1111/j.1540-627X.2012.00355.x>
- Lawrence, B. S. (1997). The black box of organizational demography. *Organization Science*, 8(1), 1–22. <https://doi.org/10.1287/orsc.8.1.1>
- Lederman, D. (2010). An international multilevel analysis of product innovation. *Journal of International Business Studies*, 41(4), 606–619. <https://doi.org/10.1057/jibs.2009.30>
- Lee, H.-U., & Park, J.-H. (2008). The influence of top management team international exposure on international alliance formation. *Journal of Management Studies*, 45(5), 961–981. <https://doi.org/10.1111/j.1467-6486.2008.00772.x>
- Leung, A. K.-Y., Maddux, W. W., Galinsky, A. D., & Chiu, C.-y. (2008). Multicultural experience enhances creativity: The when and how. *American Psychologist*, 63(3), 169–181. <https://doi.org/10.1037/0003-066X.63.3.169>
- Li, J., Chu, C. W. L., Lam, K. C. K., & Liao, S. (2011). Age diversity and firm performance in an emerging economy: Implications for cross-cultural human resource management. *Human Resource Management*, 50(2), 247–270. <https://doi.org/10.1002/hrm.20416>
- Lin, C., Lin, P., Song, F. M., & Li, C. (2011). Managerial incentives, CEO characteristics and corporate innovation in China's private sector. *Journal of Comparative Economics*, 39(2), 176–190. <https://doi.org/10.1016/j.jce.2009.12.001>
- Lumpkin, G. T., & Dess, G. G. (1996). Clarifying the entrepreneurial orientation construct and linking it to performance. *Academy of Management Review*, 21(1), 135–172. <https://doi.org/10.2307/258632>
- Luo, Y. (2005). How does globalization affect corporate governance and accountability? A perspective from MNEs. *Journal of International Management*, 11(1), 19–41. <https://doi.org/10.1016/j.intman.2004.11.003>
- March, J. G. (1991). Exploration and exploitation in organizational learning. *Organization Science*, 2(1), 71–87. <https://doi.org/10.1287/orsc.2.1.71>
- March, J. G., & Shapira, Z. (1987). Managerial perspectives on risk and risk taking. *Management Science*, 33(11), 1404–1418. <https://doi.org/10.1287/mnsc.33.11.1404>
- Matta, E., & Beamish, P. W. (2008). The accentuated CEO career horizon problem: Evidence from international acquisitions. *Strategic Management Journal*, 29(7), 683–700. <https://doi.org/10.1002/smj.680>
- McKinsey Global Institute (September 2015). Playing to win: The new global competition for corporate profits.
- Menz, M. (2011). Functional top management team members: A review, synthesis, and research agenda. *Journal of Management*, 38(1), 45–80. <https://doi.org/10.1177/0149206311421830>
- Mihalache, O. R., Jansen, J. J. J. P., Van Den Bosch, F. A. J., & Volberda, H. W. (2012). Offshoring and firm innovation: The moderating role of top management team attributes. *Strategic Management Journal*, 33(13), 1480–1498. <https://doi.org/10.1002/smj.1983>
- Miller, D., & Shamsie, J. (2001). Learning across the life cycle: Experimentation and performance among the Hollywood studio heads. *Strategic Management Journal*, 22(8), 725–745. <https://doi.org/10.1002/smj.171>
- Minkov, M., & Hofstede, G. (2011). The evolution of Hofstede's doctrine. *Cross Cultural Management: An International Journal*, 18(1), 10–20. <https://doi.org/10.1108/135276011111104269>
- Nadkarni, S., & Chen, J. (2014). Bridging yesterday, today, and tomorrow: CEO temporal focus, environmental dynamism, and rate of new product introduction. *Academy of Management Journal*, 57(6), 1810–1833. <https://doi.org/10.5465/amj.2011.0401>
- Nguyen, D. D., Hagendorff, J., & Eshraghi, A. (2018). Does a CEO's cultural heritage affect performance under competitive pressure? *Review of Financial Studies*, 31(1), 97–141. <https://doi.org/10.1093/rfs/hhx046>
- Nielsen, B. B., & Nielsen, S. (2011). The role of top management team international orientation in international strategic decision-making: The choice of foreign entry mode. *Journal of World Business*, 46(2), 185–193. <https://doi.org/10.1016/j.jwb.2010.05.003>
- Nielsen, B. B., & Nielsen, S. (2013). Top management team nationality diversity and firm performance: A multilevel study. *Strategic Management Journal*, 34(3), 373–382. <https://doi.org/10.1002/smj.2021>
- Nielsen, S. (2010a). Top management team diversity: A review of theories and methodologies. *International Journal of Management Reviews*, 12(3), 301–316. <https://doi.org/10.1111/j.1468-2370.2009.00263.x>
- Nielsen, S. (2010b). Top management team internationalization and firm performance: The mediating role of foreign market entry. *Management International Review*, 50(2), 185–206. <https://doi.org/10.2307/40658359>
- Norris, E. M., & Gillespie, J. (2009). How study abroad shapes global careers: Evidence from the United States. *Journal of Studies in International Education*, 13(3), 382–397. <https://doi.org/10.1177/1028315308319740>
- Oxelheim, L., Gregorič, A., Randøy, T., & Thomsen, S. (2013). On the internationalization of corporate boards: The case of Nordic firms. *Journal of International Business Studies*, 44(3), 173–194. <https://doi.org/10.1057/jibs.2013.3>

- Peteraf, M. A. (1993). The cornerstones of competitive advantage: A resource-based view. *Strategic Management Journal*, 14(3), 179–191. <https://doi.org/10.1002/smj.4250140303>
- Petersen, M. A. (2009). Estimating standard errors in finance panel data sets: Comparing approaches. *Review of Financial Studies*, 22(1), 435–480. <https://doi.org/10.3386/w11280>
- Pfeffer, J. (1983). Organizational demography. In L. L. Cummings, & B. M. Staw (Eds.), *Research in organizational behavior* (Vol. 5) (pp. 299–357). Greenwich: JAI Press.
- Piaskowska, D., & Trojanowski, G. (2014). Twice as smart? The importance of managers' formative-years' international experience for their international orientation and foreign acquisition decisions. *British Journal of Management*, 25(1), 40–57. <https://doi.org/10.1111/j.1467-8551.2012.00831.x>
- Prasad, B., & Junni, P. (2017). Understanding top management team conflict, environmental uncertainty and firm innovativeness: Empirical evidence from India. *International Journal of Conflict Management*, 28(1), 122–143. <https://doi.org/10.1108/IJCM-02-2016-0006>
- Rammer, C., Berger, M., Doherr, T., Hud, M., Hünermund, P., Iferd, Y., Peters, B. Schubert, T. (2017). Innovationsverhalten der deutschen Wirtschaft: Indikatorenbericht zur Innovationserhebung 2016. Mannheim.
- Reuber, A. R., & Fischer, E. (1997). The influence of the management team's international experience on the internationalization behaviors of SMEs. *Journal of International Business Studies*, 28(4), 807–825. <https://doi.org/10.1057/palgrave.jibs.8490120>
- Rosenkopf, L., & Almeida, P. (2003). Overcoming local search through alliances and mobility. *Management Science*, 49(6), 751–766. <https://doi.org/10.1287/mnsc.49.6.751.16026>
- Ruiz-Jiménez, J., Fuentes-Fuentes, M., & Ruiz-Arroyo, M. (2016). Knowledge combination capability and innovation: The effects of gender diversity on top management teams in technology-based firms. *Journal of Business Ethics*, 135(3), 503–515. <https://doi.org/10.1007/s10551-014-2462-7>
- Salomon, R. M., & Shaver, J. M. (2005). Learning by exporting: New insights from examining firm innovation. *Journal of Economics and Management Strategy*, 14(2), 431–460. <https://doi.org/10.1111/j.1530-9134.2005.00047.x>
- Sambharya, R. B. (1996). Foreign experience of top management teams and international diversification strategies of U.S. multinational corporations. *Strategic Management Journal*, 17(9), 739–746. [https://doi.org/10.1002/\(SICI\)1097-0266\(199611\)17:9<739::AID-SMJ846>3.0.CO;2-K](https://doi.org/10.1002/(SICI)1097-0266(199611)17:9<739::AID-SMJ846>3.0.CO;2-K)
- Sampson, R. C. (2007). R&D alliances and firm performance: The impact of technological diversity and alliance organization on innovation. *Academy of Management Journal*, 50(2), 364–386. <https://doi.org/10.2307/20159859>
- Savino, T., Messeni Petruzzelli, A., & Albino, V. (2017). Search and recombination process to innovate: A review of the empirical evidence and a research agenda. *International Journal of Management Reviews*, 19(1), 54–75. <https://doi.org/10.1111/ijmr.12081>
- Schein, E. H. (2016). *Organizational culture and leadership*. The Jossey-Bass Business & Management Series: Vol. 5. Hoboken, NJ: Wiley.
- Schmid, S., & Wurster, D. J. (2017). International work experience: Is it really accelerating the way to the management board of MNCs? *International Business Review*, 26(5), 991–1008. <https://doi.org/10.1016/j.ibusrev.2017.03.006>
- Schmidt, W. H., & Posner, B. Z. (1983). *Managerial values in perspective*. New York: American Management Association.
- Schmid, S., & Dauth, T. (2012). Internationale Diversität im Top-Management: Eine empirische Analyse der DAX-30-Unternehmen. *Schmalenbachs Zeitschrift für betriebswirtschaftliche Forschung : Zfbf*, 64(7), 772–802. <https://doi.org/10.1007/BF03373705>
- Schmid, S., & Dauth, T. (2014). Does internationalization make a difference? Stock market reaction to announcements of international top executive appointments. *Journal of World Business*, 49, 63–77. <https://doi.org/10.1016/j.jwb.2012.11.003>
- Schneider, S. C., & de Meyer, A. (1991). Interpreting and responding to strategic issues: The impact of national culture. *Strategic Management Journal*, 12(4), 307–320. <https://doi.org/10.1002/smj.4250120406>
- Schumpeter, J. (1939). *Business cycles*. New York, NY: McGraw-Hill.
- Shamir, B. (2011). Leadership takes time: Some implications of (not) taking time seriously in leadership research. *The Leadership Quarterly*, 22(2), 307–315. <https://doi.org/10.1016/j.leaqua.2011.02.006>
- Simsek, Z. (2007). CEO tenure and organizational performance: An intervening model. *Strategic Management Journal*, 28(6), 653–662. <https://doi.org/10.1002/smj.599>
- Simsek, Z., Heavey, C., & Fox, B. C. (2018). Interfaces of strategic leaders: A conceptual framework, review, and research agenda. *Journal of Management*, 44(1), 280–324. <https://doi.org/10.1177/0149206317739108>
- Smith, W. K., & Tushman, M. L. (2005). Managing strategic contradictions: A top management model for managing innovation streams. *Organization Science*, 16(5), 522–536. <https://doi.org/10.1287/orsc.1050.0134>
- Somech, A., & Drach-Zahavy, A. (2013). Translating team creativity to innovation implementation: The role of team composition and climate for innovation. *Journal of Management*, 39(3), 684–708. <https://doi.org/10.1177/0149206310394187>
- Sørensen, J. B., & Stuart, T. E. (2000). Aging, obsolescence, and organizational innovation. *Administrative Science Quarterly*, 45(1), 81–112. <https://doi.org/10.2307/2666980>
- Sperber, S. C. (2016). The top managers' impact on opening the organizational culture to innovation. *International Journal of Innovation Management*, 21(2), 1–42. <https://doi.org/10.1142/S1363919617500141>
- Stahl, G. K., Björkman, I., & Morris, S. (Eds.) (2012). *Handbook of research in international human resource management* (Second ed.). Cheltenham: Edward Elgar.
- Staples, C. L. (2007). Board globalisation in the world's largest TNCs 1993–2005. *Corporate Governance*, 15(2), 311–321. <https://doi.org/10.1111/j.1467-8683.2007.00573.x>
- STOXX Ltd. (2016). HDAX<sup>®</sup> hedged USD index. Factsheet. Retrieved from [https://www.dax-indices.com/document/Resources/Guides/Factsheet\\_HDAX\\_hedged.pdf](https://www.dax-indices.com/document/Resources/Guides/Factsheet_HDAX_hedged.pdf)
- Sveiby, K. E. (1997). *The new organizational wealth: Managing and measuring knowledge-based assets*. San Francisco, CA: Berrett-Koehler.
- Tadmor, C. T., Galinsky, A. D., & Maddux, W. W. (2012). Getting the most out of living abroad: Biculturalism and integrative complexity as key drivers of creative and professional success. *Journal of Personality and Social Psychology*, 103(3), 520–542. <https://doi.org/10.1037/a0029360>
- Talke, K., Salomo, S., & Kock, A. (2011). Top management team diversity and strategic innovation orientation: The relationship and consequences for innovativeness and performance. *Journal of Product Innovation Management*, 28(6), 819–832. <https://doi.org/10.1111/j.1540-5885.2011.00851.x>
- Talke, K., Salomo, S., & Rost, K. (2010). How top management team diversity affects innovativeness and performance via the strategic choice to focus on innovation fields. *Research Policy*, 39(7), 907–918. <https://doi.org/10.1016/j.respol.2010.04.001>
- Tether, B. S. (2002). Who co-operates for innovation, and why: An empirical analysis. *Research Policy*, 31(6), 947–967. [https://doi.org/10.1016/S0048-7333\(01\)00172-X](https://doi.org/10.1016/S0048-7333(01)00172-X)
- Thomas, A. K., & Millar, P. R. (2012). Reducing the framing effect in older and younger adults by encouraging analytic processing. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, 67(2), 139–149. <https://doi.org/10.1093/geronb/gbr076>
- Tihanyi, L., Ellstrand, A. E., Daily, C. M., & Dalton, D. R. (2000). Composition of the top management team and firm international



- diversification. *Journal of Management*, 26(6), 1157–1177. [https://doi.org/10.1016/S0149-2063\(00\)00076-3](https://doi.org/10.1016/S0149-2063(00)00076-3)
- Tuckman, B. W. (1965). Developmental sequence in small groups. *Psychological Bulletin*, 63(6), 384–399. <https://doi.org/10.1037/h0022100>
- Tuckman, B. W., & Jensen, M. A. C. (1977). Stages of small-group development revisited. *Group & Organization Management*, 2(4), 419–427. <https://doi.org/10.1177/105960117700200404>
- Tushman, M. L., & Anderson, P. (1986). Technological discontinuities and organizational environments. *Administrative Science Quarterly*, 31(3), 439–465. <https://doi.org/10.2307/2392832>
- Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science*, 185(4157), 1124–1131. <https://doi.org/10.1126/science.185.4157.1124>
- Un, C. A. (2016). The liability of localness in innovation. *Journal of International Business Studies*, 47(1), 44–67. <https://doi.org/10.1057/jibs.2015.24>
- Visser, M., & Faems, D. (2015). Exploration and exploitation within firms: The impact of CEOs' cognitive style on incremental and radical innovation performance. *Creativity and Innovation Management*, 24(3), 359–372. <https://doi.org/10.1111/caim.12137>
- Vroom, V. H., & Pahl, B. (1971). Relationship between age and risk taking among managers. *Journal of Applied Psychology*, 55(5), 399–405. <https://doi.org/10.1037/h0031776>
- Wiersema, M. F., & Bantel, K. A. (1992). Top management team demography and corporate strategic change. *Academy of Management Journal*, 35(1), 91–121. <https://doi.org/10.2307/256474>
- Withers, M. C., Drnevich, P. L., & Marino, L. (2011). Doing more with less: The disordinal implications of firm age for leveraging capabilities for innovation activity. *Journal of Small Business Management*, 49(4), 515–536. <https://doi.org/10.1111/j.1540-627X.2011.00334.x>
- Wu, J. (2014). The effects of external knowledge search and CEO tenure on product innovation: Evidence from Chinese firms. *Industrial and Corporate Change*, 23(1), 65–89. <https://doi.org/10.1093/icc/dtt009>
- Yadav, M. S., Prabhu, J. C., & Chandy, R. K. (2007). Managing the future: CEO attention and innovation outcomes. *Journal of Marketing*, 71(4), 84–101. <https://doi.org/10.1509/jmkg.71.4.084>
- Yim, S. (2013). The acquisitiveness of youth: CEO age and acquisition behavior. *Journal of Financial Economics*, 108(1), 250–273. <https://doi.org/10.1016/j.jfineco.2012.11.003>

**How to cite this article:** Wrede M, Dauth T. A temporal perspective on the relationship between top management team internationalization and firms' innovativeness. *Manage Decis Econ*. 2020;41:542–561. <https://doi.org/10.1002/mde.3119>