

# Top management team nationality diversity, corporate entrepreneurship and innovation in multinational firms

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**TOP MANAGEMENT TEAM NATIONALITY DIVERSITY, CORPORATE  
ENTREPRENEURSHIP AND INNOVATION IN MULTINATIONAL FIRMS\***

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*Keywords:* Top management team, nationality diversity, firm innovation, inequality, corporate entrepreneurship

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CORPORATE ENTREPRENEURSHIP AND INNOVATION IN  
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**Research summary.** We integrate insights from upper echelon theory and the literature on innovation and multinational corporations (MNCs) to develop a framework explaining when and why nationality diversity in top management teams (TMTs) affects corporate entrepreneurship—as evidenced by diversity in global knowledge sourcing—and through this innovation performance in MNCs. In a panel of 165 manufacturing MNCs based in 20 countries, we confirm that the positive effects of TMT nationality diversity on corporate entrepreneurship and innovation are only unleashed in TMTs with low social stratification and in MNCs located in home countries that are low in national power distance. Our study contributes to opening up the black box of the upper echelon’s strategic role in spurring entrepreneurship and innovation in MNCs embedded in different cultures.

**Managerial summary.** The internationalization of top management teams (TMTs) in multinational corporations (MNCs) has been increasing in response to the globalization of markets and sources of knowledge. In this study, we examine under what circumstances MNCs that have TMTs comprised of executives with diverse nationalities exhibit stronger innovation performance. Analysis of leading corporations from 20 countries over a period of 10 years reveals that MNCs with diverse TMTs engage more in corporate entrepreneurship and subsequently see increased innovation performance – but only when these TMTs are operating in environments characterized by equal distribution of power and low hierarchy. The findings underscore the important role of corporate headquarters and TMT composition in the strategic management of modern MNCs.

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## INTRODUCTION

MNCs face formidable challenges due to growing globalization, technological change and organizational complexity. To deal with these challenges, MNCs rely on innovation and renewal to achieve a sustainable competitive advantage and to survive in the long run (Ahuja & Morris Lampert, 2001; Blomkvist, Kappen, & Zander, 2017; Bower & Christensen, 1995; O'Reilly & Tushman, 2013). However, many MNCs are said to face a “globalization penalty” as MNCs seem to lag behind locally focused champions in terms of learning and innovation (Dewhurst, Harris, & Heywood, 2011). Scholars have highlighted the pivotal role of corporate headquarters in spurring and shaping entrepreneurship and innovation in modern MNCs, with the aim to avoid such penalty. Corporate headquarters are responsible for providing the strategic leadership necessary to leverage corporate resources across regions and divisions in order to fully utilize the innovative capacity of the multimarket firm (Dewhurst *et al.*, 2011; Menz, Kunisch, & Collis, 2015). Particularly the way headquarters are staffed and the background characteristics of TMT members are likely to have an important impact on strategic leadership, corporate entrepreneurship (CE) initiatives, and subsequent innovation performance of MNCs (Heavey & Simsek, 2013; Menz *et al.*, 2015; Talke, Salomo, & Rost, 2010).

This resonates well with the claim in the upper echelon’s literature that organizations are a reflection of their top managers (Hambrick & Mason, 1984). Research in this tradition has suggested that diverse backgrounds and expertise in TMTs help firms to address the business challenges associated with environmental uncertainty and frequent technological change (Certo, Lester, Dalton, & Dalton, 2006; Heavey & Simsek, 2013; Knight *et al.*, 1999; Simons, Pelled, & Smith, 1999). MNCs recognize the need to have a more global outlook and, accordingly, have appointed members holding different nationalities to TMTs (e.g., Staples, 2007). As executives are imprinted with the tacit norms and conventions specific to the countries in which they were born and raised, it is believed that TMT nationality diversity substantially boosts a TMT’s human and social capital, which, in turn, influences TMT dynamics, CE initiatives and innovation, and

ultimately firm financial performance (Hambrick, Davison, Snell, & Snow, 1998; Nielsen & Nielsen, 2013). Hikmet Ersek, CEO of Western Union, for example, argues that the internationally diverse composition of their executive team enables them to stay connected with their diverse customer base, allowing adequate responses to changing global demands (McKinsey, 2018). Surprisingly, however, TMT nationality diversity received only limited attention in prior research and we still know little about *why* and *when* it affects innovation performance of MNCs.

In this paper, we examine the “why” question by integrating insights from upper echelon theory and theories of CE and innovation in MNCs to develop a conceptual model suggesting that TMT nationality diversity can benefit MNC innovation by spurring CE efforts for global external knowledge sourcing. We argue that TMT nationality diversity provides MNCs with the human capital and geocentric attitude (Levy, Beechler, Taylor, & Boyacigiller, 2007) necessary to implement and stimulate global CE initiatives (Blomkvist *et al.*, 2017). Hence, we hypothesize that TMT nationality diversity will enhance CE—as expressed by the geographical and technological diversity of M&As, technology alliances, and corporate venturing initiatives—so that MNCs gain access to increasingly globally dispersed knowledge pools, emergent technologies, and specialized expertise, ultimately increasing MNC innovation (Ahuja & Katila, 2001, 2004; Blomkvist *et al.*, 2017; Kafouros, Buckley, & Clegg, 2012; Lavie & Miller, 2008).

To address the “when” question, we argue that TMT nationality diversity will only incite external knowledge sourcing initiatives when TMT social categorization and dysfunctional political processes are absent. Under these conditions, the variety of nationalities will spur geocentric leadership and, thus, global external knowledge sourcing initiatives (Boone & Hendriks, 2009; Hambrick, 1994). These initiatives will increase MNC innovation performance if MNCs have decentralized structures and processes in place that allow collaboration and knowledge exchange across the MNCs and support local initiatives (Blomkvist *et al.*, 2017; Hedlund, 1986). We argue that the degree to which TMTs will act as real teams and the likelihood that MNCs will have in place such decentralized structures and processes is crucially

dependent on the absence of two important sources of inequality: *social stratification* at the TMT-level and *national power distance* at the MNC home-country level.

*Social stratification* among executives refers to power and status differences that may trigger nationality-based social categorization processes in TMTs. These in turn cause negative ingroup-outgroup team dynamics, political struggles and interpersonal animosity (Bunderson, Van der Vegt, Cantimur, & Rink, 2016; Harrison & Klein, 2007; Van Knippenberg, De Dreu, & Homan, 2004).<sup>1</sup> Non-egalitarian TMTs are also less likely to put in place decentralized structures and processes supportive of cooperation, creativity, and knowledge exchange. *National power distance* (NPD) of the MNC's home country (Hofstede, 2001) refers to the extent to which “the less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally” (Hofstede, 1991, p. 28). Given that NPD permeates organizations, it indirectly affects many TMT and company-wide processes and outcomes, such as the decision-making power of CEOs, MNC-level decentralization, and the nature of headquarter-subsidiary relationships (Huang, Zhu, & Brass, 2017; Van Der Vegt, Van de Vliert, & Huang, 2005). When embedded in a low NPD culture, TMTs are more likely to operate as a team, in which all executives contribute to strategy making and implementation.

We test and largely support our hypotheses using panel data (1998-2007) from 165 large, publicly listed manufacturing MNCs based in 20 countries. Our study contributes to the upper echelons and strategic management literatures by integrating research on TMT diversity, social stratification in teams, and national culture. By revealing the important role of TMTs in spurring CE, we are able to dig deeper into *why* TMT nationality diversity facilitates innovation. By doing so, we contribute to opening the black box of upper echelon's strategic decision-making in large

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<sup>1</sup> Following Hambrick, Humphrey and Gupta (2015) the extent of social stratification is assessed by the presence of different hierarchical rank titles in TMTs (as explained in the Methods section). Because we focus on formal hierarchies in TMTs, we use power and status interchangeably as they are in all likelihood strongly correlated.

firms. In addition, in focusing on *when* TMT nationality diversity affects innovation, we answer to the call of scholars to bring the macro-context back into TMT research, which has tended to ignore the macro-institutional environment focusing mainly on U.S. samples (Hambrick, 2007; Nielsen & Nielsen, 2013; Tsui, 2007; Yamak, Nielsen, & Escribá-Esteve, 2014). Finally, we also contribute to the MNC literature that has often emphasized, but seldom systematically studied, the important role of corporate headquarters and TMT composition in the strategic management of modern MNCs in the context of CE and innovation (Blomkvist *et al.*, 2017; Menz *et al.*, 2015; Mihalache, Jansen, Van Den Bosch, & Volberda, 2012).

## **THEORETICAL BACKGROUND AND HYPOTHESES**

The overarching logic of our theoretical model is summarized in Figure 1. It schematically indicates that we expect TMT nationality diversity to be related to the diversity of external knowledge sourcing initiatives (H1a), which in turn will improve MNC innovation performance (H1b). We also propose that the relationship between TMT nationality diversity and CE (as specified in H1a) will be stronger when TMT social stratification is low (H2a) and when the MNC's headquarter is embedded in a low NPD culture (H2b). Finally, the relationship between CE and innovation performance is expected to be stronger when the MNC operates as a decentralized network in which power, knowledge, and capabilities are dispersed, and in which collaboration and knowledge exchange across units and with external actors are fostered. We argue that this is also more likely to be the case when TMT social stratification and NPD are low (H3a and H3b). We note that in order to preserve a parsimonious framework, we treat the two inequality moderators as separate, additive influences. TMT social stratification and national power distance are partially related because TMTs in high NPD countries are more likely to be stratified; still, there is substantial heterogeneity in social stratification among MNCs in such contexts as well. We return to this issue and study potential multiplicative or antagonistic influences in a supplementary analysis.

-- Insert Figure 1 about here --

## **TMT nationality diversity, CE, and MNC innovation**

**CE and innovation.** CE is “the process through which firms innovate, create new businesses, and transform themselves by changing the business domain or key strategic processes” (Heavey & Simsek, 2013, p. 838). CE incorporates a firm’s venturing behavior (e.g., corporate venture capital investments, M&A’s, and alliance formation), its commitment to creating new products and services, and its willingness to strategically redefine its mission (Heavey & Simsek, 2013; Simsek & Heavey, 2011). Innovation and renewal are essential to cope with technological uncertainty and potential disruptive technologies (Henderson & Clark, 1990) and to explore promising technologies with the aim to create, strengthen or maintain a sustained competitive advantage (Ahuja & Morris Lampert, 2001; Bower & Christensen, 1995; O’Reilly & Tushman, 2013; Leten *et al.*, 2016).

MNCs use a diversity of external knowledge sourcing strategies (e.g., M&As, technology alliances, and corporate venturing) to advance innovation through CE, because internal sources of knowledge are limited and because exploration activities are often difficult to orchestrate internally (Tushman & Anderson, 1986). MNCs need to search and source across different technological fields and geographic spaces in order to improve innovation performance (Ahuja & Katila, 2004; Phene, Fladmoe-Lindquist, & Marsh, 2006; Rosenkopf & Almeida, 2003; Belderbos *et al.*, 2013). A broader search across technology fields expands the knowledge resources available to a firm, opening up new technological opportunities (e.g., Ahuja & Katila, 2001; Leiponen & Helfat, 2010; Rosenkopf & Nerkar, 2001). Such technological diversification creates the potential to cross-fertilize and recombine, yielding new inventions and functionalities and/or increased product and process performance (Fleming, 2001; Leten, Belderbos, & Van Looy, 2007). Similarly, by expanding their geographic reach firms may unlock technological opportunities and improve their recombination potential, as technology search approaches and knowledge bases are often country-specific (e.g., Belderbos, Jacob, & Lokshin, 2018; Phene *et al.*, 2006).



Taken together, we expect firm innovation to benefit from CE activities focusing on external sourcing across a variety of technological fields and geographical spaces. Extant research indeed has documented positive associations between innovation performance of firms and their engagement in technology-intense M&As (Ahuja & Katila, 2001; Hitt, Beamish, Jackson, & Mathieu, 2007), technology alliances (Goerzen & Beamish, 2005; Lavie & Miller, 2008), corporate venturing (Belderbos *et al.*, 2018; Wadhwa, Phelps, & Kotha, 2016; Zahra & Hayton, 2008), and geographically dispersed knowledge search (Ahuja & Katila, 2004; Chung & Yeaple, 2008; Leiponen & Helfat, 2010; Phene *et al.*, 2006).

**TMT nationality diversity and CE.** Top-level leaders play an essential role in developing CE initiatives focusing on external knowledge sourcing strategies (Burgelman, 1991, 2002; O'Reilly & Tushman, 2013). In modern MNCs, TMTs have an initiating and steering role in sensing and seizing opportunities on a global scale, in sourcing and recombining knowledge in various technological domains and geographical regions, and in leveraging corporate resources across regions and divisions (Mihalache *et al.*, 2012; Nielsen & Nielsen, 2013; Talke *et al.*, 2010). We argue that MNCs led by TMTs with a higher nationality diversity are in a better position to leverage globally distributed knowledge sources, for three reasons.

First, according to the information/decision-making perspective, knowledge-based diversity in TMT members' background and expertise is likely to lead to CE initiatives because such diversity makes accessible varied ideas, skills and perspectives, fosters constructive debate, stimulating creativity and effective decision-making (Certo *et al.*, 2006; Heavey & Simsek, 2013; Talke *et al.*, 2010). Diverse TMTs will process varied information and alternatives more easily, which ultimately also spurs decision speed. The latter has been shown to be an important precursor of innovation performance in dynamic environments (Eisenhardt, 1989). The more varied the knowledge that TMT members bring in, the more likely it is that this knowledge can be (re)combined in creative ways and the higher the chances are that TMTs come up with novel CE initiatives (Amason, 1996; Bunderson & Sutcliffe, 2002; Elenkov, Judge, & Wright, 2005;

Levine & Moreland, 1998). Thus, we expect nationality-diverse TMTs to have a larger combined set of skills, knowledge, and human capital, which helps them to sense and seize innovation opportunities and to engage in a diversity of global external knowledge sourcing initiatives.

Second, nationality diversity provides an important source of variety that helps TMTs deal with the different institutional contexts that they face (Nielsen & Nielsen, 2013). TMTs consisting of executives raised in different countries have deep-level complementary knowledge about institutions and markets on a global scale. Such TMT knowledge diversity strengthens a team's ability to scan and interpret the available international information, foresee and prevent potential problems (e.g., foreign liability issues), and, to deploy effective global knowledge sourcing strategies for innovation. Roche, the Swiss multinational healthcare company, for instance, set itself the objective of increasing the number of leaders from emerging markets by 30 percent, because, as CEO Severin Schwan put it, “we need to understand markets like China not just from a commercial perspective but from the point of view of all the functions” (McKinsey, 2016, p. 8).

Third, we expect that TMTs that harbor different nationalities are more likely to succeed in cultivating an MNC-wide open and geocentric attitude—that is, a managerial mindset that values ideas independent of their national origin (Heenan & Perlmutter, 1979; Nielsen & Nielsen, 2010). Such TMTs downplay nationality differences between headquarters and subsidiaries, source ideas and knowledge in a manner unrestricted by nationality or geographical boundaries, and, thus are more likely to support and develop CE initiatives.

The above arguments suggest that the extent to which a TMT deploys an outspoken CE strategy, reflected in the MNC's geographical and technological heterogeneity of different venturing initiatives such as M&A's, alliances and corporate venturing, will depend on the TMT's nationality diversity. As the variety of CE initiatives focusing on knowledge sourcing increases, the MNC's innovation performance should also rise.

Hypothesis 1a. *TMT nationality diversity is positively associated with CE, as exemplified by geographical and technological diversity of external knowledge sourcing strategies.*

Hypothesis 1b. *CE, as exemplified by geographical and technological diversity of external knowledge sourcing strategies, is positively associated with MNC innovation.*

### **Moderation of the TMT nationality diversity - CE relationship**

The benefits of nationality diversity with respect to CE are more likely to be unleashed when TMT members engage in open knowledge exchange and act as a “real” team (Boone & Hendriks, 2009; Hambrick, 1994). Without behavioral integration and effective communication, the TMT human capital associated with differences in executives’ knowledge bases cannot be tapped (Brodbeck, Kerschreiter, Mojzisch, & Schulz-Hardt, 2007; Hambrick, 1994; Van Dijk & van Engen, 2013). However, nationality diversity in TMTs may also have downsides (Boone & Hendriks, 2009; Harrison & Klein, 2007; Van Dijk & van Engen, 2013; Van Knippenberg *et al.*, 2004). Social categorization theory suggests that diversity may actually hamper exchange and communication with dissimilar team members (across nationalities) because people identify more with similar team members (of the same nationality). Such social categorization processes spur negative in-group –outgroup dynamics in multinational teams and provoke interpersonal conflict, competition, and dysfunctional political behavior. These team dynamics may make it impossible for TMTs to reap the potential benefits of CE that lay dormant in their diverse composition. We argue that negative TMT dynamics are more likely to emerge when TMT social stratification is high, and when the MNC’s headquarter is located in a high NPD country. As a result, we expect that both conditions will attenuate the relationship between nationality diversity and CE (see Figure 1).

**Social stratification.** Following recent theorizing about the role of social hierarchy and inequality (Bunderson *et al.*, 2016; Harrison & Klein, 2007), we argue that the negative implications of TMT nationality diversity are more likely to emerge when social stratification in TMTs is high. Socially stratified teams have elaborated social hierarchies associated with

inequality in power, status, and privileges, which has been shown to create negative social dynamics in teams, including conflicts about the allocation of responsibilities and tasks (Bunderson *et al.*, 2016; Nishii, 2013). The mere presence of inequality and a fixed status configuration in a TMT may negatively impact team processes, as members socially categorize each other based on status, and adjust their behavior accordingly (Moore Jr, 1968; Van Dijk & van Engen, 2013). It is well known that high status people behave more dominantly, have more impact on decision making, and are treated with deference by low status people (Wittenbaum & Bowman, 2005). Status differences and power asymmetries in teams tend to hamper effective communication so that information is exchanged less openly and less completely among TMT members (Boone & Hendriks, 2009; De Brabander & Thiers, 1984). Greve and Mitsuhashi (2007) similarly argued that power concentration in TMTs (in terms of rank inequality) restricts information exchange and debate so that less powerful members, although possessing valuable information, may withhold their input (see Eisenhardt & Bourgeois, 1988). Consequently, the decisions taken in a TMT would reflect primarily the interests of a few powerful members. In the worst case, inequality may be seen as unfair and unjust, which may manifest in “various forms of resigning behavior among low-status group-members that ranges from lower levels of commitment to apathy” (Van Dijk & van Engen, 2013, p. 230).

In TMTs with high nationality diversity *and* social stratification, the formal rank status differences between executives might become intertwined with their countries of origin. This is likely to make the deep-level value differences associated with nationality more salient and to trigger the formation of nationality-based fault lines, which will reinforce social categorization, stereotyping, and in-group-outgroup distinctions (Boone & Hendriks, 2009; Harrison & Klein, 2007; Lau & Murnighan, 1998; Nishii, 2013). The more solid such nationality-based fault lines are, the less productive the knowledge exchange and openness to new ideas in the TMT will be.

These arguments suggest that, if inequality is high, TMTs are less likely to reap diversity-related benefits. TMTs also will find it more difficult to cultivate an open and geocentric mindset,

which would be necessary to initiate company-wide global external knowledge sourcing initiatives. This suggests the following hypothesis:

Hypothesis 2a. *The positive association between TMT nationality diversity and CE is stronger for MNCs with TMTs low in social stratification than for MNCs with TMTs high in social stratification.*

**National power distance.** NPD is an important aspect of national culture and refers to the degree to which people accept that power in societies and organizations is distributed unequally. With regard to the work context, power distance proxies the extent to which power difference between power-holders and others is accepted, expected, and taken for granted (Crossland & Hambrick, 2011; Daniels & Greguras, 2014; Hofstede, 2001). Power distance has been shown to have important ramifications for the functioning of teams and organizations (Alderfer, 1987; Chatman, Polzer, Barsade, & Neale, 1998; Ely & Thomas, 2001; Lau & Murnighan, 1998).

In high NPD countries, leadership is highly privileged and those occupying positions of authority are seen as superior and ascribed much respect and status (Crossland & Hambrick, 2011; Daniels & Greguras, 2014). Status differences are regarded as legitimate, power-holders are expected to lead autocratically, far-reaching executive actions are tolerated, and decision-making (on average) is strongly centralized. Disagreements and conflicts are not openly discussed but may lead to covert actions, coalition building, and insurgent behaviors (Eisenhardt & Bourgeois, 1988). In such environments, the creativity of nationally diverse TMTs is stifled because the potential that lies dormant in executives' different knowledge bases is unlikely to be used (Brodbeck *et al.*, 2007; Van Dijk & van Engen, 2013).

In low NPD countries, in contrast, TMTs are more likely to act as a team and to show more behavioral integration by sharing resources, information, and decisions (Hambrick, 1994), which, in turn, is a necessary condition for TMT diversity to have positive effects. Disagreement and conflicts are more likely to be openly discussed among an empowered group of senior executives, and are less likely to escalate into dysfunctional covert political behavior (Bourgeois &

Eisenhardt, 1988; Eisenhardt & Bourgeois, 1988). In those cultures, it is also common that unbalanced power and status allocation is met with skepticism, and not accepted easily. Low-status employees would be more likely to approach higher-status employees, contradict them, and introduce their own viewpoints (Van Der Veegt *et al.*, 2005). Taken together, we therefore, expect that MNCs are more likely to unleash the impetus that TMT nationality diversity can give to CE initiatives in low NPD environments:

Hypothesis 2b. *The positive association between TMT nationality diversity and CE is stronger for MNCs based in low power distance countries than for MNCs based in high power distance countries.*

### **Moderation of the CE - MNC innovation relationship**

CE does not guarantee firm innovation. For external knowledge sourcing strategies to result in firm-level innovation, structures need to be put in place that allow synthesizing knowledge and insights across CE initiatives. Specifically, to translate CE into innovation, MNCs depend on decentralized structures that allow accessing, integrating, and recombining (tacit) knowledge and emerging technologies across locations (Arora, Belenzon, & Rios, 2014). Prior research has highlighted that decentralized MNC networks enable diverse local knowledge sourcing activities and cross-unit fertilization of knowledge and technologies (e.g., Blomkvist *et al.*, 2017; Hedlund, 1986). Research on innovation and corporate renewal has also emphasized that, in order for innovation strategies to work, firms need to provide innovating units with a substantial degree of autonomy (Burgelman, 2002). However, it often remains a challenge for (foreign) affiliates to obtain sufficient R&D resources and the legitimacy to assume an important role in knowledge sourcing and transfer within the MNC's R&D network (Cantwell & Mudambi, 2005). Effective knowledge sourcing and utilization also implies that affiliates and corporate headquarters exchange information (e.g., Lahiri, 2010; Monteiro & Birkinshaw, 2017). It is the combination of externally sourced and internally developed knowledge transferred within the network of the MNC that is most effective for innovation (Asmussen, Foss, & Pedersen, 2013; Phene & Almeida, 2008). We expect that the MNC-level structures and processes needed to transform

diversity of external knowledge sourcing in MNC-wide innovation are more likely to be put in place when social stratification and NPD are low, such that social stratification and NPD attenuate the CE-innovation relationship (see Figure 1).

**Social stratification.** TMTs play a pivotal role in elaborating organizational structures and processes. This is because executives determine reporting lines, evaluate and hire middle managers based on whether they adhere to and implement corporate strategy, and decide whether to rely on top-down or bottom-up innovation and business development processes (Burgelman, 1991, 2002; Heavey & Simsek, 2013). The literature has shown that TMTs play an important facilitating role in identifying and enacting possible synergies across innovation activities (Bower & Christensen, 1995; O'Reilly & Tushman, 2013; O'Reilly & Tushman, 2008). TMTs are also best positioned to assess whether a particular innovation activity aligns with the MNC's overall strategy, and which entrepreneurial initiative is most commercially sensible (Barney, Foss, & Lyngsie, 2018).

As organizations are a reflection of TMTs, we expect that TMTs low on social stratification and formal hierarchy will be more likely to implement and facilitate company-wide decentralized structures that foster autonomy, cooperation, and inter-unit knowledge flow. A good illustration is the pharmaceutical firm Roche which does not have a global head of R&D because, as CEO Schwan puts it, such a position could “destroy value by taking away freedoms and stifling diversity” (McKinsey, 2016, p. 4). In contrast, TMTs that exhibit social stratification and a strict hierarchy are less likely to embrace or agree upon the importance of bottom-up processes and openness throughout the MNC organization. Hence, it is unlikely that such hierarchical TMTs will put in place the structures and processes necessary to benefit from company-wide CE initiatives. This suggests the following hypothesis:

Hypothesis 3a. *The positive association between CE and innovation is stronger for MNCs with TMTs that are low in social stratification than for MNCs with TMTs that are high in social stratification.*

**National power distance.** It is well established that national culture, including NPD, permeates organizations (Hofstede, 2001), and therefore affects, among others, corporate governance, MNC-level decentralization, and headquarter-subsidiary relationships (Huang *et al.*, 2017; Li & Harrison, 2008; Van Der Veegt *et al.*, 2005). For instance, corporate boards in high NPD countries have more outside directors, while the CEO often acts as chairman of the board (Li & Harrison, 2008). In high NPD countries, international strategic decision-making is much more centralized and authority differences across echelons more pronounced (Dimitratos, Petrou, Plakoyiannaki, & Johnson, 2011). TMTs in high NPD cultures will grant less autonomy to subsidiaries and invest less in MNC-wide structures that would help translate CE activities into MNC innovation (Drogendijk & Holm, 2012). In low-power distance cultures, in contrast, less powerful actors are more likely to, and encouraged to, get involved in decision-making (Li & Harrison, 2008). TMTs are more likely to implement MNC decentralized network structures and processes, in which all hierarchical levels and units are stimulated to share, and act upon knowledge that is generated from a variety of external sourcing activities across different corporate units. These arguments suggest that CE initiatives focusing on external knowledge sourcing strategies are less (more) likely to result in higher innovation performance if MNCs are headquartered in high (low) NPD countries:

Hypothesis 3b. *The positive association between CE and MNC innovation is stronger for MNCs based in low power distance countries than for MNCs based in high power distance countries.*

## **METHODS**

### **Data and sample**

We test hypotheses on panel data for a sample of leading multinational firms headquartered in 20 OECD countries. The sample firms, all of which had patent applications in the observation period, are among the top ten largest players in the European market in their respective industries (in terms of sales). All manufacturing industries are represented, in addition to ICT and telecommunication services. The focus on European market leaders stems from the use of



secondary data gathered to examine the relationship between technology and market leadership in Europe by the European Commission (Belderbos *et al.*, 2010). Among 250 identified leading firms, 165 publicly listed firms applied for at least one patent during the period. Despite the focus on European market leadership, the firms are headquartered in a broad range of countries. The largest number of firms are based in the US (34), followed by Germany (26), France (21), the UK (19) and Japan (15). The remaining firms have their headquarters in small open European economies. The study's timeframe for analyzing the firms' innovation performance spans the years 1998 to 2007.

The sample of larger multinationals is quite suitable for our study. They operate in a large number of industries so that industry-specific biases that may plague single industry studies are ruled out. Moreover, the countries in which the firms are headquartered cover a broad NPD spectrum, with the Hofstede score for the countries represented in the sample varying between 11 and 77, which ensures substantial between-firm variation in NPD.

We initially relied on firms' annual reports to identify top executives employed in the focal companies during the sample period and subsequently used the BoardEx database to collect detailed information on these top executives. In total, we gathered information on over 3,000 individuals employed by the focal companies during the sample period.

To gauge the diversity of external knowledge sourcing strategies, we collected data from a variety of sources to map a firm's alliance, corporate venturing, and M&A activities. We used Thomson's SDC Platinum database as well as the MERIT-CATI database to gather information about the alliance activities of the sample firms. We retained only those alliances for which we knew that technology development and technology sharing were among the objectives of the alliance. To collect information on firms' venturing activity we used Thomson's VentureXpert database, which combines information from several industry associations (e.g., Dushnitsky & Lavie, 2010). Information on M&A activities of sample firms was retrieved from the SDC and

Zephyr databases. Information on patent applications was collected from the PATSTAT database published by the European Patent Office.

## **Measures**

**Dependent variable: MNC innovation.** We use an invention (patent) count as our measure of firms' innovation output, and we use the patent application date as the first indication of new capabilities and invention (Jaffe & Trajtenberg, 2002). Patents offer a rich source of information for studies on innovation and have been extensively used as an indicator of innovation (Sampson, 2007). Their main advantage is consistency and objectiveness because patent examiners validate new inventions based on novelty (relating to innovative character) and utility of use (related to potential commercial applicability). Drawbacks are that patent propensities vary across firms and that patented inventions differ in their technical and economic value. We use patent data from the European patent office, as this aligns with the sample firms that are important market participants in Europe with strong incentives to file for patents in this market. Another advantage of using European Patent office data is that the EPO patent examination process is substantially more rigorous than the US process, such that European patent applications are more likely to be representative of novel technologies with utility (Guellec & de La Potterie, 2007).

**Focal independent variable: TMT nationality diversity.** We identify 'TMT' members from information provided in annual reports. For instance, in a Dutch setting these are defined, in Dutch, as *Raad van Bestuur*, and for German firms 'TMT' members are defined, in German, as members of the *Vorstand*. In those firms for which annual reports did not contain such delineation, we defined the 'TMT' as individuals with at least the rank of Vice President (Chairman, Vice Chairman, Chief Executive Officer, Chief Financial Officer, Chief Technology Officer, Chief Operating Officer, Executive Vice President, Senior Vice President) or individuals holding a board executive directorship. This operationalization is consistent with extant studies on TMTs (Lee & Park, 2008; Michel & Hambrick, 1992).

We used information on the country of origin of the top executives as stated in the BoardEx database. We then measured the degree of TMT nationality diversity as  $B = 1 - \sum s_i^2$ , where  $s_i$  is the share of the TMT executives with the  $i$ -th nationality in a firm in a given year. In the sample period we observe an upward trend in TMT nationality diversity with respect to nationality, consistent with prior evidence on the growing internationalization of TMTs (Van Veen & Marsman, 2008). This trend has been more pronounced in MNCs located in small, open economies in the EU, and the patterns indicate substantial diversity and dynamics in team composition.

**TMT social stratification.** In line with Hambrick, Humphrey, and Gupta (2015) we measure social stratification at the TMT level by standardizing and averaging two indicators based on the presence of different hierarchical rank titles in TMTs. The first indicator is a count of title gradations per TMT as explained above (e.g., Chief Executive Officer, Chief Financial Officer) in the TMT in each year. The second indicator of TMT social stratification is the presence of a COO reflecting an additional hierarchical level in the TMT.

**National power distance.** We use the Hofstede typology to measure cultural context. Despite its shortcomings, it remains the most influential typology in the organization sciences (Crossland & Hambrick, 2007; Taras, Kirkman, & Steel, 2010). Using this typology thus facilitates the comparability of findings and systematic knowledge building (see, e.g., the meta-analysis from Taras *et al.*, 2010). We use the country-specific score on NPD corresponding to the countries in which our focal firms have their headquarters. Since scores on German-speaking and French-speaking Switzerland differ significantly in terms of power distance, we assigned different scores to firms headquartered in these regions.

**Corporate entrepreneurship.** To construct this variable we first categorize each of the external knowledge-sourcing modes, that is, technology alliances, technology based M&As (M&As of target firms with patent activities) and CVC investments according to the geographic origin of the targets and by SIC industry (SDC and VentureExpert) or technology field (CATI

alliance data). We map these SIC codes and technology fields into standard technology fields based on a concordance between World Intellectual Property Office (WIPO) technology classes and industries. We then examine the distribution of each firm's investment targets and alliance partners across countries and technologies across the three technology sourcing modes. The CE variable is the number of unique technology-country-sourcing mode combinations in a given firm-year. On average, those firms that are engaged in CE are active in six unique technology-country-sourcing mode combinations, with a sample maximum of 59. When assessing the impact of CE on innovation we follow prior literature and take the CE activities during the prior three years—recognizing that these activities often last for a number of years and are likely to affect innovation performance during multiple years (e.g., Dushnitsky & Lavie, 2010; Lavie & Miller, 2008).

**Control variables.** Our analyses control for several other time-variant TMT-related demographic characteristics: TMT functional diversity, (international) work experience diversity, and tenure diversity. TMT functional diversity captures the degree to which top-level managers differ in terms of their functional expertise. Consistent with prior research on functional diversity (Talke, Salomo, & Kock, 2011; Talke *et al.*, 2010) we identified eight different functional categories: Finance and administration, sales and marketing, operations, human resources, legal, information technology, R&D, and a set of remaining functions. We classified each executive in one of the groups depending on his or her dominant specialization. We then computed a team-level measure of functional diversity by using a Blau index of heterogeneity using the formula explained above.

Prior TMT research has shown the importance of top executive experience gained abroad (e.g., Carpenter & Fredrickson, 2001). The Blau index of TMT diversity in international work experience (IWE) during the past five years captures the TMT's work experience diversity across countries. TMT tenure diversity is the standard deviation of the tenure of TMT members

(Barkema & Shvyrkov, 2007; Wiersema & Bantel, 1992). Finally, we controlled for 'TMT' size and TMT members' average age.

The analyses also control for firm-level time-variant variables expected to influence innovation performance. Firm size is included to control for potential resource scale and market power effects on innovation, measured as the logarithm of the number of firm employees. The value of R&D expenditures (in logarithm) is included to account for variations in inputs into the innovation process. The (lagged) patent propensity of the firm, measured as the ratio of the number of patents held by the firm to R&D expenditures, is included to control for firms' (changing) focus on innovation and patenting, which otherwise could be an important source of unobserved heterogeneity. Another set of control variables capture the firms' degree of product diversification, spread of international sales, and geographic spread of R&D activities. Geographic diversity of sales and product diversity of sales are Blau indices of geographic and product segmentation of a firm's sales across countries and products, respectively. Geographic diversity of R&D activities is the Blau index of the distribution of a firm's patent activities across countries, which we calculated using information on the country of location of inventors of the firms' patents.

Finally, all models include a set of industry and year dummy variables to account for the variation across industries and the unobserved changing macroeconomic conditions that may affect firms' incentives to innovate. We lag time-varying right-hand side variables by one year, with the exception of CE where a past three-year window is used. On average, we observe firms for 8.2 years, as we were not always able to find historical firm information on some of the variables. For all estimations, we use an unbalanced panel of 1,358 observations on the 165 firms from 1998 to 2007.

### **Analysis and methods**

Our core dependent variable, MNCs' innovation performance, measured by the number of patent applications of the firms in a given year, is a count variable. We therefore use panel count

models to relate innovation to CE. We found no systematic differences between coefficients on focal variables obtained from the random effects and those obtained from conditional fixed effects models, using the robust version of the Hausman. Since tests indicated significant overdispersion, we estimated random effects negative binomial models that allow for overdispersion and informative inference on time-invariant predictors such as NPD. Heterogeneity at the firm level is accommodated by random effects and several time-varying strategy-related variables. An extensive set of team-level variables controls for heterogeneity at the team level, while a set of industry dummies controls for industry-level heterogeneity in innovation outcomes.

In models in which CE is the dependent variable, we estimate zero-inflated Poisson models because we did not observe over-dispersion for the majority of the sample firms, and because the Vuong LR test rejected a Poisson model in favor of the zero inflated version of the model (4.73,  $p = 0.000$ ). Since the zero-inflated model itself does not control for unobservable between-firm heterogeneity, we follow an approach suggested by Blundell, Griffith, and Van Reenen (1999) and estimate a pseudo fixed effects version of the model. This method uses pre-sample information to construct a mean of the dependent variable, which then is included in the estimation alongside the other variables. In addition to controlling for firm-level heterogeneity, the pre-sample pseudo fixed effects estimator is attractive in that it does not require strict exogeneity of the explanatory variables, provides consistent estimates, and allows inference on time-invariant predictors. We use industry dummies to model firms' probability of engaging in CE (the inflation part of the model).

In order to test hypotheses 2a-2b and 3a-3b we estimate the CE and innovation models on different sub-samples: Low versus high social stratification and low versus high NPD. This approach generates the clearest insights into the chain of effects, from TMT diversity to CE to innovation, across different social stratification and power distance settings. Sub-sample analysis is also a more general specification than interaction effects models, as it does not put restrictions

on the coefficients of the other covariates and allows the influence of all variables to differ across the different NPD and social stratification settings. We use the median sample split and report results obtained from alternative splits in the supplementary analysis section.

## Findings

Table 1 provides descriptive statistics and pairwise correlations for the variables. TMTs are relatively international in composition: The mean number of nationalities in a TMT is about 4 with a standard deviation of 1.8. Correlations between variables are low to moderate in most cases. The mean variance inflation factor (VIF) for the variables used in the estimation is about 6, below the commonly used cut-off of 10.

-- Insert Table 1 about here --

The empirical results of the analyses testing our hypotheses are reported in Tables 2 and 3. In Table 2, estimation results are for the entire sample and focus on the average effects, while Table 3 presents results for the low and high social stratification and NPD sub-samples. We first discuss the results presented in Table 2. Model 1 and model 3 that have CE and innovation as dependent variables, respectively, include only control and moderator variables and serve as reference points. In both the CE and innovation models, R&D expenditures is positive and significant, as are product and geographic diversification. In model 3 with innovation as the dependent variable, the lagged patent stock scaled by firms' R&D has a positive and highly significant coefficient, while firm size is negative in the CE equation. Among the TMT control variables, international work experience diversity is positive and significant in both the CE and innovation models. Tenure diversity is negative and significant and TMT size and functional diversity are positive and significant in the CE model only.

-- Insert Table 2 about here --

Hypotheses 1a predicts a positive relationship between TMT nationality diversity and CE. When we add TMT nationality diversity in model 2, its coefficient is positive and significant ( $\beta = 0.691, p = 0.000$ ), in support of this hypothesis. The coefficients of the negative binomial and

Poisson models are semi-elasticities and inform about the proportional effects of changes in the independent variables. The coefficient on ND implies that a standard deviation change increases CE by 17.6 percent. Model 5 in Table 2 in turn shows that CE is positively related to firm innovation ( $\beta = 0.003, p = 0.001$ ), in support of hypothesis 1b. A standard deviation change in CE increases innovation performance by - a modest - 6.5 percent. At the same time, ND in addition has a direct significantly positive effect on innovation ( $\beta = 0.253, p = 0.011$ ).

To examine hypotheses 2a we estimated the CE model separately for the low and high social stratification sub-samples. The results are presented in Table 3 in columns (1) and (2). A Chow test ( $\chi^2 = 299.57, p = 0.000$ ) rejects the null hypothesis that the estimated coefficients in the two subsamples are equal, suggesting the appropriateness of the subsample estimation. Comparison of the results in models 1 and 2 shows that TMT nationality diversity has a significantly positive effect on CE in the low social stratification sub-sample ( $\beta = 0.905, p = 0.000$ ), while the coefficient is not significant in the high social stratification sub-sample ( $\beta = 0.130, p = 0.413$ ). The difference in the estimated coefficients is (marginally) statistically significant ( $\chi^2(1) = 3.436, p = 0.06$ ), in support of hypothesis 2a. The estimated coefficient implies that under low social stratification, a one standard deviation increase in TMT nationality diversity increases CE by 24.1 percent.

To test hypothesis 2b we estimated the CE model separately for the low and high NPD sub-samples. These results are presented in Table 3 in columns (3) and (4). The Chow test ( $\chi^2 = 348.16, p = 0.000$ ) again rejects the null hypothesis that the estimated coefficients in the subsamples are equal. Comparison of the results in models 3 and 4 reveals that TMT nationality diversity has a larger and significant effect on CE when NPD is low ( $\beta = 1.064, p = 0.000$ ), compared to the (insignificant) effect ( $\beta = 0.225, p = 0.108$ ), when it is high. The difference in the estimated coefficients is statistically significant ( $\chi^2(1) = 4.55, p = 0.03$ ) in support of



hypothesis 2b. When NPD is low, a one standard deviation increase in TMT nationality diversity increases corporate entrepreneurship by 27.1 percent.

Hypothesis 3a is tested by comparing the influence of CE on firm innovation in low and high social stratification sub-samples. The Chow test again indicates overall significant differences in coefficients between the subsamples ( $\chi^2 = 81.25, p = 0.000$ ). Results reported in models 6 and 8 show that the estimated coefficient of CE is larger and significant in model 6 when social stratification is low ( $\beta = 0.006, p = 0.000$ ), compared to the (insignificant) coefficient in model 8 when social stratification is high ( $\beta = -0.001, p = 0.440$ ). The difference in the estimated coefficients is statistically significant ( $\chi^2(1) = 3.838, p = 0.05$ ) in support of Hypothesis 3a. A standard deviation increase in CE when social stratification is low increases firm innovation on average by 10.2 percent.

Finally, in support of Hypothesis 3b, the estimated coefficient of CE is larger and significant when NPD is low in model 10 ( $\beta = 0.009, p = 0.000$ ), compared to the (insignificant) estimated coefficient in model 12 when it is high ( $\beta = 0.001, p = 0.372$ ). The difference in the estimated coefficients is statistically significant ( $\chi^2(1) = 3.872, p = 0.049$ ). A standard deviation increase in CE when NPD is low increases innovation by 13.0 percent. Again, the Chow test also indicates overall significant differences in coefficients between the two NPD sub-samples ( $\chi^2 = 196.12, p = 0.000$ ).

It is salient to observe that in the split sample models that allow for heterogeneous effects of all TMT and other control variables, TMT nationality diversity no longer has a significant direct effect on innovation (i.e., if we compare model 4 in Table 2 with models 6 and 10 in Table 3). Hence, the relationship between TMT nationality diversity and innovation performance only plays out in low social stratification and low NPD environments and it does so by spurring CE initiatives.

-- Insert Table 3 about here --

### **Robustness and supplementary analysis**

To test the robustness of our findings we considered a number of alternative specifications of our model. When using forward citation-weighted patents as the dependent variable to account for potential heterogeneity in the quality of patents, we found consistent results with those reported in Table 3. We also used an alternative definition of low versus high social stratification and NPD sub-samples—by splitting the sample at the sample mean values. These analyses produced more unevenly populated sub-groups but the results were close to those in the original specification. As an alternative to the Blau index, we used an entropy measure to operationalize nationality diversity, which, again, did not alter our findings. We also found that the results obtained from running HGLM-multilevel random effects models were very similar to those reported here. We did not find evidence that reverse causality is a concern in the context of our analysis: neither prior innovation performance nor prior CE or NPD had a significant effect on TMT nationality diversity.

We examined whether social stratification and NPD are re-enforcing or weakening each other's influence. We estimated four models by splitting each sub-sample into two groups, resulting in four sub-samples: low social stratification and low NPD; high stratification and high NPD; and two mixed cases when one is low and the other is high. Consistent with our conceptual framework and theory that NPD and social stratification attenuate the relationship between TMT nationality diversity, CE, and firm innovation, the coefficients of ND (in the CE models) and of CE (in the innovation models) had the largest size and strongest significance when both social stratification and NPD were low. The pattern of coefficients was consistent with the moderating effects of NPD and social stratification reinforcing each other in the innovation models, while partially substituting for each other in the CE models. The latter may be related to the notion that social stratification configurations are influenced by the firm's NPD environment, as they fit the broader societal values shared in their institutional environment (e.g., Li & Harrison, 2008).

We also conducted supplementary analysis to examine whether our arguments on power distance were more broadly consistent with stylized patterns in the data. The equality of means *t*-test confirmed that the geographic diversity of R&D activities—as an indicator of decentralized organizational structure—was significantly greater for MNCs based in low NPD environments ( $t = 2.8, p < 0.01$ ), although a similar significant mean difference was not observed for TMTs with low and high social stratification. We also examined whether TMT turnover rates are higher under high TMT social stratification in combination with TMT nationality diversity, consistent with the notion that such TMTs are more likely to experience internal friction. Results of a regression of average TMT tenure on TMT social stratification and its interaction with nationality diversity indeed showed a significantly shorter tenure in nationality diverse TMTs with high social stratification, in support of our argument.

## **DISCUSSION**

To meet the challenges of a globalizing, dynamic world, MNCs place a premium on adaptation, learning and innovation. Given the central role that TMTs play in steering and organizing innovation across the globe, MNCs have increasingly staffed their TMTs with executives holding different nationalities. The underlying assumption here is that TMT nationality diversity benefits MNC innovation. This relationship, however, and the question of *when* and *why* this relationship exists, has received limited scholarly attention. To make progress in this direction, we integrated insights from upper echelon theory and the literature on MNC and innovation in order to develop and test a framework explaining *when* and *why* nationality diversity affects corporate entrepreneurship (CE), and through this, the innovation performance of MNCs.

The pattern of findings can be summarized as follows. First, TMT nationality diversity enhances CE, as witnessed by the geographical and technological diversity of technology-based M&As, technology alliances, and corporate venturing initiatives. These CE initiatives provide MNCs access to globally dispersed knowledge, emergent technologies, and specialized expertise, which ultimately increases MNC innovation. Second, we find that these relationships are

attenuated by two important sources of inequality. Specifically, the positive chain from TMT nationality diversity to CE and innovation only materializes when social stratification at the TMT-level and national power distance at the MNC home-country level are low. The fact that our findings are conditional upon the presence of low inequality suggests that TMT nationality diversity can only spur CE when TMTs act as “real teams”. In such circumstances, the variety of nationalities is likely to result in true geocentric leadership that facilitates the deployment of global external knowledge sourcing initiatives. It also suggests that in order to reap the potential innovation benefits of external knowledge sourcing initiatives, MNC-level structures and processes have to be put in place that allow MNCs to operate as decentralized networks. Taken together, the pattern of findings suggest that TMT nationality diversity, provided that inequality is low, plays an important role in the performance of modern, heterarchy-like adaptive MNCs with high innovation potential (Blomkvist *et al.*, 2017; Hedlund, 1986).

### **Contributions and implications**

Our study contributes to upper echelon and strategic management research by highlighting how status and power dynamics affect the impact of TMT nationality diversity on CE and innovation across different country contexts. An important finding is that TMT nationality diversity does not have a unitary effect on CE and innovation, but that its impact depends on inequality in social relationships both at the team- and country-level. Although the important role of inequality has been stressed by several theorists (Blau, 1977; Harrison & Klein, 2007), little attention has been given to inequality in TMT research (see Bunderson & Van der Vegt, 2018). Upper echelons theorists might find this insight especially relevant, as it may help explain some of the inconsistent implications of TMT heterogeneity identified in the literature (Hambrick *et al.*, 2015). In contrast with prior research on vertical differentiation, we study inequality across two levels (i.e., team and country)—we find inequality in the team (i.e., vertical differentiation) and in the country (i.e., national power distance) to severely limit the innovation potential of diverse

TMTs. The complex interplay between these two dimensions of (in)equality merits further attention in future research.

A second contribution is that the large-scale cross-country design of our study allowed us to put cultural context back into the picture of TMT composition effects. The importance of national systems in affecting a CEO's managerial discretion has been studied before (Crossland & Hambrick, 2007, 2011). However, the question of how this national context moderates the influence of TMT composition has not received substantive attention in the literature, despite recent calls of scholars to bring the macro-context back into the “decontextualized” TMT research (Hambrick, 2007; Nielsen & Nielsen, 2013; Yamak *et al.*, 2014). Our findings reveal that the home country in which MNCs are located strongly affects whether and how the impact of TMT nationality diversity unfolds. We find TMT diversity to spur CE and innovation only in low NPD environments—a finding of substantial theoretical importance as it suggests that an upper echelons perspective might be complete only when accounting for the larger institutional context. This finding also suggests that when sampling across countries, TMT heterogeneity scholars should seek to control for country differences or—better—model these differences in more substantial ways to reflect the fact that consequences of TMT heterogeneity are likely to differ across countries. Together, our findings highlight the crucial role of inequality for our understanding of the effects of TMT heterogeneity—future studies on TMT diversity, firm behavior, and performance should thus aim to integrate the role of inequality.

Finally, our findings also underscore the important role of TMTs in spurring CE in MNCs. Although scholars have started to investigate the link between TMT composition and CE (Heavey & Simsek, 2013), we are not aware of prior work studying this relationship in large MNCs, and with focus on TMT nationality diversity and inequality. Our findings reveal that when vertical differentiation and national power distance is low, heterogeneity in external knowledge sourcing strategies might be one important CE dimension through which TMTs affect the innovation capacity of MNCs. By revealing the important role of TMTs in spurring

CE, we were able to dig deeper into “why” TMT nationality diversity might facilitate innovation. By doing so, we contribute to opening the black box of upper echelon’s strategic decision-making in large firms, and to the broader MNC literature that has often emphasized, but seldom systematically studied, the important role of corporate headquarters and TMT composition in the strategic management of modern MNCs.

### **Limitations and future research**

Our study is not without limitations. First, we could only partially open the “black box” of the relationship between TMT nationality diversity and firm innovation. Specifically, we zoomed in on how TMTs shape an important dimension of CE, that is, variety in external knowledge sourcing strategies. However, TMTs might affect innovation in MNCs in other complementary ways, such as by cultivating high-quality work relationships (Caridi-Zahavi, Carmeli, & Arazy, 2016) or by fostering an opportunity-seeking approach to markets and technology development (Talke *et al.*, 2011). Other, more indirect, mechanisms that TMTs can leverage to induce and steer firm innovation include goal-setting, changing the incentive structure, and investing in failure-tolerant firm cultures (see Wu, Levitas, & Priem, 2005). It thus seems promising to conduct additional research on how exactly TMT nationality diversity, status differences, and national culture affect TMT functioning and innovation performance (e.g., by using surveys or case studies).

Second, because we were interested in linking demography and status differences at multiple levels we focused on national power distance, which provides a natural starting point for this investigation. However, this is only one of the many dimensions that characterize a country’s culture. Given our promising results, we encourage future studies to examine how other dimensions of national culture and business systems might affect TMT functioning in MNCs and the organizational implications thereof. One relevant other dimension that may affect the functioning of TMTs is individualism versus collectivism because it influences whether TMT

decisions are taken in a more consensus-oriented or unilateral fashion (Crossland & Hambrick, 2007).

Third, although we performed a large-scale study with carefully compiled secondary data in a multi-country, multi-industry setting, our sample of MNCs is unbalanced with respect to the different countries and only includes the largest players in the European market in their respective industries. This implies that our findings might only apply to market leaders, and may not be generalizable to, for instance, smaller firms. The use of large-scale secondary data also does not allow investigating micro-level mechanisms through which TMTs influence innovation by, for instance, their linkages with middle management and R&D departments.

Finally, as is the case with most upper echelons studies, we cannot definitively exclude the possibility of reverse causality, that is, that innovation performance of MNCs also affects the composition of TMTs. We minimized this possibility by lagging all independent variables to ensure a proper time ordering, and by controlling for the MNC's past patent application propensity. Regression of TMT nationality diversity on past patents and CE, furthermore, did not indicate reverse causality concerns, and it is not obvious how a reverse causality logic could explain the complex interactions between TMT nationality diversity, social stratification and NPD. We do see research into the drivers of TMT nationality diversity in the context of multinational firms as a promising avenue for future research, and our study underscores the broad potential of research into the important, but still relatively uncharted domain of the consequences of TMT composition across various national and firm contexts.

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**TABLE 1. Descriptive statistics and pairwise correlations**

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Patents	186.03	330.59															
2. Firm size	10.59	1.35	0.43														
3. R&D	5.40	2.15	0.54	0.71													
4. Patents/R&D	0.40	1.75	-0.01	-0.13	-0.23												
5. Geographic diversity sales	0.62	0.16	0.06	0.01	0.06	-0.01											
6. Product diversity sales	0.55	0.24	0.18	0.14	0.09	0.01	0.08										
7. Geographic diversity R&D	0.62	0.34	0.34	0.19	0.31	0.01	-0.03	0.11									
8. TMT size	11.36	10.67	0.33	0.33	0.41	-0.04	0.03	0.14	0.20								
9. Average age TMT	51.08	4.35	0.06	0.15	0.07	-0.02	0.04	-0.02	0.07	-0.20							
10. Tenure diversity TMT	4.42	3.54	-0.09	0.08	-0.04	-0.02	0.05	-0.09	0.04	0.08	0.14						
11. IWE diversity TMT	0.47	0.24	0.07	0.16	0.04	0.00	0.21	0.01	0.03	-0.08	0.00	-0.00					
12. Functional diversity TMT	0.62	0.19	0.05	0.17	0.19	-0.02	0.02	-0.04	0.05	0.33	-0.19	-0.05	0.03				
13. Nationality diversity TMT	0.30	0.26	0.12	0.12	0.11	-0.01	0.11	-0.02	0.16	0.13	-0.07	-0.07	0.54	0.14			
14. Social stratification TMT	0.00	1.00	0.08	0.17	0.21	-0.06	0.04	0.10	0.11	0.44	-0.26	-0.05	0.00	0.24	0.12		
15. National power distance	42.56	13.13	0.01	0.18	0.10	0.00	-0.01	0.05	-0.05	0.46	0.04	-0.07	0.07	-0.20	-0.09	0.07	
16. Corporate entrepreneurship	3.29	6.63	0.45	0.32	0.49	-0.05	0.03	0.13	0.26	0.46	-0.07	-0.07	0.02	0.15	0.14	0.19	-0.03

*Note.* Correlations based on 1,358 observations for 165 firms. Correlations greater than  $|\text{.05}|$  are statistically significant at an alpha level of .05, and correlations greater than  $|\text{.08}|$  are statistically significant at an alpha level of .01.

**TABLE 2. TMT nationality diversity, corporate entrepreneurship and innovation**

Dependent variable Model	Corporate entrepreneurship		Firm innovation (patents)		
	(1)	(2)	(3)	(4)	(5)
Firm size	-0.347 (0.000)	-0.346 (0.000)	0.024 (0.521)	0.014 (0.703)	0.018 (0.638)
R&D	0.619 (0.000)	0.612 (0.000)	0.235 (0.000)	0.237 (0.000)	0.211 (0.000)
Patents/R&D	0.016 (0.792)	0.033 (0.512)	0.049 (0.000)	0.050 (0.000)	0.047 (0.000)
Geographic diversity sales	0.038 (0.772)	0.008 (0.955)	0.173 (0.157)	0.192 (0.118)	0.190 (0.120)
Product diversity sales	0.526 (0.000)	0.581 (0.000)	0.467 (0.000)	0.444 (0.000)	0.499 (0.000)
Geographic diversity R&D	0.412 (0.000)	0.361 (0.000)	0.289 (0.000)	0.268 (0.001)	0.263 (0.001)
TMT size	0.007 (0.000)	0.005 (0.000)	0.003 (0.151)	0.003 (0.205)	0.003 (0.261)
Average age TMT	0.004 (0.432)	0.007 (0.110)	-0.002 (0.725)	-0.000 (0.939)	0.000 (0.928)
Tenure diversity TMT	-0.037 (0.000)	-0.028 (0.000)	-0.009 (0.196)	-0.008 (0.228)	-0.008 (0.200)
IWE diversity TMT	0.904 (0.000)	0.402 (0.001)	0.291 (0.011)	0.212 (0.074)	0.219 (0.064)
Functional diversity TMT	0.487 (0.000)	0.432 (0.001)	0.038 (0.757)	0.038 (0.761)	0.009 (0.944)
Social stratification TMT	0.106 (0.000)	0.114 (0.000)	-0.074 (0.002)	-0.079 (0.001)	-0.087 (0.000)
National power distance	0.004 (0.011)	0.005 (0.002)	0.013 (0.006)	0.013 (0.006)	0.012 (0.013)
Nationality diversity TMT		<b>0.691</b> <b>(0.000)</b>		0.236 (0.018)	0.253 (0.011)
Corporate entrepreneurship					<b>0.003</b> <b>(0.001)</b>
Wald test of model significance	3,336.07 (0.000)	3,387.35 (0.000)	393.45 (0.000)	402.19 (0.000)	420.29 (0.000)
$\chi^2(1)$ test of improved model fit		51.28 (0.000)		5.63 (0.018)	11.03 (0.001)

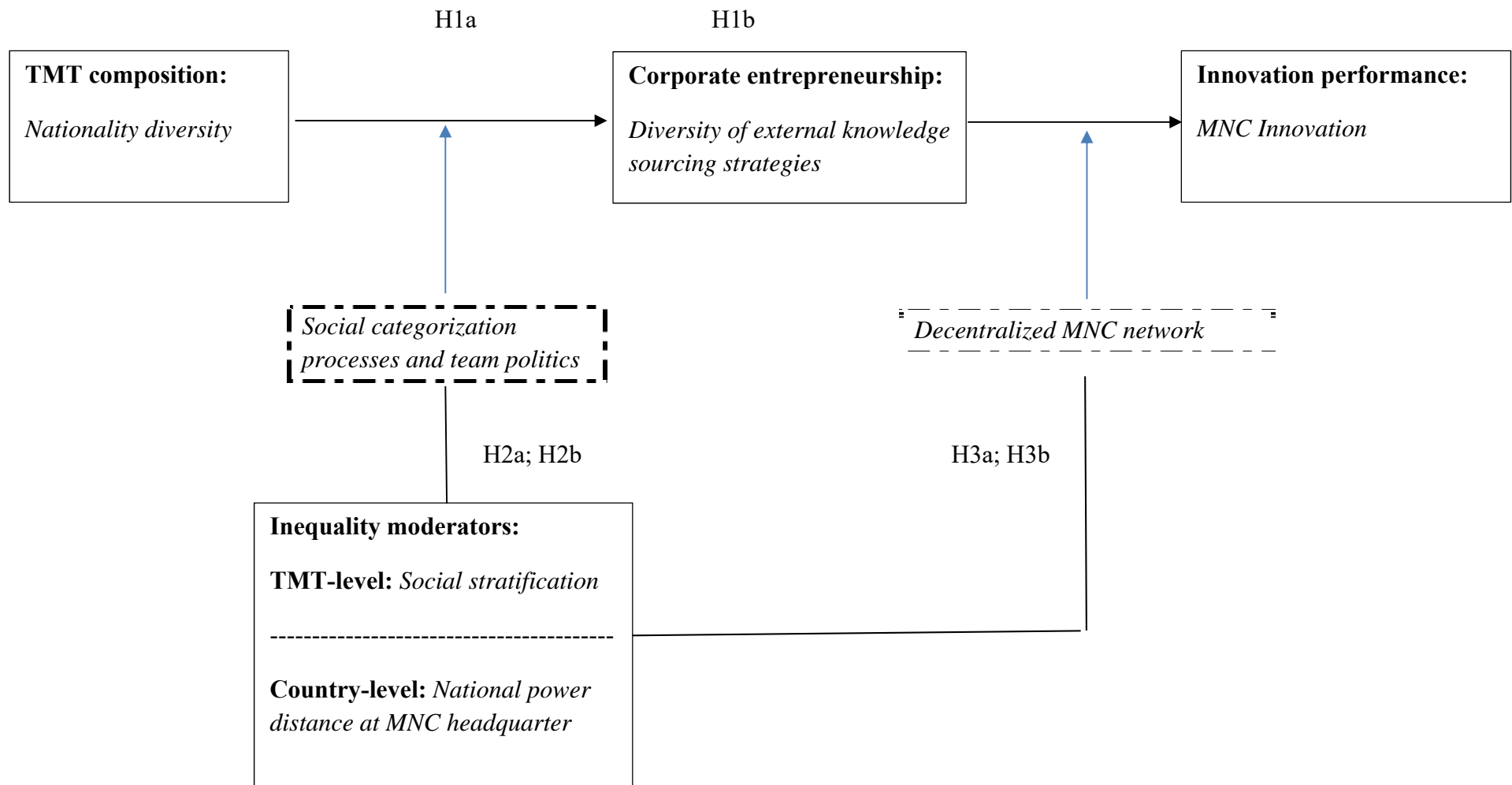
*Note.* P-values in parentheses. All models are estimated on a sample of 1,358 observations for 165 firms and include a constant, time and industry dummies. The CE model is zero-inflated Poisson; the innovation model random effects negative binomial. The CE models include pseudo fixed effects, which are the pre-sample means of the dependent variable. The  $\chi^2$  test statistic is the likelihood-ratio test comparing the focal model with the more parsimonious model. Hypotheses testing variables in bold.

**TABLE 3. TMT nationality diversity, corporate entrepreneurship and innovation: Sub-sample analyses**

	Corporate entrepreneurship				Innovation							
	(1) Low SS	(2) High SS	(3) Low PD	(4) High PD	(5) Low SS	(6) Low SS	(7) High SS	(8) High SS	(9) Low PD	(10) Low PD	(11) High PD	(12) High PD
Firm size	-0.282 (0.000)	-0.456 (0.000)	-0.393 (0.000)	-0.361 (0.000)	-0.022 (0.631)	-0.023 (0.611)	-0.022 (0.764)	-0.022 (0.766)	-0.076 (0.194)	-0.092 (0.103)	0.144 (0.009)	0.147 (0.008)
R&D	0.562 (0.000)	0.779 (0.000)	0.592 (0.000)	0.781 (0.000)	0.405 (0.000)	0.373 (0.000)	0.461 (0.000)	0.474 (0.000)	0.388 (0.000)	0.370 (0.000)	0.173 (0.001)	0.159 (0.004)
Patents/R&D	0.030 (0.531)	0.255 (0.037)	-0.238 (0.074)	0.418 (0.000)	0.059 (0.000)	0.056 (0.000)	0.719 (0.000)	0.721 (0.000)	0.166 (0.000)	0.159 (0.000)	0.027 (0.022)	0.026 (0.028)
Geographic diversity sales	-0.044 (0.815)	0.195 (0.387)	-0.156 (0.510)	0.895 (0.000)	0.238 (0.098)	0.265 (0.065)	0.210 (0.328)	0.219 (0.308)	0.213 (0.257)	0.185 (0.311)	0.272 (0.107)	0.263 (0.119)
Product diversity sales	0.714 (0.000)	0.822 (0.000)	0.613 (0.000)	0.927 (0.000)	0.270 (0.084)	0.246 (0.109)	0.493 (0.001)	0.482 (0.002)	0.265 (0.094)	0.186 (0.242)	0.499 (0.000)	0.517 (0.000)
Geographic diversity R&D	0.436 (0.005)	-0.035 (0.784)	0.614 (0.001)	0.034 (0.762)	0.124 (0.182)	0.146 (0.117)	0.625 (0.000)	0.628 (0.000)	-0.099 (0.385)	-0.084 (0.464)	0.668 (0.000)	0.665 (0.000)
TMT size	-0.002 (0.570)	0.010 (0.000)	0.004 (0.339)	0.003 (0.009)	-0.002 (0.650)	0.001 (0.888)	-0.001 (0.614)	-0.002 (0.586)	0.010 (0.069)	0.013 (0.005)	0.001 (0.838)	0.001 (0.826)
Average age TMT	0.023 (0.000)	-0.020 (0.016)	0.003 (0.778)	0.013 (0.042)	-0.012 (0.028)	-0.011 (0.054)	0.001 (0.948)	0.000 (0.962)	-0.007 (0.295)	-0.011 (0.095)	-0.001 (0.838)	-0.001 (0.895)
Tenure diversity TMT	-0.023 (0.001)	-0.061 (0.000)	-0.118 (0.000)	-0.017 (0.022)	-0.005 (0.455)	-0.006 (0.370)	0.017 (0.371)	0.016 (0.379)	0.012 (0.291)	0.008 (0.463)	-0.009 (0.262)	-0.009 (0.276)
IWE diversity TMT	0.582 (0.001)	0.083 (0.668)	0.331 (0.162)	0.504 (0.002)	0.317 (0.028)	0.312 (0.026)	-0.071 (0.758)	-0.067 (0.770)	0.444 (0.014)	0.435 (0.012)	-0.046 (0.758)	-0.055 (0.714)
Functional diversity TMT	0.509 (0.003)	0.960 (0.000)	-0.842 (0.000)	1.422 (0.000)	0.035 (0.790)	0.020 (0.872)	-0.071 (0.782)	-0.042 (0.871)	-0.281 (0.084)	-0.253 (0.103)	0.283 (0.084)	0.272 (0.097)
Social stratification TMT	0.394 (0.000)	0.205 (0.000)	-0.101 (0.014)	0.179 (0.000)	-0.100 (0.213)	-0.091 (0.242)	-0.176 (0.000)	-0.178 (0.000)	-0.168 (0.000)	-0.146 (0.000)	-0.035 (0.227)	-0.041 (0.169)
National power distance	-0.002 (0.448)	0.020 (0.000)	-0.033 (0.002)	0.006 (0.028)	0.008 (0.165)	0.008 (0.182)	0.019 (0.004)	0.019 (0.004)	-0.019 (0.236)	-0.020 (0.207)	0.024 (0.010)	0.024 (0.009)
Nationality diversity TMT	<b>0.905</b> <b>(0.000)</b>	<b>0.130</b> <b>(0.413)</b>	<b>1.064</b> <b>(0.000)</b>	<b>0.225</b> <b>(0.108)</b>	0.105 (0.371)	0.120 (0.285)	0.194 (0.290)	0.189 (0.299)	0.318 (0.034)	0.219 (0.122)	0.036 (0.780)	0.042 (0.747)
Corporate entrepreneurship						<b>0.006</b> <b>(0.000)</b>		<b>-0.001</b> <b>(0.440)</b>		<b>0.009</b> <b>(0.000)</b>		<b>0.001</b> <b>(0.372)</b>
Number of firms	123	92	82	83	123	123	92	92	82	82	83	83
Number of observations	790	568	662	696	790	790	568	568	662	662	696	696
Wald test of model	1,852.6 (0.000)	1,848.0 (0.000)	1,505.8 (0.000)	2,267.0 (0.000)	299.2 (0.000)	342.6 (0.000)	409.6 (0.000)	411.2 (0.000)	352.7 (0.000)	435.3 (0.000)	283.4 (0.000)	285.4 (0.000)

Note. P-values in parentheses. All models include a constant, time and industry dummies. The CE model is zero-inflated Poisson; the innovation model random effects negative binomial. The CE models include pseudo fixed effects, which are the pre-sample means of the dependent variable. Hypotheses testing variables in bold. A median split is used in all models. The number of observations is not equal across sub-samples due to the non-continuous nature of the focal moderator variable.





**FIGURE 1: Conceptual model**

*Note: The boxes with dashed lines represent the unmeasured, assumed underlying mechanisms of the moderation effects*

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