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Research paper

# The role of top management teams' functional background diversity in firms' coopetitive behavior

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ABSTRACT

Since the proliferation of coopetition among prominent business players, inter-firm coopetition has gained increasing academic and public attention. Yet aspects on the management and team levels remain underexplored—despite the advancements in coopetition research. This study focuses on top management teams (TMTs) as pivotal players in firms' strategic decisions, particularly in the context of coopetition. We posit that TMT functional background diversity positively influences inter-firm coopetition, fostering the intensity of competition and cooperation in inter-firm coopetition. Using a dataset of 1698 alliances among 334 that were listed at least once in the Standard and Poor's 500 index (S&P 500) from 2005 to 2020, our findings reveal that TMT functional background diversity promotes inter-firm coopetition. Further, we highlight the positive association between TMT functional background diversity and competitive intensity in coopetition while elucidating the surprisingly negative effect of TMT functional background diversity on cooperation intensity in coopetition. This study enriches our understanding of coopetition dynamics and emphasizes the crucial role of TMTs functional backgroud diversity in shaping these strategic inter-firm relationships, therefore offering valuable insights for theory and practice.

## 1. Introduction

Inter-firm coopetition, the simultaneous occurrence of competition and cooperation among rivaling firms, has garnered significant attention in both academic research and the business world (e.g., Bengtsson & Raza-Ullah, 2016; Gernsheimer, Kanbach, & Gast, 2021; Raza-Ullah, Bengtsson, & Kock, 2014). With a rich history and prominent case studies, such as the collaboration between Apple and Samsung to create value in the fiercely competitive smartphone market (Brandenburger & Nalebuff, 2021), coopetition has become a central phenomenon in strategic management discussions (e.g., Bengtsson & Raza-Ullah, 2016; Corbo et al., 2023; Gernsheimer et al., 2021). This extensive attention is not surprising, given the manifold benefits attributed to coopetition, including cost-sharing, increased customer value, and enhanced innovation (e.g., Estrada, Faems, & Faria, 2016; Le Roy & Fernandez, 2015; Ritala & Sainio, 2014). However, firms must contend with the paradoxical nature of coopetition, necessitating the development of various strategic options and timely, informed decision-making to manage effectively the conflicting dynamics inherent in coopetition (Bengtsson & Raza-Ullah, 2016; Raza-Ullah & Eriksson, 2017). In line with this, recent research has underscored the pivotal role played by top management team (TMT) members in shaping a firm's coopetition capability and alliance behavior (Bengtsson, Raza-Ullah, & Srivastava, 2020; Roberson, Holmes, & Perry, 2017). Therefore, our study sheds light on this phenomenon and endeavors to address two noteworthy gaps in current research.

First, prior studies on TMTs have yielded valuable insights into the importance of the TMT for alliances (Roberson et al., 2017) and TMT's functional diversity in enhancing a firm's coopetitive capability (Bengtsson et al., 2020). Except for these contributions (Bengtsson et al., 2020; Roberson et al., 2017), the majority of works still ignore the team-level perspective as a potential antecedent of coopetitive behavior. Furthermore, the question of whether and how TMT functional background diversity—i.e., the degree of variation among TMT members' professional expertise (e.g, Cannella, Park, & Lee, 2008)—influences the occurrence of coopetition remains unanswered (e.g., Bengtsson et al., 2020). This is surprising, considering calls for a more nuanced examination of the precursors to coopetition (e.g., Dagnino & Minà, 2021; Gernsheimer et al., 2021; Letcher, Villiers Scheepers, & Graham, 2022) and TMT research highlights the immense influence of the TMT on firm-

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related decisions and outcomes (e.g., Eisenhardt, 1989).

Second, despite the recognition of various coopetition types and the call to differentiate between explicit and implicit cooperation within the coopetition domain (Czakon, Srivastava, Le Roy, & Gnyawali, 2020; Hoffmann, Lavie, Reuer, & Shipilov, 2018), the existing literature predominantly fixates on the general prevalence of coopetition. Such a limited focus leaves a substantial lack of research investigating the nuanced aspects and implications of the diverse forms coopetition can take, varying intensity of competition and cooperation among them (Greven, Fischer-Kreer, Müller, & Brettel, 2022). The complexities within coopetition dynamics can result in varying degrees of both competition and cooperation; this, in turn, may result in varied balances within coopetition that affect organizational structures, process configurations, and outcomes (Park, Srivastava, & Gnyawali, 2014). Hence, more focused research is required to unravel the mechanisms underlying coopetition dynamics.

This study aims to bridge the existing gaps in our understanding of coopetition by infusing two bodies of literature: inter-firm coopetition and TMT research. We question whether functional background diversity may serve to approach the paradoxical nature of coopetition effectively (Bengtsson & Raza-Ullah, 2016; Raza-Ullah & Eriksson, 2017). In addition, to investigate coopetition and understand its nuances, we consider the occurrence of coopetition and, simultaneously, the intensity of competition and cooperation in coopetition (Greven et al., 2022). Hence, we address the following research questions: (1) How does TMT functional background diversity influence the intensity of competition in coopetition? (2) Does TMT functional background diversity foster the occurrence of inter-firm coopetition? (3) How does TMT functional background diversity impact the intensity of cooperation in coopetition?

We theorize that TMT functional background diversity will be positively associated with the occurrence of inter-firm coopetition. This type of diversity stands out from other diversity constructs due to its specific focus on the varied professional experiences and expertise within the team (Harrison, Price, & Bell, 1998; Milliken & Martins, 1996). Unlike other types of diversity, such as demographic diversity regarding individuals' inherent characteristics (e.g., gender, age, ethnicity), functional background diversity concerns the array of skills, knowledge, and experiences derived from different functional areas within an organization (e.g., Harrison et al., 1998). Since the TMTs decision-making reflects the TMT members' cognitions and knowledge (e.g., Eisenhardt, 1989; Hambrick, 2007), we understand functional background diversity, encompassing differences in work experience and education, as most relevant to the scope of our study. We posit that TMT functional background diversity will promote competition intensity in coopetition and cooperation intensity in coopetition.

We tested our hypotheses in the context of large U.S. firms and used a multi-source, cross-industry dataset of 1698 alliances entered by 334 firms listed in the Standard and Poor's (S&P) 500 Index between 2005 and 2020. In line with prior works conceptualizing coopetition as broad or narrow depending on the scope of analysis (e.g., Afuah, 2004; Bengtsson et al., 2020; Gnyawali, He, Madhavan, & Ravindranath, 2006), this study discusses coopetition from the broader angle, hence acknowledging that a single company may engage in numerous collaborative interactions with rivals, suppliers, customers, and various other entities which are part of the S&P 500. Along with our conjectures, we find evidence for a positive association between TMT functional background diversity and the intensity of competition in inter-firm coopetition. Further, our findings confirm the theorized positive relationship between TMT functional background diversity and the occurrence of inter-firm coopetition. Our findings do not support our third hypothesized relationship, which postulated a positive relationship between TMT functional background diversity and the intensity of cooperation in coopetition. On the contrary, our results reveal that TMT functional background diversity is negatively associated with the intensity of cooperation in inter-firm coopetition.

Our study makes two main contributions at the intersection between TMT and coopetition literature. First, we build upon prior research that established a link between TMT diversity rooted in deep-level attributes and coopetition capabilities by validating the actual occurrence of coopetition (Bengtsson et al., 2020). In doing so, we narrow the focus on team-level functional background diversity, enriching the microfoundations perspective of coopetition. Specifically, this exploration accentuates the role of managerial cognition mirrored in TMT functional background diversity, emphasizing its criticality in fostering organizational-level capabilities (e.g., Felin, Foss, & Ployhart, 2015; Gavetti & Rivkin, 2007; Laamanen & Wallin, 2009). Our study extends the majority of previous research by shifting the focus from the individual manager's perspective to a more comprehensive understanding of how TMTs operate within inter-firm coopetition (Gernsheimer et al., 2021). Furthermore, our findings enhance the exploration of why companies choose to engage in coopetition (Crick & Crick, 2021), offering a nuanced understanding of the precursors to coopetition (Czakon, Klimas, & Mariani, 2020; Gernsheimer et al., 2021).

Second, our study extends prior research, which primarily focuses on the occurrence of coopetition as an outcome, by embracing a more holistic approach that not only considers the occurrence of coopetition but also delves into the nuances of the intensity of cooperation and competition within coopetition (Greven et al., 2022). This expansion offers a nuanced perspective on the multiple facets of coopetition, responding to the call to comprehend the diverse manifestations of this complex interplay (Czakon, Klimas, & Mariani, 2020). In particular, our intended contribution aims to pivot research toward considering the facets of intensity of cooperation and competition within coopetition, thereby unraveling the complexities of this phenomenon more accurately.

Third, we contribute to TMT literature by addressing the appeal to investigate diversity-capability relationships (Roberson et al., 2017). While prior TMT research has primarily focused on the relationships between TMT diversity and performance outcomes (Horwitz & Horwitz, 2007; Roberson et al., 2017), we expand this perspective and demonstrate that TMT diversity unfolds coopetition-enhancing mechanisms. Thus, coopetition might act as an intermediary mechanism through which diversity potentially affects firm performance. Hence, we offer novel avenues for future studies to develop an understanding of team-level antecedents and their implications for coopetition. Our results show that it is crucial for businesses to grasp how TMT diversity affects both competition and cooperation, thereby deriving valuable insights for practice. Specifically, for firms to navigate these complexities effectively, we highlight how important it is to consider TMT member composition, manage functional differences among TMT members (e.g., through workshops), clarify and align expectations among firms, and build stronger trustful relationships.

## 2. Theoretical background and derivation of hypotheses

### 2.1. TMT functional background

In line with the definition stated in the introduction, TMT functional background diversity refers to the extent of differentiation among TMT members in terms of their professional backgrounds (Cannella et al., 2008). Concretely, we can distinguish between the two dimensions of intra- and interpersonal TMT functional background diversity (Cannella et al., 2008). While intrapersonal functional background diversity reflects the within-member breadth of functional experience, interpersonal functional background diversity describes the team-level heterogeneity in the functional areas in which each TMT member has served (Bunderson & Sutcliffe, 2002). In line with prior coopetition research, we deem the interpersonal, team-level functional background diversity most relevant to our study (Bengtsson et al., 2020). This is based on the perspective that inter-firm coopetition decisions are the result of the TMT as a whole in all its diversity rather than reflecting a

mere accumulation of members' individual characteristics (Carpenter, Geletkanycz, & Sanders, 2004).

Previous research indicates that individuals' backgrounds can significantly influence their experience, skills, cognitive frameworks, and strategic choices (Stam & Elfring, 2008). This effect manifests in a broader spectrum of perspectives and expertise (Simons, Pelled, & Smith, 1999), amplifies individuals' access to information by expanding their social networks (Ancona & Caldwell, 2012), and encourages them to consider a wider array of options and viewpoints when making strategic decisions (Certo, Lester, Dalton, & Dalton, 2006). More specifically, a TMT's diverse pool of expertise and knowledge with its complementary viewpoints and skills enhances TMT strategic decision-making, thereby promoting overall corporate performance (A. Smith, Houghton, Hood, & Ryman, 2006). Earlier research shows that TMT functional background diversity is positively associated with firm performance (Buyl, Boone, Hendriks, & Matthyssens, 2011; Cannella et al., 2008), strategic innovation (Barkema & Shvyrkov, 2007; Li, 2017), and strategic decision-making (Finkelstein & Hambrick, 1996). TMT members' characteristics, such as cognitions and beliefs, shape firms' strategic decisions, hence may largely determining the nature of firms' strategic coopetition. Indeed, previously acknowledged as being "at the forefront of managing coopetitive relationships" (Bengtsson et al., 2020, p. 6), firms' TMTs are key to analyzing the occurrence of inter-firm coopetition and the intensities of competition and cooperation. With their individual attributes and engagement in team-level interactions, TMT members represent a pivotal managerial factor in firms' behavior. Specifically, they play a particularly notable role in balancing cooperation and competition in coopetition (e.g. Roberson et al., 2017). Bengtsson et al. (2020) also show that TMT functional background diversity augments a firm's coopetitive capability. Prior works, however, did not investigate whether TMT functional background diversity serves as a potential precursor to actual coopetitive behavior.

### 2.2. The importance of TMT functional background diversity and the paradox lens of inter-firm coopetition

Coopetition, which is defined as "simultaneous competition and cooperation among firms with value creation intent" (Gnyawali & Ryan Charleton, 2018, p. 2512), has been investigated through multiple theoretical lenses, such as the resource-based view, game theory, and network theory (Bengtsson & Kock, 2014). By integrating and reconciling the different facets of these theories, a comprehensive framework for understanding coopetition has been established (Gnyawali & Ryan Charleton, 2018). However, while there is still no unanimously agreed-on and unified theoretical perspective on coopetition, scholars largely concur that the simultaneity of cooperation and competition results in a unique, paradoxical nature (Bengtsson & Raza-Ullah, 2016; Raza-Ullah et al., 2014; Ricciardi, Zardini, Czakon, Rossignoli, & Kraus, 2021). Bengtsson and Raza-Ullah (2016) revealed that the ability to engage in coopetition moderates the link between the intensity of coopetition and the level of tension experienced. A stronger coopetition capability appears to assist firms in managing the negative effects of tension arising from coopetition. Wilhelm and Sydow (2018) further illustrated that the detrimental aspects of tension and unproductive conflicts can be averted through coopetition capability. Likewise, underscoring its significance, Raza-Ullah and Eriksson (2017) established that, on the one hand, coopetition capability acts as a negative moderator, attenuating the substantial positive effects of coopetition on the paradoxical tension encountered by managers; on the other hand, it acts as a positive moderator, amplifying the mitigating effects of paradoxical tension on coopetition performance.

Despite its paradoxical nature, research has uncovered that coopetition is linked to a range of mutual advantage (Gernsheimer et al., 2021)—for instance, with cost sharing among competitors (Gnyawali & Park, 2009), heightened customer value (Le Roy & Fernandez, 2015), and increased innovation development from better access to resources and knowledge (Estrada et al., 2016; Quintana-Garcia & Benavides-Velasco, 2004; Ritala & Sainio, 2014). Consequently, coopetition may promote disruptive innovation (Ansari, Garud, & Kumaraswamy, 2016). In sum, coopetition enables firms to develop projects that would be unattainable without access to a competitor's expertise (Gast, Gundolf, Harms, & Collado, 2019).

However, coopetition may also entail downsides, including knowledge leakage, opportunistic behavior, commitment issues, and instable relationships (Hoffmann et al., 2018). Despite these potential risks, the majority of research suggests that the positive outcomes of coopetition tend to outweigh the negatives (Crick & Crick, 2021; Gernsheimer et al., 2021). Greven et al. (2022) also highlight that risks associated with coopetition will vary, as intensities of competition and cooperation will differ in coopetition. For instance, a higher degree of similarity between the industries in which the firm partners operate reflects a higher intensity of competition (Wang & Zajac, 2007). Further, some strategic alliances imply significantly higher levels of cooperation than others, with joint ventures reflecting high cooperation intensity between two partners (Hoffmann et al., 2018). Considering the interplay of competition and cooperation intensities, prior works indicate three major facets implying asymmetries: potential differences occurring in balance (Gast et al., 2019), harmony (Chou & Zolkiewski, 2018), and power dynamics (Akpinar & Vincze, 2016). Earlier research focused specifically on balance (e.g., Peng & Bourne, 2009), because Park et al. (2014) highlighted that balanced coopetition is important for coopetition to succeed. However, given the potential for tensions and conflicts, developing a balance is considered challenging for firms (Raza-Ullah et al., 2014; Smith & Lewis, 2011; Tidström, 2014). Since "we know little about the unique capabilities required for managing the interplay of competition and cooperation" (Hoffmann et al., 2018, p. 3037) and that recent research has emphasized the potential of functionally diverse TMTs to enhance coopetition capabilities (Bengtsson et al., 2020), we extend this perspective and investigate the role of TMT functional background diversity in coopetition.

Prior works demonstrate that TMTs comprising individuals with diverse functional backgrounds tend to perform better in decision-making, problem-solving, and generating creative solutions; they also display improved analytical capabilities (Horwitz & Horwitz, 2007). Analytical capability, in particular, plays a crucial role in coopetition scenarios: It enables managers to grasp and navigate the complex dynamics of coopetition adequately, facilitating a timely and high-quality decision-making process (Gnyawali, Madhavan, He, & Bengtsson, 2016). Consequently, a variety of cognitive resources—mirrored in TMT functional background diversity—may be a valuable asset for firms hoping to thrive in a coopetition environment (Greven et al., 2022). Such cognitive resources serve as an effective control mechanism to mitigate the potential risks associated with heightened competition, such as knowledge leakage (Greven et al., 2022). Given that coopetition literature highlights the downsides of coopetitive behaviors, such control mechanisms are crucial for the firms involved (Bouncken, Gast, Kraus, & Bogers, 2015; Gast et al., 2019; Gast, Filser, Gundolf, & Kraus, 2015). However, the potential risks may vary depending on the intensity of competition (Bengtsson et al., 2020; Raza-Ullah et al., 2014). Therefore, functionally diverse TMTs are compelled to make adequate—and, if need be, adapt earlier—strategic decisions in response to the changing conditions of the underlying paradoxical situation (Rai, Gnyawali, & Bhatt, 2023).

We argue that TMT functional background diversity will be positively associated with competition intensity in coopetition for two reasons. First, TMT functional background diversity may enhance the intensity of coopetition because firms are likely to engage more in risk-taking behaviors since they consider a broader range of perspectives and ideas available due to the cognitive differences within the TMT, which enhances their confidence to compete. Variations in cognitive attributes among individuals, often mirrored by differences in their educational backgrounds (Henneke & Lüthje, 2007; Visintin & Pittino, 2014), or

functional experiences and industry expertise (Eisenhardt & Schoonhoven, 1990; Muñoz-Bullon, Sanchez-Bueno, & Vos-Saz, 2015), serve as sources of diversity. Within functionally diverse TMTs, these differences may lead to the identification of potential risks and opportunities that might otherwise go unnoticed in more homogeneous TMTs. Hence, TMTs with higher levels of functional background diversity and encompassing a broad spectrum of knowledge and perspectives expand the scope of entrepreneurial opportunities and enhance the perceived feasibility of these activities (Dess et al., 2003; Floyd & Lane, 2000). As a result, this diversified array of viewpoints and knowledge boosts a firm's confidence in undertaking risk. TMTs' functional background diversity enables firms to consider multiple options concurrently (Eisenhardt, 1989), reducing uncertainties and concerns related to risk-taking behaviors (Heavey & Simsek, 2017). Such increased certainty, in turn, fosters a more optimistic outlook on the viability of alternatives selected based on the diverse knowledge pool (Dimov, 2010). Consequently, contemplating the diverse TMT viewpoints is likely to increase a firm's confidence in the ability to implement the chosen strategies effectively. As a result, the firm is more inclined to engage in competition.

Second, TMTs with a broader cognitive base are better endowed to seize benefits and manage potential drawbacks arising from competition intensity in coopetition (Heavey & Simsek, 2017). Higher functional background diversity significantly enhances the cognitive base of teams, thus broadening the capabilities of TMTs to react to potential threats. In particular, its functional background diversity may enable the TMT to comprehend a situation from various angles. As a result, the TMT can cultivate a range of alternative strategies (Finkelstein, Hambrick, & Cannella, 2009) to address the distinctive challenges associated with coopetition, such as competition (Bouncken et al., 2015; Gast et al., 2015; Gast et al., 2019). With higher competition intensity heightening risks, such as opportunism and knowledge leaking in alliances (Greven et al., 2022), TMTs will benefit from a comprehensive mental framework and diversified skills to counter arising challenges. Additionally, higher functional background diversity helps TMTs leverage the firm partners' knowledge more effectively, swaying high competition intensity to their firms' advantage. Hence, TMT functional background diversity will benefit firms in seizing the upsides of cooperations with players from closely related industries. In sum, TMTs with diverse functional backgrounds are more likely to understand the risks and challenges associated with coopetition. This understanding can help them develop risk-mitigation strategies, making the TMT more willing to engage in high levels of competition with a reduced fear of potential negative consequences. Therefore, we hypothesize:

**Hypothesis 1**. TMT functional background diversity is positively associated with competition intensity in inter-firm coopetition.

### *2.3. TMT functional background diversity and occurrence of inter-firm coopetition*

Negotiating simultaneous cooperation and competition lies at the core of coopetition—in a nutshell, it is about managing tensions (Chiambaretto, Massé, & Mirc, 2019). Accordingly, a distinct coopetition mindset is crucial to embracing the paradoxical nature of coopetition (Rai et al., 2023). We argue that TMT functional background diversity (Cannella et al., 2008) will benefit inter-firm coopetition and foster its occurrence for the following reasons. First, TMTs with diverse functional backgrounds may promote the occurrence of coopetition because they are able to manage tensions through constructive information exchange and problem-solving. For instance, prior research has established a positive link between TMT functional background diversity and coopetition capabilities (Bengtsson et al., 2020). This argument is grounded in the notion that attributes like education and work experience result in a more advanced cognitive structure at the TMT level, which, in turn, leads to the emergence of constructive, task-related conflicts (Cannella et al., 2008; Martins & Sohn, 2022; Milliken & Martins, 1996), thereby enhancing a TMT's ability to manage tensions. Specifically, TMT members "with diverse educational, functional, industry, and organizational backgrounds will combine different views of the world and have more constructive task conflicts" (Talke, Salomo, & Kock, 2011, p. 823) because productive knowledge exchange and debates might occur (Jehn, 1995; Jehn & Mannix, 2001)to enhance knowledge development and integration within the firm (Grant, 1996; Nonaka, 1994). The emergence of such conflicts stimulates TMT members with diverse functional backgrounds to deliberate intensely but constructively on how to address complex problems adequately (Horwitz & Horwitz, 2007). Being well-versed in solving idea-related conflicts, TMTs with diverse functional backgrounds will demonstrate superior abilities to manage tension, a core component of coopetition (Chiambaretto et al., 2019). In contrast, TMT diversity in attributes such as age and nationality is likely to compromise coopetition (Bengtsson et al., 2020) as the resulting affective conflicts will conceivably impair the TMT's ability to address appropriately tensions arising from coopetition (Bengtsson et al., 2020).

Second, functionally diverse TMTs exhibiting enhanced flexibility and creativity—a prerequisite for successful coopetition management (Gnyawali & Ryan Charleton, 2018)—may promote the occurrence of coopetition because they are more adept at addressing tensions. As coopetition is risky and dynamic, TMTs have to make and, if need be, adjust strategic decisions to respond to the changing conditions of the underlying paradoxical situation (Rai et al., 2023). Coopetition literature highlights significant risks for the participating firms (Bouncken et al., 2015), ranging from alliance instability to opportunism (Hoffmann et al., 2018). Enhanced thinking structures which are captured in functional background diversity can help firms react more effectively to challenges posed by coopetition. Researchers have established that TMT functional background diversity acts as a catalyst for proficient decision-making and fosters a climate of creativity (Horwitz & Horwitz, 2007). TMTs' diverse cognitive reservoirs of information result in transactive memory systems, which encapsulate the concept of understanding "who possesses what knowledge and who excels in specific areas" (Argote, 2015, p. 198). Such transactive memory systems expedite the detection and resolution of issues while enhancing adaptability and motivation to refine existing strategies, processes, and practices (Liang, Moreland, & Argote, 1995). Consequently, they fortify the generation of strategic knowledge for organizational purposes (Certo et al., 2006; Stam & Elfring, 2008). Ultimately, knowledge generating processes may facilitate a firm's decision to engage in coopetition by skillfully addressing the paradoxical challenges associated with such cooperative-competitive endeavors. Hence, we hypothesize:

**Hypothesis 2**. TMT functional background diversity is positively associated with the occurrence of inter-firm coopetition.

### *2.4. TMT functional background diversity and intensity of cooperation in inter-firm coopetition*

Research highlights how important it is to create win-win outcomes from coopetition (e.g., Brandenburger & Nalebuff, 1996). To achieve win-win scenarios, firms might reduce the potential risks arising from coopetition by intensifying their cooperation with partner firms to leverage accompanying positive synergies. In this context, two forms of coopetition have gained particular academic attention: In the first form of coopetition, the firms intending to engage in coopetition do not establish a separate legal entity for their cooperation; in the second form, they establish a joint venture, with at least two competitors acting as shareholders of the newly created, independent firm (Hennart & Zeng, 2005). Following Greven et al. (2022), we intend to look more closely into the cooperation intensity within coopetition specifically within joint ventures, as this type of cooperation indicates high cooperation intensity (Gnyawali & Ryan Charleton, 2018).

Two wo reasons underlie our argument that TMT functional

background diversity will be positively associated with cooperation intensity in coopetition. First, the diversity in functional backgrounds integrates various perspectives within the TMT, contributing to a comprehensive understanding of joint venture processes and thus potentially enhancing the efficacy of negotiations and overall joint venture operation. Joint ventures are characterized by shared ownership and control and therefore require close interaction among firms. Close interaction, in turn, makes coordinating stakeholders particularly crucial in coopetition (Greven et al., 2022). We assume that TMTs representing various functional backgrounds are more likely to resonate with diverse stakeholder profiles. Thus, TMT functional background diversity will likely facilitate interaction among joint venture partners—especially given that coopetition often reflects the diversity profile of their partnering organizations. Diversity within the partner TMTs accordingly increases team effectiveness, potentially benefitting the joint venture (e.g., Du Chatenier, Verstegen, Biemans, Mulder, & Omta, 2009; Hambrick, Li, Xin, & Tsui, 2001). Hence, functional background diversity will be positively associated with cooperation intensity in coopetition.

Second, in joint ventures, different functions, such as research and development, marketing, or operations, often need to work closely together (e.g., Nippa & Reuer, 2019). TMTs with a broad scope of functional backgrounds are better equipped to manage the interactions and interdependencies emerging from the close cooperation of functional counterparts in a joint venture. Their multifaceted knowledge framework enables TMTs with diverse functional backgrounds to better understand their counterparts' needs and interests (Heavey & Simsek, 2017). This heightened understanding can help them overcome the hurdles of coordinating and integrating different organizational cultures, which facilitates cooperation. More diverse TMTs are also likely to be able to enrich joint functional teams with a broader range of ideas (Heavey & Simsek, 2017), which may be critical to challenging collaborative endeavors such as product development or market expansion. Thus, TMT functional background diversity might lead to superior steering of combined efforts, enhancing the cooperation in coopetition, therefore we postulate:

**Hypothesis 3.** TMT functional background diversity is positively associated with cooperation intensity in inter-firm coopetition.

## 3. Method

### 3.1. Sample and data collection

We used two databases to compile the cross-sectional dataset for our study, the Compustat database and the Securities Data Company (SDC) Platinum database. We started with a group of U.S. firms that were listed in the S&P 500 Index at least once between 2005 and 2020. By using S&P-500-listed firms, we ensured broad and diverse industry coverage. Conducting three steps, we selected our final sample from the initial company list. Table 1 provides detailed information on our sample selection and merging process.

First, we used the firms' annually filed 10-K reports to gather information on TMT members' names, positions, demographic data, and careers. Similar to earlier research on TMTs in large firms (Garms & Engelen, 2019; Nath & Bharadwaj, 2020), we adopted the TMT definition of the U.S. Security and Exchange Commission (SEC). Correspondingly, we considered all executive officers members of the TMT. To obtain missing TMT data, we used supplementary sources like LinkedIn, Bloomberg, and corporate press releases, resulting in a comprehensive TMT dataset with 74,031 TMT members, corresponding to 7699 firm-year observations over 16 years. Second, to incorporate additional data on the firm and industry level, we used the Compustat database. Third, following previous literature on coopetition (Runge, Schwens, & Schulz, 2022), we gathered information on alliances from the SDC Platinum database. This database is often used by researchers exploring inter-organizational connections among firms because it provides details on an extensive number of diverse partnership forms and information on firm industries, alliance announcement dates, and major alliance activities (e.g., Rothaermel & Deeds, 2006). For our study, we considered inter-firm coopetition for which information on *gvkey*, the North American Industry Classification System (NAICS) and/or Standard Industrial Classification (SIC) codes were available for all

**Table 1**
Overview of sample selection and merging process.

| Sample selection and merging process | Number of firms | Firm-year observations | Number of deals | Note |
|---|---|---|---|---|
| Initial sample of executives S&P 500 | 824 | 7699 | | Firms were included in the sample if they had been listed in the S&P 500 index at least once between 2005 and 2020. |
| Merge with Compustat database | 34,464 | 390,325 | | We used the *gvkey* and the financial year as unique identifiers to match our sample to Compustat North America data (1979–2021). |
| Drop-outs | | 6 | | Drop-outs of firm-year observations with missing Compustat data. |
| Remaining | 822 | 7693 | | |
| Merge with SDC Platinum database | 9369 | | 568,840 | We used the *gvkey* and the financial year as unique identifiers to match our sample to deal data recorded in the SDC Platinum database between 1990 and 2022. |
| Drop-outs | | | 560,875 | Drop-outs of deal observations with missing S&P 500 executive data and firm-year observations without corresponding deal data. |
| Remaining | 579 | | 7965 | |
| Drop-outs | | | 5738 | Observations for which *gvkey*, NAICS, and/or SIC code information was not available for deal partners. |
| Remaining | 414 | | 2227 | |
| Drop-outs | | | 529 | Observations for which one or more variables of interest, e.g., financial slack, could not be computed due to missing values. |
| **Final sample for analysis** | **334** | | **1698** | **1698 deals used for H1;**<br>- 1679 observations (19 observations out of 1698 omitted in logit regression) for H2;<br>- 485 observations (subsample of coopetitive alliances) for H3. |

deal partners (Droege, Greven, Fischer-Kreer, & Brettel, 2023; Greven et al., 2022). This approach of identifying firms who collaborate is in line with prior research; when a four-digit NAICS code match is identified between two competing companies, it indicates they engage in collaboration (Wang & Zajac, 2007). We excluded deal observations where we did not have complete data for all variables of interest. Our final cross-sectional sample contains 1698 inter-firm coopetition partnerships entered by 334 U.S.-American firms that were listed at least once in the S&P 500 Index between 2005 and 2020 for hypothesis 1. For hypothesis 2, the dataset contains 1679 inter-firm coopetition partnerships entered by 327 firms; the subsample for hypothesis 3 comprises 485 inter-firm coopetition partnerships among 147 firms. Table 2 presents our final sample composition.

### 3.2. Measures

#### 3.2.1. Dependent variables

Following Greven et al. (2022), we focus on a tripartite set of interrelated dependent variables (DVs)—the competition intensity in inter-firm coopetition; the occurrence of inter-firm coopetition; and the cooperation intensity in inter-firm coopetition.

*Competition intensity in inter-firm coopetition.* In line with prior works establishing the level of competition between firms, we computed the actual competition intensity between alliance partners by analyzing the level of congruence between the NAICS codes of each participating entity (Wang & Zajac, 2007). NAICS codes reflect a hierarchical structure, with the digits of the code conveying information on the respective firm's industry and subindustries. We operationalized competition as a function of the degree of alignment between the digit segments of the six-digit NAICS codes of the firms (Greven et al., 2022; Wang & Zajac, 2007). Hence, competition intensity is captured by an ordinal variable that can take the values 0 (low intensity competition, four identical digits), 1 (medium intensity competition, five identical digits), or 2 (high intensity competition, all six digits identical). In essence, a greater degree of numerical correspondence signifies heightened competition. We examined each inter-firm coopetition from the perspective of each individual firm involved in coopetition.

*Occurrence of inter-firm coopetition.* To measure the occurrence of inter-firm coopetition, we compared the NAICS codes of the partnering firms, analyzing the inter-firm coopetition from each firm's view. We classified an alliance as coopetitive if we found a four-digit NAICS code match between the firms, reflecting that two competing firms are cooperating (Wang & Zajac, 2007). The occurrence of inter-firm coopetition was captured by a binary variable that takes the value 1 if it reflects coopetition for the focal firm, and 0 if otherwise.

*Cooperation intensity in inter-firm coopetition.* We determined the cooperation intensity in coopetition of each participant based on information extracted from the SDC database. Inter-firm coopetition is known to differ in the levels of cooperation intensity, with joint ventures reflecting a higher level of cooperation (Gnyawali & Ryan Charleton, 2018). Thus, we determined whether firms identified as being part of a coopetition are also part of a joint venture. Consequently, cooperation intensity in coopetition is captured by a binary variable that takes the value 1 if the participating firm is involved in a joint venture, and 0 if otherwise.

**Table 2**
Sample description.

| | % | | % |
|---|---|---|---|
| **Industry** | | **Firm age (years since first Compustat entry)** | |
| Manufacturing | 47 | 0–10 | 6 |
| Services | 24 | 11–20 | 13 |
| Transportation and public utilities | 13 | 21–30 | 37 |
| Trade | 8 | 31–40 | 43 |
| Mining and construction | 5 | >40 | 1 |
| Finance, insurance, and real estate | 2 | | |
| Other | 1 | | |
| **Firm size (sales in USD bn)** | | **Firm size (no. of employees in 1000)** | |
| <5 | 13 | <10 | 17 |
| 5–10 | 11 | 10–50 | 31 |
| 11–50 | 45 | 51–100 | 21 |
| 51–100 | 12 | 101–500 | 29 |
| >100 | 19 | >500 | 2 |
| **TMT size (no. of members)** | | **TMT average tenure (years)** | |
| <10 | 54 | <10 | 26 |
| 10–15 | 38 | 10–15 | 25 |
| 16–20 | 7 | 16–20 | 26 |
| >20 | 1 | 21–30 | 20 |
| | | >30 | 3 |

$N = 1698$ observations

#### 3.2.2. Independent variable

*TMT functional background diversity.* To operationalize TMT functional background diversity, we followed Cannella et al. (2008) and built a measure that captures functional background diversity at the interpersonal (team) level. While intrapersonal functional diversity focuses on the within-member breadth of functional experience, interpersonal functional diversity reflects the heterogeneity in the functional areas in which the TMT members have served (Cannella et al., 2008). Following (Cannella et al., 2008), we manually classified the functional background of each TMT member (i.e., finance and accounting, law, management, marketing and sales, production and operations, research and development, information technology, and others). In addition, we considered executives' previous functional background experience. Thus, as opposed to Cannella et al. (2008), we did not only include TMT members' dominant function in their career tracks but also captured all other functions they had actively held. In line with Cannella et al. (2008), we then employed a version of the Herfindahl-Hirschman index (HHI) to capture functional diversity at the TMT level. We calculated the index as $1 - \sum S_i^2$, where $S_i$ is the proportion of a TMT member in the $i^{th}$ functional category, and then standardized the values. Our measure varies between 0 and 1, with values closer to 1 representing higher functional background diversity (less overlap in functional experience) and values close to 0 indicating lower functional background diversity (high overlap in functional experience) at TMT level.

#### 3.2.3. Control variables

We included several control variables at the firm and TMT level to isolate the theorized effects on our dependent variables. Prior coopetition scholarship suggests that firm age and size influence firms' coopetition and their potential to realize benefits through coopetition (Bouncken, Fredrich, & Kraus, 2020). Thus, we considered *firm age*, measured as the number of years since the firms' first Compustat entry since 1979 in the respective observation period (Gnyawali & Park, 2009). We included *firm size*, proxied by the number of firms' employees (Bouncken et al., 2020). We contended that firms' resource flexibility and their performance might influence coopetition their (Kandemir, 2006). Thus, we considered their *financial slack*, *return on assets*, and *financial leverage* across our models. On the TMT level, we controlled for *TMT size* to account for the breadth of cognitive resources involved in strategy setting (Wiersema & Bantel, 1992). Consistent with prior studies on TMT diversity (Krishnan & Park, 2005), we recorded high values for TMT size ($m = 9.69$–$10.37$) since our TMT definition includes all executive officers listed with the SEC. Following Cannella et al. (2008), we included *TMT firm tenure* as a control variable because prior works highlight the role of tenure for companies' risk-taking propensity and pursuit of entrepreneurial initiatives, which coopetition reflects (e.g., Simsek, 2007). Like earlier research on the TMT, we controlled for *age heterogeneity* (e.g., Nielsen & Nielsen, 2013). We also controlled for TMT *gender diversity* as research has shown that female leaders tend to display more collaborative leadership styles (Bendig, 2022; Dezsö & Ross, 2012). Finally, we included year and industry dummies at SIC 1 level in our regression models to control for fixed effects (Greven et al.,

2022). We lagged all explanatory variables by one year.

## 4. Results

### 4.1. Analyses and hypotheses testing

For each of our three models, we followed criteria proposed by Kalnins (2018) to examine the potential issue of multicollinearity regarding the explanatory variables. We considered the values of the pairwise correlation coefficients. For those values greater than the threshold of |0.3|, we conducted additional analyses to rule out a multicollinearity issue (Kalnins, 2018). Tables 3 and 4 show that the correlation coefficient between TMT firm tenure heterogeneity and firm age exceeds the value of |0.3|. Last, we assessed the correlation coefficients between firm size and financial slack and, respectively, TMT firm tenure heterogeneity (Table 5). We note that all the aforementioned correlation coefficient values do not exceed the recommended threshold of |0.3| by >0.08.

In accordance with Kalnins (2018), a beta could yield a misleading result as a false positive if the beta coefficients of two variables exhibit opposite signs when positively correlated or show the same sign when negatively correlated. Further, we might have a false positive if the bivariate correlation of the independent variable with the dependent variable is of the opposite sign from the beta coefficient. Our analysis indicated that we might have one false positive due to the correlation between firm age and firm size for hypothesis 2 (Table 4, |0.32|). While the recommended threshold was only slightly exceeded, we further argue that a positive correlation between firm age and firm size is reasonable and likely not a major concern for our analyses. In addition, we evaluated the variance inflation factors (VIFs) corresponding to our predictor variables and observed values well below the recommended threshold of |5| (*mean VIF* = 1.18, max. *VIF* = 1.38) (Hair, Babin, Anderson, & Black, 2014).

To estimate our models, we employed the statistical software STATA 17. Since competition intensity in coopetiton is an ordinal variable, we opted for an ologit regression to test hypothesis 1. To test hypotheses 2 and 3, we used logit regression models, which fit dichotomous dependent variables. This method of estimation aligns well with our binary dependent variables, as Hair et al. (2014) suggest. Additionally, to ensure consistency, we standardized all predictors and control variables before introducing them into the logit estimator (Hair et al., 2014). For each of our three hypotheses, we used hierarchical regression models. First, we established Models x.1, which serve as the baseline models encompassing control variables. Subsequently, we progressed to Models x.2, which incorporate the independent variable TMT functional background diversity.

Hypothesis 1 states that TMT functional background diversity is positively associated with competition intensity in inter-firm coopetition. We considered 1698 alliances formed by 334 firms to test this relationship. Our results (Table 6, Model 6.2) confirm this hypothesis ($\beta = 1.84$; $p = 0.02$).

Hypothesis 2 put forward that TMT functional background diversity is positively related to the occurrence of inter-firm coopetition. To test this hypothesis, we considered 1679 alliances formed by 327 firms. Our findings (Table 7, Model 7.2) confirm our second theorized relationship ($\beta = 2.34$; $p = 0.01$).

Hypothesis 3 states that TMT functional background diversity is positively associated with cooperation intensity in inter-firm coopetition. Hence, to test hypothesis 3, we used a subsample of the observations analyzed for hypothesis 2, corresponding to 485 alliances formed by 147 firms. Our results (Table 8, Model 8.2) do not support this hypothesis. On the contrary, the empirical findings reveal a highly significant negative association between TMT functional background diversity and cooperation intensity in inter-firm coopetition ($\beta = -5.72$; $p = 0.00$). We summarize our findings in Tables 6 to 8.

### 4.2. Addressing potential endogeneity

To address the concerns of endogeneity and causality, we performed two additional analyses (Papies, Ebbes, & van Heerde, 2017). First, we employed an alternative regression model using a one-year lagged version of our explanatory variables. We lagged our explanatory variables by one year in the re-estimation of our analyses pertaining to our hypotheses. This is a well-established and recommended approach in TMT studies (Hambrick, 2007). Through this rigorous approach, we find that the results of our analyses remain consistent in terms of both direction and statistical significance.

In addition, we followed an instrumental variable approach (Papies et al., 2017) to eliminate endogeneity concerns resting on omitted variable bias. Following Germann, Ebbes, and Grewal (2015), we introduced the industry average of our independent variable as a relevant instrument for our calculations. We computed the average on SIC 2 code level and performed the endogeneity test for all three models using the control function ivprobit. This technique is appropriate in case of non-continuous dependent variables (Lewbel, Dong, & Yang, 2012). Our instrument indicates significant *p*-values for all models ($p = 0.00$) and all three tests show valid results (Prob chi2 < 0.02). Hence, we conclude that endogeneity is unlikely to affect our analyses.

**Table 3**
Descriptive statistics and bivariate correlations (Hypothesis 1).

| Variables | Mean | Std. dev. | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) Competition intensity in alliances | 0.46 | 0.78 | 1 | | | | | | | | | | |
| (2) TMT functional background diversity | 0.75 | 0.08 | 0.05** | 1 | | | | | | | | | |
| (3) Firm age | 27.71 | 9.13 | 0.07*** | 0.05** | 1 | | | | | | | | |
| (4) Firm size | 83.83 | 90.37 | −0.12*** | 0.05** | 0.29*** | 1 | | | | | | | |
| (5) Financial slack | 1.80 | 1.28 | 0.02 | 0.05** | −0.21*** | −0.25*** | 1 | | | | | | |
| (6) Return on assets | 0.11 | 0.07 | −0.02 | −0.04 | −0.07*** | −0.07*** | 0.29*** | 1 | | | | | |
| (7) Financial leverage | 0.21 | 0.15 | 0.00 | 0.04* | 0.22*** | 0.07*** | −0.16*** | −0.16*** | 1 | | | | |
| (8) TMT size | 9.71 | 3.61 | 0.10*** | 0.00 | 0.10*** | 0.08*** | −0.21*** | 0.05** | −0.10*** | 1 | | | |
| (9) TMT firm tenure heterogeneity | 8.41 | 3.36 | 0.05** | 0.10*** | 0.34*** | 0.18*** | −0.16*** | 0.03 | 0.06*** | 0.20*** | 1 | | |
| (10) TMT age heterogeneity | 5.22 | 1.78 | −0.03 | 0.08*** | −0.14*** | −0.20*** | 0.13*** | 0.01 | −0.05* | 0.00 | 0.12*** | 1 | |
| (11) TMT gender composition | 0.18 | 0.13 | −0.01 | 0.26*** | 0.16*** | 0.11*** | 0.10*** | 0.08*** | 0.15*** | −0.10*** | 0.11*** | 0.01 | 1 |

N = 1698; firm and TMT sizes are winsorized at 1% level; explanatory variables are lagged by one year.
* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

**Table 4**
Descriptive statistics and bivariate correlations (Hypothesis 2).

| Variables | Mean | Std. dev. | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) Occurrence of coopetition | 0.30 | 0.46 | 1 | | | | | | | | | | |
| (2) TMT functional background diversity | 0.75 | 0.08 | 0.07*** | 1 | | | | | | | | | |
| (3) Firm age | 27.80 | 9.12 | 0.10*** | 0.05** | 1 | | | | | | | | |
| (4) Firm size | 82.65 | 88.87 | −0.14*** | 0.05** | 0.32*** | 1 | | | | | | | |
| (5) Financial slack | 1.80 | 1.29 | −0.01 | 0.05** | −0.21*** | −0.26*** | 1 | | | | | | |
| (6) Return on assets | 0.11 | 0.07 | −0.03 | −0.04 | −0.06** | −0.10*** | 0.30*** | 1 | | | | | |
| (7) Financial leverage | 0.21 | 0.14 | 0.03 | 0.04* | 0.22*** | 0.09*** | −0.16*** | −0.15*** | 1 | | | | |
| (8) TMT size | 9.69 | 3.59 | 0.12*** | 0.01 | 0.12*** | 0.06*** | −0.21*** | 0.04 | −0.09*** | 1 | | | |
| (9) TMT firm tenure heterogeneity | 8.40 | 3.37 | 0.08*** | 0.09*** | 0.35*** | 0.18*** | −0.16*** | 0.03 | 0.07*** | 0.20*** | 1 | | |
| (10) TMT age heterogeneity | 5.22 | 1.78 | −0.05* | 0.08*** | −0.15*** | −0.19*** | 0.13*** | 0.02 | −0.05** | 0.00 | 0.13*** | 1 | |
| (11) TMT gender composition | 0.18 | 0.13 | −0.01 | 0.26*** | 0.16*** | 0.11*** | 0.10*** | 0.08*** | 0.15*** | −0.10*** | 0.12*** | 0.01 | 1 |

$N = 1679$; firm and TMT sizes are winsorized at 1% level; explanatory variables are lagged by one year.
* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

**Table 5**
Descriptive statistics and bivariate correlations (Hypothesis 3).

| Variables | Mean | Std. dev. | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) Cooperation intensity in coopetition | 0.26 | 0.44 | 1 | | | | | | | | | | |
| (2) TMT functional background diversity | 0.76 | 0.08 | −0.19*** | 1 | | | | | | | | | |
| (3) Firm age | 29.31 | 8.68 | 0.08* | −0.03 | 1 | | | | | | | | |
| (4) Firm size | 62.02 | 58.93 | 0.21*** | −0.03 | 0.35*** | 1 | | | | | | | |
| (5) Financial slack | 1.78 | 1.11 | −0.26*** | 0.03 | −0.19*** | −0.31*** | 1 | | | | | | |
| (6) Return on assets | 0.11 | 0.07 | −0.21*** | 0.00 | −0.14*** | −0.08* | 0.30*** | 1 | | | | | |
| (7) Financial leverage | 0.22 | 0.13 | −0.05 | −0.04 | 0.03 | 0.01 | −0.08* | −0.17*** | 1 | | | | |
| (8) TMT size | 10.37 | 3.62 | 0.03 | 0.06 | 0.14*** | 0.24*** | −0.24*** | 0.02 | −0.07 | 1 | | | |
| (9) TMT firm tenure heterogeneity | 8.84 | 3.34 | 0.14*** | 0.08* | 0.29*** | 0.38*** | −0.18*** | −0.11** | 0.05 | 0.03 | 1 | | |
| (10) TMT age heterogeneity | 5.11 | 1.60 | −0.10** | 0.04 | −0.10** | −0.11** | 0.12*** | 0.10** | −0.05 | 0.04 | 0.05 | 1 | |
| (11) TMT gender composition | 0.18 | 0.12 | −0.18*** | 0.19*** | 0.23*** | 0.02 | 0.04 | 0.04 | 0.13*** | 0.03 | 0.07 | −0.03 | 1 |

$N = 485$; firm and TMT sizes are winsorized at 1% level; explanatory variables are lagged by one year.
* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

### 4.3. Supplemental analyses

We conducted five supplemental analyses to ensure the robustness of our findings and to mitigate potential structural inaccuracies. First, to test the technological robustness of our models, we performed alternative estimations. We re-ran the analysis for hypothesis 1 using an ordered probit model; for hypotheses 2 and 3, we used probit models as alternative specifications (Karlson, Holm, & Breen, 2012). The significance and direction of our results remained stable, substantiating their robustness. Second, we re-ran our analyses employing alternative controls (e.g., proxying firm size through revenues instead of number of employees and including Tobin's Q for a market valuation perspective). Our results remained consistent in terms of direction and significance, reasserting the robustness and validity of our models. Third, we estimated the relationship between TMT functional background diversity and cooperation intensity in all inter-firm relationships. Thus, we extended our analysis beyond the coopetition-based sample used for hypothesis 3 (Greven et al., 2022). Our results showed the same direction and significance, suggesting a negative relationship between TMT functional background diversity and cooperation intensity ($\beta = -2.32$; $p = 0.02$) beyond coopetitive inter-firm relationships. As a counterpart, we also investigated the relationship between TMT functional background diversity and the competition intensity in coopetition. Thus, we restricted the sample used for hypothesis 1 to coopetition-based inter-firm relationships only. However, we find no significant effect.

Fourth, we considered intrapersonal functional diversity (Cannella et al., 2008) as an alternative independent variable in our computations. Contrary to the measure at interpersonal level, which we used for our main regression models, this measure captures the within-member breadth of functional experience. We computed the intrapersonal functional diversity score for each TMT member and then averaged the scores as follows: $\sum_{i=1}^{n}(1 - \sum P_{ij}^2)$ / n, with $P_{ij}$ being the proportion of member i's time spent in function j, and n being the number of members in a TMT (Bunderson & Sutcliffe, 2002; Cannella et al., 2008). Because we were unable to find information on the time spent in each function, we weighted each executive's functional areas equally (Cannella et al., (2008). We argue that the effects of TMT functional background diversity on firm performance depend on both how diversity is conceptualized and in which context it is embedded. In line with Cannella et al. (2008), our results indicate an opposite effect of intrapersonal functional diversity compared to functional background diversity at team level. We note the indication of a negative association between intrapersonal functional diversity and competition intensity ($\beta = -0.89$; $p = 0.07$), and between intrapersonal functional diversity and occurrence of coopetition ($\beta = -0.99$; $p = 0.06$). Further, our results suggest a positive relationship between intrapersonal functional diversity and cooperation intensity in coopetition ($\beta = 1.72$; $p = 0.12$).

Last, we examined the effect of industrial background diversity on our DV set. Since M. Li and Patel (2019) used an alternative approach to explain TMT diversity in a broader operationalization, we computed the

**Table 6**
Ordered logit regression results (Hypothesis 1).

| Dependent variable: Competition intensity in alliances | Model 6.1 | | Model 6.2 | |
|---|---|---|---|---|
| | Coefficient (Std. Err.) | *p*-value | Coefficient (Std. Err.) | *p*-value |
| **Controls** | | | | |
| Firm age | 0.00 | 0.86 | 0.00 | 0.91 |
| | (0.01) | | (0.01) | |
| Firm size | −0.00 | 0.17 | −0.00 | 0.19 |
| | (0.00) | | (0.00) | |
| Financial slack | 0.09 | 0.11 | 0.09 | 0.11 |
| | (0.05) | | (0.05) | |
| Return on assets | −2.01 | 0.04 | −1.88 | 0.05 |
| | (0.97) | | (0.98) | |
| Financial leverage | −0.97 | 0.07 | −1.03 | 0.05 |
| | (0.52) | | (0.53) | |
| TMT size | 0.01 | 0.51 | 0.01 | 0.49 |
| | (0.02) | | (0.02) | |
| TMT firm tenure heterogeneity | 0.03 | 0.12 | 0.03 | 0.19 |
| | (0.02) | | (0.02) | |
| TMT age heterogeneity | −0.03 | 0.39 | −0.04 | 0.31 |
| | (0.04) | | (0.04) | |
| TMT gender composition | 0.23 | 0.65 | −0.07 | 0.90 |
| | (0.50) | | (0.52) | |
| TMT funct. background diversity | | | 1.84 | 0.02 |
| | | | (0.80) | |
| Constant /cut1 | 1.24 | | 2.51 | |
| | (0.51) | | (0.75) | |
| Constant /cut1 | 1.86 | | 3.13 | |
| | (0.51) | | (0.76) | |
| Year dummies included | Yes | | Yes | |
| Industry dummies included | Yes | | Yes | |
| Number of observations | 1698 | | 1698 | |
| Number of firms | 334 | | 334 | |
| Pseudo R-square | 0.12 | | 0.12 | |

N = 1698; firm and TMT sizes are winsorized at 1% level; explanatory variables are lagged by one year.

**Table 7**
Ordered logit regression results (Hypothesis 2).

| Dependent variable: Occurrence of coopetition | Model 7.1 | | Model 7.2 | |
|---|---|---|---|---|
| | Coefficient (Std. Err.) | *p*-value | Coefficient (Std. Err.) | *p*-value |
| **Controls** | | | | |
| Firm age | 0.01 | 0.29 | 0.01 | 0.36 |
| | (0.01) | | (0.01) | |
| Firm size | −0.00 | 0.02 | −0.00 | 0.02 |
| | (0.00) | | (0.00) | |
| Financial slack | 0.05 | 0.37 | 0.05 | 0.41 |
| | (0.06) | | (0.06) | |
| Return on assets | −2.40 | 0.02 | −2.25 | 0.03 |
| | (1.02) | | (1.03) | |
| Financial leverage | −0.54 | 0.31 | −0.63 | 0.24 |
| | (0.53) | | (0.54) | |
| TMT size | 0.01 | 0.70 | 0.01 | 0.70 |
| | (0.02) | | (0.02) | |
| TMT firm tenure heterogeneity | 0.03 | 0.12 | 0.03 | 0.18 |
| | (0.02) | | (0.02) | |
| TMT age heterogeneity | −0.03 | 0.44 | −0.04 | 0.32 |
| | (0.04) | | (0.04) | |
| TMT gender composition | 0.49 | 0.34 | 0.16 | 0.77 |
| | (0.51) | | (0.53) | |
| TMT funct. Background diversity | | | 2.34 | 0.01 |
| | | | (0.83) | |
| Constant | −0.72 | 0.15 | −2.32 | 0.00 |
| | (0.51) | | (0.77) | |
| Year dummies included | Yes | | Yes | |
| Industry dummies included | Yes | | Yes | |
| Number of observations | 1679 | | 1679 | |
| Number of firms | 327 | | 327 | |
| Pseudo R-square | 0.18 | | 0.18 | |

N = 1679; firm and TMT s are winsorized at 1% level; explanatory variables are lagged by one year.

**Table 8**
Ordered logit regression results (Hypothesis 3).

| Dependent variable: Cooperation intensity in coopetition | Model 8.1 | | Model 8.2 | |
|---|---|---|---|---|
| | Coefficient (Std. Err.) | *p*-value | Coefficient (Std. Err.) | *p*-value |
| **Controls** | | | | |
| Firm age | 0.02 | 0.50 | 0.01 | 0.60 |
| | (0.02) | | (0.02) | |
| Firm size | 0.01 | 0.03 | 0.01 | 0.02 |
| | (0.00) | | (0.00) | |
| Financial slack | −0.53 | 0.01 | −0.49 | 0.02 |
| | (0.21) | | (0.21) | |
| Return on assets | −2.97 | 0.20 | −3.17 | 0.18 |
| | (2.32) | | (2.34) | |
| Financial leverage | −3.83 | 0.02 | −3.59 | 0.02 |
| | (1.57) | | (1.56) | |
| TMT size | −0.03 | 0.44 | −0.04 | 0.33 |
| | (0.04) | | (0.04) | |
| TMT firm tenure heterogeneity | 0.03 | 0.55 | 0.04 | 0.43 |
| | (0.05) | | (0.05) | |
| TMT age heterogeneity | −0.08 | 0.38 | −0.04 | 0.67 |
| | (0.09) | | (0.09) | |
| TMT gender composition | −3.11 | 0.02 | −2.03 | 0.15 |
| | (1.34) | | (1.40) | |
| TMT funct. Background diversity | | | −5.72 | 0.00 |
| | | | (1.85) | |
| Constant | 3.14 | 0.01 | −2.32 | 0.00 |
| | (1.18) | | (0.77) | |
| Year dummies included | Yes | | Yes | |
| Industry dummies included | Yes | | Yes | |
| Number of observations | 485 | | 485 | |
| Number of firms | 147 | | 147 | |
| Pseudo R-square | 0.35 | | 0.36 | |

N = 485; firm and TMT sizes are winsorized at 1% level; explanatory variables are lagged by one year.

industrial background diversity score by summing up the different industries in which each TMT member had been active. Then, we averaged the score on TMT level. We found no significant effect of industrial background diversity on competition intensity in inter-firm coopetition (β = −0.05; $p = 0.71$), nor on the occurrence of coopetition (β = −0.07; $p = 0.61$). However, our results showed a significant negative relationship between TMT industrial background diversity and cooperation intensity in inter-firm coopetition (β = −0.97; p = 0.00).

## 5. Discussion

This study provides insights into the link between TMTs with diverse functional backgrounds and their likelihood to participate in coopetitive activities. Utilizing a cross-sectional dataset encompassing 1698 alliances formed by 334 companies listed at least once in the S&P 500 during the period from 2005 to 2020, we show that firms with TMTs composed of members from various functional areas are more inclined toward coopetition. Moreover, we emphasize the necessity for a more detailed comprehension of coopetition by revealing that TMT functional background diversity is positively linked to the intensity of competition within coopetition, while unexpectedly showing a negative association with the intensity of cooperation in coopetition. In sum, our study offers valuable contributions for both academia and practice.

### 5.1. Implications for research and theory

This study presents three substantial contributions to the fields of inter-firm coopetition and TMT literature. First, we expand the literature on inter-firm coopetition by considering how TMT functional background diversity as an interpersonal, team-level antecedent affects firms' engagement in inter-firm coopetition. Hence, our valuable insights help answer why certain firms opt for coopetition (Crick & Crick, 2021). By doing so, our study is the first study addressing the TMT level of analysis in coopetition literature using a large sample. Our findings

show a positive association between TMTs' diversity of functional backgrounds at the interpersonal level and the occurrence of inter-firm coopetition. While prior research identifies various firm-specific antecedents that affect a firm's decision to partake in coopetition, such as firm's propensity for cooperation or past coopetition experiences (e.g., Gernsheimer et al., 2021), team-level perspectives as antecedents remain understudied. Research confirms that inter-firm coopetition represents a strategic choice (Devece, Ribeiro-Soriano, & Palacios-Marqués, 2019) and previous studies show that TMT diversity influences strategic decisions (e.g., Eisenhardt, 1989). Surprisingly, we know little about how TMT diversity contributes to a firm's coopetitive behavior. However, noteworthy exceptions, such as the research by Roberson et al. (2017), underscore the significance of a TMT in influencing coopetition. Additionally, Bengtsson et al. (2020) show a positive correlation between TMT diversity and a firm's capabilities in coopetition. Our study extends this perspective by shifting the focus to the actual formation of coopetition, thereby enriching both coopetition and TMT literature. We assembled a secondary, cross-industry dataset and followed the methodology previously employed for the analysis of coopetition antecedents (Bengtsson et al., 2020; Czakon, Klimas, & Mariani, 2020). We thus address calls to use quantitative data when measuring inter-firm coopetition (e.g., Bouncken & Fredrich, 2012; Dorn, Schweiger, & Albers, 2016; Park et al., 2014).

Second, our study advances coopetition literature by following the recommendation of earlier research to recognize the existence of "several possible types of coopetition" (Czakon, Srivastava, et al., 2020, p. 14). While the majority of prior works analyze the occurrence of coopetition in general, our study provides a more nuanced perspective on firms' coopetitive behavior and thus on the types of coopetition, because next to the occurrence of coopetition, we examined both the competition intensity in coopetition (i.e., H1) and the intensity of cooperation in coopetition (i.e., H3). This approach sheds light on the varying degrees of competition and cooperation to develop a more refined understanding and paves the way for future studies to adopt a holistic approach in developing an understanding of coopetition. Our findings indicate a positive association between TMT functional background diversity and the intensity of competition in coopetition. This could be attributed to the notion that TMTs with greater functional background diversity tend to possess a broader cognitive framework (Heavey & Simsek, 2017) and a more innovative mindset (Horwitz & Horwitz, 2007; Li, 2017), making them more accommodating of higher levels of competitive intensity in coopetition.

We adopt the perspective of Hoffmann et al. (2018), who argue for a differentiation within the coopetition domain, and demonstrate that TMT heterogeneity is positively associated with the occurrence and competition intensity in inter-firm coopetition. However, we cannot validate hypothesis 3 because our findings unexpectedly show a negative association between TMT functional background diversity and the intensity of cooperation. We assume that this unfavorable association may stem from TMTs approaching their differences in a counterproductive manner within joint ventures. This notion aligns with prior TMT research that highlights the dual nature of TMT functional background diversity, which can be both an asset and a liability for firms, depending on how it is managed and leveraged (Hambrick, Cho, & Chen, 1996; Jehn, Northcraft, & Neale, 1999; Simsek, 2007). Differences in cognitive processes can present challenges for teams in terms of integrating and coordinating the diverse knowledge available (Bunderson & van der Vegt, 2018; Martins & Sohn, 2022), potentially hindering strategic consensus (Hambrick et al., 1996) and constraining entrepreneurial behavior (O'Reilly III, Williams, & Barsade, 1998). These disparities within joint venture TMTs might exacerbate "interpersonal incompatibilities among group members, which typically includes tension, animosity, and annoyance" (Jehn, 1995, p. 258). Consequently, these disparities can undermine TMT cohesion and lead to conflicts that divert the team's focus, potentially dissuading firms from pursuing joint ventures, thereby keeping cooperation intensity lower. In contrast, lower levels of functional background diversity might be more fruitful for collaboration, because the TMTs of the firms might be connected with a better common understanding of the business (Ritala, 2012). These findings underline the necessity for a nuanced understanding of the various manifestations of cooperations and, ultimately, coopetition (Greven et al., 2022).

Third, our study makes a significant contribution to the TMT literature by addressing the call to investigate "diversity-capability relationships" and recognizing that diversity influences performance outcomes through organizational capabilities (Roberson et al., 2017). While a substantial portion of diversity research traditionally focuses on examining the relationships between TMT diversity and performance outcomes (Horwitz & Horwitz, 2007; Roberson et al., 2017), our study uncovers the connection between functional background diversity and the intermediary mechanism, specifically coopetition behavior, through which diversity affects performance. We thus extend the work of Bengtsson et al. (2020) by empirically investigating the actual occurrence of coopetition and its nuanced manifestations such as the intensity of competition and cooperation in inter-firm coopetition. Adding to the findings of Bengtsson et al. (2020), we demonstrate that TMT functional background diversity not only influences the related capabilities but also the actual occurrence of coopetition. While Bengtsson et al. (2020) "could not establish its external validation by studying such consequences due to lack of data available on alliance (and firm) performance" (p. 15), our study shows that TMT functional background diversity is associated with coopetition at the macro level. This comprehensive exploration enhances our understanding of diversity and coopetition dynamics, providing valuable insights for scholars and practitioners alike (Roberson et al., 2017). In summary, our study offers a comprehensive perspective that deepens our understanding of both diversity-capability relationships and the formation of coopetition, thereby enriching the academic discourse in these interconnected domains (Bengtsson et al., 2020).

### 5.2. Managerial implications

Our empirical findings show that the composition of TMTs' functional backgrounds influences firms' coopetitive behavior. Furthermore, we demonstrate that TMT functional background diversity shapes the intensity of competition and cooperation in inter-firm coopetition, while finding that TMT functional background diversity is negatively associated with the intensity of cooperation in coopetition. To enrich our contributions to practice, we presented our empirical findings to TMT members of stock-listed companies and asked for their experience, insights, and reflections based on the findings. The combination of generating empirical insights and sharing these insights with practitioners allows us to offer important insights managers can draw on when shaping the TMT and developing coopetition.

Through the discussion with practitioners, we conclude that firms may find their strategic options limited when faced with highly functional diverse management teams, emphasizing the need for collaborative decision-making within the TMTs to strengthen their collective approach. As competition intensity rises within inter-firm relationships, firms are prompted to reassess existing strategies. This heightened competition intensity suggests the importance of defining overarching goals for the firms within coopetition and, in the context of functional team diversity, requires adept negotiators who prioritize collective goals over local optima. Recognizing that diverse perspectives foster innovation, firms must actively manage this diversity to harness its benefits. Implementing effective governance structures becomes imperative, especially as our findings reveal a positive correlation between TMT functional background diversity and the intensity of cooperation in coopetition. By reinforcing governance mechanisms, such as clearer expectations and trust-building measures (e.g., Fernandez, Ji, & Yami, 2014; Fernandez & Chiambaretto, 2016; Le Roy & Fernandez, 2015), organizations can navigate the delicate balance between competition

and cooperation, fostering common goals and successful coopetitive endeavors (e.g., Quintana-Garcia & Benavides-Velasco, 2004; Tidström, 2014).

### 5.3. Limitations and further research

We acknowledge several limitations of our study, which open promising avenues for future research. First, we measure competition intensity based on firms' NAICS codes, aiming to capture the business similarity between inter-firm coopetition partners (Wang & Zajac, 2007). In addition, we use the overlap in firms' NAICS codes to identify coopetitive alliances. However, this approach does not allow for a more nuanced view of business similarity or competition between coopetition partners. In addition, the NAICS codes may not include all facets of competition. Research has recently validated differentiated measures, such as technological or product market overlaps, to capture coopetition in research and development (Runge et al., 2022). Extending their application to our research setting might help advance the understanding of coopetitive behavior.

Second, we conduct our research based on a sample of S&P 500 firms. Hence, our study does not capture coopetiton between partners from geographies other than the United States. Additionally, exclusively drawing on S&P 500 listings, our work is limited to large firms. Future studies might consider exploring cross-geographical coopetition and including smaller firms in their considerations. An integrative sample might result in a more multifaceted view of coopetition, revealing insights that are yet to be unlocked.

Last, the exploration of managerial antecedents to coopetition remains relatively limited. The empirical evidence may act as a catalyst, encouraging future researchers to adopt a TMT-centric perspective in the development of coopetition theories and frameworks. Hence, we pave the way for subsequent studies to delve into the diverse manifestations of coopetition stemming from varying levels of competition and cooperation (Gnyawali & Ryan Charleton, 2018). Future investigations could extend their focus to individual TMT members, thereby enriching the comprehension of managerial antecedents influencing firms' coopetitive behavior. It is plausible that specific TMT roles, such as chief strategy officer or chief risk officer, influence firms' coopetitive actions. Additionally, further examining CEO attributes could present a promising avenue for research into coopetition antecedents.

## 6. Conclusion

Our study significantly advances the understanding of coopetition dynamics, focusing on the pivotal role of TMTs in shaping their firms' behavior. We propose that TMT functional background diversity positively influences inter-firm coopetition. Based on a dataset covering 1698 alliances among 334 S&P 500 firms from 2005 to 2020, our findings confirm the promotional role of TMT functional background diversity in inter-firm coopetition and reveal its nuanced impact on cooperation and competition intensity within coopetition. This research offers valuable insights for both theoretical advancements and practical applications, emphasizing the crucial role of TMTs in shaping strategic inter-firm relationships.

## CRediT authorship contribution statement

**Carolin Krieweth:** Conceptualization, Writing – review & editing. **Patricia Guragata-Balasa:** Conceptualization, Writing – original draft. **Andrea Greven:** Conceptualization, Methodology. **Malte Brettel:** Supervision.

## Declaration of competing interest

None.

## Data availability

Data will be made available on request.

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