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RESEARCH ARTICLE

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How management teams foster the transactive memory system–entrepreneurial orientation link: A domino effect model of positive team processes

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Abstract

Research Summary: Specialized knowledge can be a facilitator of entrepreneurial orientation (EO), but little is known about how management teams transform their knowledge resources into entrepreneurial activity. Complementing the knowledge-based view with social interdependence theory, we suggest that team processes mediate the impact of teams' transactive memory system (TMS) on EO. Our empirical analysis of data from interdisciplinary management teams shows that a strong TMS serves as a starting point to initiate a beneficial "domino effect" of positive team interaction patterns (enhanced team learning and participative decision-making) and positive team psychological processes (enhanced team identification), which, in turn, foster the development of EO. We thereby contribute new insights to the largely unresolved questions about the "where" and "why" of EO genesis within organizations.

Managerial Summary: Enhancing entrepreneurial orientation (EO) is of major importance for established firms to stay competitive in the market. This study sheds light on the question how EO emerges within management teams of a firm's decentralized units and specifically gives insights

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about how team design and team processes can foster the EO of these units. We find that teams with specialized experts who share a common meta-knowledge about who knows what in their team (i.e., teams with a strong transactive memory system) engage in more team learning and participative decision-making and identify themselves more strongly with their team, which consequently spurs unit EO. Our results highlight that well-designed and well-functioning management teams below the executive level can play an important role in fostering entrepreneurship in multiunit organizations.

KEYWORDS

entrepreneurial orientation, knowledge-based view, social interdependence theory, team processes, transactive memory systems

1 | INTRODUCTION

Entrepreneurship depends on knowledge (Floyd & Wooldridge, 1999; Shane, 2000; Wiklund & Shepherd, 2003). To engage in entrepreneurial orientation (EO), firms need to create new knowledge and, at the same time, combine and integrate existing knowledge (De Clercq, Dimov, & Thongpapanl, 2013; Hayton, 2005). To be precise, knowledge resides within the individuals and teams working in these firms (Covin & Slevin, 1991). The knowledge-based view (Grant, 1996b) claims that organizations benefit from a broad and diverse knowledge base held by its members, and entrepreneurship scholars have agreed that knowledge specialization, that is, teams composed of individuals specialized in diverse areas of expertise, could be a facilitator of entrepreneurial behavior (Alvarez & Busenitz, 2001; Sciascia, Mazzola, & Chirico, 2013). However, *possessing* (knowledge) resources is not enough—the question of how teams *use* these resources is at least as important (cf. Hansen, Perry, & Reese, 2004; Wales, Patel, Parida, & Kreiser, 2013). In this regard, it is surprising that EO research has yet to examine how teams *transform* their specialized knowledge into entrepreneurial action.

We complement the knowledge-based view (Grant, 1996b) with insights from social interdependence theory (Deutsch, 1949) to increase the understanding of how EO emerges from teams. We posit that teams with a strong transactive memory system (TMS)—a shared system of specialized knowledge with a joint understanding of who knows what (Lewis, 2003; Wegner, 1987)—can foster EO by eliciting a beneficial "domino effect" of positive team interaction patterns (team learning, participative team decision-making) and positive team psychological processes (team identification). In doing so, we add to the rare and limited research on the genesis of EO (Wales, Gupta, & Mousa, 2013; Wiklund & Shepherd, 2003). Specifically, we address the two key questions (1) "*where* does EO emerge?" and (2) "*why* does EO emerge?"

Considering the (1) *where* question, the picture is still incomplete regarding the *loci of EO emergence*. Prior research has identified two main loci of EO emergence: the CEO level (e.g., Boling, Pieper, & Covin, 2015; Cao, Simsek, & Jansen, 2015; Miller, 1983; Simsek, Heavey, & Veiga, 2010) and the top management team (TMT) level (e.g., Cho & Hambrick, 2006; Escribá-Esteve, Sánchez-Peinado, & Sánchez-Peinado, 2009; Sciascia et al., 2013; Zahra, 1993). The importance of CEOs and TMTs for shaping a firm's EO has been justified by the upper echelons

theory, according to which a firm's strategic orientation depends on the characteristics of its key executives (Hambrick & Mason, 1984). However, while this top-level view on EO emergence is certainly important, it disregards theoretical notions of EO being a pervasive phenomenon that manifests at all hierarchical levels of the organization (Covin & Slevin, 1991; Wales, Monsen, & McKelvie, 2011). Understanding EO emergence as an exclusively top-level (and thus top-down) process is especially problematic when it comes to multiunit firms, where separate units develop their own strategic orientations (Covin & Lumpkin, 2011; Jansen, Van den Bosch, & Volberda, 2005, 2006; Slevin & Terjesen, 2011). Here, the top-level view of EO may underestimate the power and influence of teams located at lower-level units in developing and shaping EO (Covin et al., 2020; Wales et al., 2011). Related to that, this view also underestimates the collective specialized knowledge residing within these teams as a key foundation of EO. We posit that these teams possess valuable specialized knowledge that they—in a cooperative effort—transform into entrepreneurial initiatives and thus into competitive advantage for the entire firm. Hence, we take up the idea that EO could arise from teams *below* the executive (CEO/TMT) level of the firm, which has been theoretically taken into consideration (e.g., Lumpkin, Cogliser, & Schneider, 2009; Wales et al., 2011; Wales, Covin, & Monsen, 2020) but rarely examined empirically before (for a recent exception, see Covin et al., 2020).

Considering the (2) *why* question, the picture is also incomplete regarding the *processes of EO emergence*, particularly within teams. In identifying antecedents of EO within teams, prior research has mostly focused on personal characteristics that TMT members bring into the team. Many of these characteristics relate to their knowledge resources, for example, their educational or functional background, tenure, or prior experience (e.g., Cho & Hambrick, 2006; Escribá-Esteve et al., 2009; Sciascia et al., 2013; Talke, Salomo, & Kock, 2011; Yang & Wang, 2014; Zahra, 1993). While this view on team knowledge resources can be helpful when examining the *ideal* composition of teams, it is still partly incomplete. In more detail, it may explain which (knowledge) resources are available but not how these are integrated and transformed into competitive advantage. Following the logic of the input-processes-output (I-P-O) models of team effectiveness (Gladstein, 1984; Kozlowski & Ilgen, 2006; McGrath, 1984), the above-noted knowledge resources would fall into the *input* part for explaining the *output*, that is, EO. However, the *processes* part necessary for team effectiveness has been largely neglected in both TMS (cf. Michinov & Juhel, 2018) and EO (cf. Wales, Gupta, et al., 2013) research. This is problematic because team processes are the key engine that "transform" (Gladstein, 1984, p. 500) or "convert" (Marks, Mathieu, & Zaccaro, 2001, p. 357) team resources into team outcomes. Considering the importance of knowledge for EO (e.g., Hayton, 2005; Wiklund & Shepherd, 2003), it is surprising that only very few EO scholars have yet tried to open the black box between knowledge resources and entrepreneurial action (e.g., De Clercq et al., 2013; De Clercq, Dimov, & Thongpapanl, 2015). We address this black box with the help of social interdependence theory and introduce three key mediating team processes (team learning, participative decision-making, and team identification) that jointly explain why a team's knowledge resources (i.e., its TMS) translate into EO.

Taken together, we offer a new theoretical perspective to EO emergence by advancing the knowledge-based view with a team-based process perspective derived from social interdependence theory. Contributing to *future EO research*, we show that fully understanding EO emergence requires shifting the locus of observation to teams *below* the top management. Our findings thus highlight the importance of placing EO in more narrowly circumscribed contexts (Miller, 2011; Wales, 2016; Wales et al., 2011) and of considering EO as a phenomenon that can pervade organizations and their business units heterogeneously (Slevin & Terjesen, 2011; Wales et al., 2011). Contributing to *research on the interface between EO and the knowledge-based view*, we show that fully understanding EO emergence also requires considering *in-depth processes* happening within teams. We thus hope that our approach to combine the knowledge-based view with a social interdependence perspective will spur discussions about the importance of knowledge as a managerial resource for EO (Miller, 2011), and, more importantly, the team process required to integrate and transform such knowledge into EO.

2 | THEORY AND HYPOTHESES DEVELOPMENT

2.1 | EO and the important role of management teams in lower-level organizational units

EO reflects management's decision-making orientation and inclination toward entrepreneurial activities and behaviors (Gupta & Dutta, 2016; Zhao, Li, Lee, & Chen, 2011). Following Hughes and Morgan (2007) and Lumpkin and Dess (1996), it consists of *innovativeness* (a tendency toward experimentation, creativity, and new solutions that lead to incremental or radical innovations), *proactiveness* (a prospect-oriented, forward-looking mentality and tendency to anticipate environmental changes and opportunities), *risk-taking* (the willingness to bear risk and uncertainty, including the extensive commitment of resources to yet unknown outcomes), *competitive aggressiveness* (a tendency to compete, outperform, and out-maneuver rivals through constantly exploiting information and leveraging one's own adaptive capabilities), and *autonomy* (the freedom to engage in creative, self-directed activities beyond formal job descriptions that may lead employees to recognize, pursue, and champion new opportunities).

Due to its role as the strategic posture of a firm (Covin & Slevin, 1991; Lumpkin & Dess, 1996), EO and its development has traditionally been ascribed to the actors located at the top of the firm—that is, CEOs and TMTs (Lyon, Lumpkin, & Dess, 2000). Accordingly, most studies have examined the characteristics and actions of CEOs (e.g., Wales, Patel, & Lumpkin, 2013) and TMTs (e.g., Sciascia et al., 2013) as important antecedents of EO. While this top-level perspective has yielded multiple valuable insights, it may reach its explanatory limits when we consider that firms commonly consist of multiple—oftentimes, autonomously acting—organizational units (cf. Tsai, 2002). Often, these units face very different or even contradictory local environments, forcing them to adopt different strategic orientations (Jansen et al., 2005, 2006). This aligns with the idea that EO is a pervasive phenomenon that can exist and emerge at different levels of the firm (Lumpkin et al., 2009; Wales et al., 2011) and contradicts the idea that CEOs and TMTs may top-down "dictate" EO throughout the multiunit firm.

We follow the notion that EO can arise from organizational units located *below* the top management, which has been only theoretically discussed so far (e.g., Wales et al., 2011). Specifically, we examine EO emergence within the lower organizational units of multiunit firms (hereafter referred to as *unit EO*). We assume that the management teams of these units (hereafter referred to as *management teams*) represent carriers of valuable specialized knowledge, which enables them to crucially shape their unit's EO.

2.2 | EO and the important role of specialized knowledge resources

A firm's knowledge resources can be key to competitive advantage (Grant, 1996a, 1996b). Knowledge resides within a firm's employees, who are themselves mostly organized in teams (Simsek & Heavey, 2011). Management teams do not only form pools of specialized knowledge but also set, implement, and execute strategic decisions (Floyd & Wooldridge, 1992; Hambrick, 2007; Joardar & Wu, 2011). We thus understand EO as emerging from the collective effort of management team members (cf. van der Vegt & Janssen, 2003). Following the knowledge-based view (Grant, 1996a, 1996b), firms benefit from teams that are composed of employees with diverse sets of specialized knowledge. When brought together, specialized knowledge within teams promises multiple new ideas and perspectives, the consideration of more decision alternatives, and the creation of new knowledge—all ultimately leading to more entrepreneurial action (Boeker, 1997; Covin et al., 2020; Floyd & Wooldridge, 1999; Sciascia et al., 2013). Consequently, management teams with specialized knowledge can be an important driving force of EO (Alvarez & Busenitz, 2001; Dai, Roundy, Chok, Ding, & Byun, 2016; Miller, 2011).

However, as with any organizational resource, knowledge must not only *exist* but also be *used* appropriately in order to be valuable (Hansen et al., 2004). In other words, "individual specialized knowledge does not automatically translate into entrepreneurial action" (De Clercq et al., 2013, p. 510). Thus, the knowledge-based view holds that

"the fundamental task of organizations is to coordinate the efforts of many specialists" (Grant, 1996b, p. 113). Against this background, we suggest that EO depends on the extent to which management teams are capable of integrating and leveraging their specialized knowledge resources (cf. De Clercq et al., 2013; Floyd & Wooldridge, 1999). We argue that a well-developed TMS will especially benefit management teams in their attempts to act in entrepreneurial ways. Supporting that idea, within a different research context (new venture teams), Dai et al. (2016) showed that a TMS can be "a micro-foundation of the entrepreneurial orientation of a new venture" (p. 1339).

2.3 | The transactive memory system as a starting point for EO emergence within teams

In the present study, we suggest that a strong TMS can be a valuable starting point helping teams to coordinate and integrate their specialized knowledge resources, ultimately leading to higher EO. A TMS is defined as a system of cognitive interdependence between team members (Lewis, 2003). In teams with a strong TMS, team members each possess unique expert knowledge and, at the same time, have a shared meta-knowledge about who knows what (Lewis, 2003; Mell, van Knippenberg, & van Ginkel, 2014; Wegner, Giuliano, & Hertel, 1985). TMS is characterized by specialization, credibility, and coordination of knowledge (Lewis, 2003; Li & Huang, 2013). *Specialization* means that team members each possess differentiated expert knowledge (Hollingshead, 1998, 2000; Wegner, 1987). *Credibility* describes the trust and reliance of team members on each other's specialized knowledge. *Coordination* is the team's ability to orchestrate specialized and distributed knowledge effectively and efficiently among team members and to delegate specific tasks to the person most capable of fulfilling them (Li & Huang, 2013; Wegner, 1987). Altogether, TMS has proven to be very beneficial for a wide variety of team-level and organizational-level outcomes, including team creativity (Gino, Argote, Miron-Spektor, & Todorova, 2010), team innovation (Fan et al., 2016), team (learning) performance (Austin, 2003; Michinov & Michinov, 2009), organizational ambidexterity (Dai, Du, Byun, & Zhu, 2017; Heavey & Simsek, 2015), and organizational innovation (Kwon & Cho, 2016).

We argue that a strong TMS is especially suited to support teams in the complex collective task of developing an EO and the associated exhibition of entrepreneurial acting. Acting entrepreneurially is challenging because entrepreneurial opportunities are often multifaceted and complex to assess (De Clercq et al., 2013; Grégoire, Barr, & Shepherd, 2010). Entrepreneurial actions require teams to fulfill multiple complex and highly uncertain nonroutine tasks, such as strategic decision-making and new venture activities (Lumpkin & Dess, 1996). Moreover, acting entrepreneurially requires teams to act rapidly and flexibly on opportunities, threats, and other environmental changes as they emerge (Argote & Ren, 2012). We suggest that a strong TMS can set the ground for EO emergence within teams because it equips teams with the necessary abilities to engage at all stages of entrepreneurial behavior, that is, to discover, evaluate, and exploit entrepreneurial opportunities (cf. Shane & Venkataraman, 2000).

The *specialization* aspect of a strong TMS equips teams with "quick and coordinated access to specialized expertise" (Lewis & Herndon, 2011, p. 1254). This allows teams' capabilities to become greater than the sum of their parts, enhancing knowledge creation and greater innovativeness (Sankowska, 2013) throughout all phases of entrepreneurial activity. During the discovery phase, specialization is helpful because a diverse spectrum of expertise from different fields can lead to the recognition of a greater number of promising business opportunities that single individuals might overlook (Heavey & Simsek, 2015). During the evaluation phase, teams with experts from different domains bring together diverse interpretations of the environment, which enables more specialized and in-depth assessments of business opportunities (Grégoire et al., 2010; Heavey & Simsek, 2015). During the exploitation phase, a diverse set of specialized knowledge opens up more possible avenues to act on entrepreneurial opportunities, thereby increasing the perceived feasibility of certain routes and activities (cf. De Clercq et al., 2013).

The *credibility* and *coordination* aspects of a strong TMS additionally form the basis for entrepreneurial action. Due to the effective coordination of knowledge and team members' trust in each other's expertise, team members

enjoy more individual autonomy in their own specific knowledge domain (Dai et al., 2016; Peltokorpi & Hasu, 2016). In the discovery phase, the higher degrees of cognitive freedom owing to shared cognitive labor and, thus, a reduced cognitive load for each individual in a TMS (Heavey & Simsek, 2017) may facilitate teams to continuously scan the environment and update the organization's possible strategic alternatives (Dai et al., 2016). During the evaluation phase, the mutual coordination and reliance within a strong TMS may support the approval of riskier actions and stronger, more aggressive competition with out-groups (Ashforth & Mael, 1989). During the exploitation phase, a more accurate understanding of the expertise held by other team members and the mutual reliance on their knowledge enables a team to prevent conflicts as well as facilitate collaborative discussions and proactive decision-making (Kozlowski & Ilgen, 2006).

Taken together, management teams with a strong TMS should be more capable of implementing an EO as opposed to those with a weak TMS (Dai et al., 2016). However, a strong TMS is only the starting point that can "facilitate the combinative integration and renovation of an organization's knowledge assets" (Argote & Ren, 2012, p. 1375). This raises the questions of why and how teams with a strong TMS successfully *transform* their specialized knowledge into actual EO.

2.4 | Social interdependence theory and the mediating role of team processes in the TMS–EO relationship

The idea that a TMS can set the ground for EO aligns with the tenet of knowledge-based view, which highlights the benefits of knowledge specialization within organizations (De Clercq et al., 2013; Grant, 1996b). However, we suggest that the knowledge-based view alone cannot explain how teams *transform* the TMS into EO. This is because the TMS—that is, the cognitive structure of a team—is only an *input* factor in the sense of the I-P-O logic of team functioning (Gladstein, 1984; McGrath, 1984; Wales, Gupta, et al., 2013). As an input factor, a TMS is a starting point that *enables* team-related outcomes (including EO). To understand the full impact of a TMS, however, it is essential to pay closer attention to the *processes* ("P") part necessary to transform inputs into beneficial team outcomes (Kozlowski & Ilgen, 2006).

We suggest that complementing the knowledge-based view with insights from *social interdependence theory* (Deutsch, 1949) can help to shed light into the black box of team processes standing between a TMS and EO. Social interdependence theory states that interdependence among team members—the degree to which the success of one individual depends on the actions and success of other individuals—is the starting point of team effectiveness (Johnson & Johnson, 1989, 2002). Social interdependence can take either a positive form, where single individuals can only be successful if the entire team is successful, or a negative form, where single individuals can only be successful if some or all other team members fail (DeOrtentiis, Summers, Ammeter, Douglas, & Ferris, 2013; Johnson & Johnson, 1989). According to social interdependence theory, interdependence within teams determines how team members interact and consequently feel, which in turn affects team outcomes (Johnson & Johnson, 2005). Positive interdependence gives rise to positive *team interaction patterns* and positive *team psychological processes* that finally lead to positive team outcomes (Deutsch, 1949; Johnson & Johnson, 2009).

Members of teams with a strong TMS depend and rely heavily on each other's specialized and distributed knowledge (Agnew, Van Lange, Rusbult, & Langston, 1998; Heavey & Simsek, 2015). In line with Wegner (1987), we thus suggest that a well-functioning TMS constitutes a form of *positive* interdependence where team members can only be successful in a joint effort—that is, when each team member's specialized knowledge is used and integrated. Following social interdependence theory, such positive interdependence will elicit a domino effect of positive team processes that finally lead to the emergence of EO. In a multimediator model, we propose that positive *team interaction patterns* (team learning, participative decision-making) and *positive team psychological processes* (team identification) explain how a TMS translates into EO. Figure 1 depicts the overall mediation model.

Specifically, since a TMS makes team members strongly interdependent on one another's knowledge, it will also prompt these team members to act in ways that increase the likelihood of all of them being successful (Johnson & Johnson, 2005). By learning from each other, which subsequently enables all members to participate in decisions, teams increase the likelihood that they will jointly be successful (cf. DeOrtentiis et al., 2013). *Team learning* and *participative team decision-making* thus represent two interconnected *positive team interaction patterns* driven by a TMS. Further, following social interdependence theory, we suggest that team learning and participative team decision-making will enhance team identification, representing team members' positive feelings toward the team and thus a *positive team psychological process*. This positive psychological feeling of belonging and togetherness will in turn set the ground for the emergence of the central outcome examined within our study—EO.

2.4.1 | Linking TMS and team interaction patterns (team learning and participative team decision-making)

Social interdependence theory posits that interdependence among team members determines how individuals interact with each other (Deutsch, 1949; Tolmie et al., 2010). In teams with a strong TMS, a single team member cannot succeed unless all other team members succeed (cf. Kirschner, Paas, Kirschner, & Janssen, 2011), resulting in a *positive* interdependence among team members. When team members are positively interdependent upon each other (as in the case of a strong TMS), they engage in positive interaction patterns in order to increase the likelihood of achieving joint success (Johnson & Johnson, 2005). Thus, when team members' efforts are immediately interconnected, they tend to encourage and facilitate each other's efforts (Tolmie et al., 2010).

We suggest that *team learning* is one key interaction pattern through which members of teams with a strong TMS encourage collective efforts. Team learning describes how teams receive and process information to adapt and improve. It includes seeking feedback, gathering and sharing information, experimenting, and considering errors as a source of future improvements (cf. Edmondson, 1999). Team learning is a primary process by which specialized knowledge is exchanged in a team (van Knippenberg, Dreu, & Homan, 2004). Following social interdependence theory, teams with a strong TMS should be particularly motivated to engage in team learning because all team members benefit from a reliable collective knowledge base. Team learning not only enables each member to acquire deeper knowledge in their own field of expertise, but also permits them to identify other experts and integrate their own

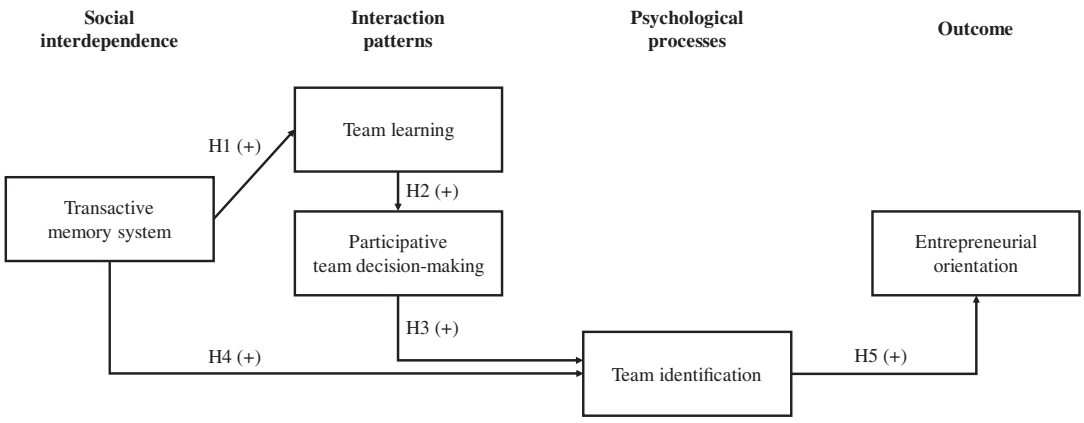

FIGURE 1 Theoretical model and hypotheses.
Notes: Hypothesis H6 (not shown) states that team learning, participative team decision-making, and team identification sequentially mediate the relationship between the transactive memory system and entrepreneurial orientation. Hypothesis H7 (not shown) states that team identification mediates the relationship between the transactive memory system and entrepreneurial orientation

knowledge with those members' expertise in complementary fields (Lewis, Lange, & Gillis, 2005; Wegner, 1987; Zheng & Mai, 2013). Such knowledge integration also helps teams to create new knowledge that can serve as a potential source of new ideas and innovation (Cohen & Levinthal, 1990; Lewis et al., 2005; Peltokorpi, 2008; Wegner et al., 1985).

Taken together, for teams with a strong TMS, team learning is an opportunity to constantly expand, improve, and renew their collective knowledge base (cf. Heavey & Simsek, 2017; Michinov & Michinov, 2009). Team learning advances not only each member's expert knowledge but also the shared meta-knowledge of who knows what (Lewis & Herndon, 2011; Ren & Argote, 2011), which again helps *all* interdependent team members to be successful. Consistent with this view, in their review of the TMS literature, Lewis and Herndon (2011, p. 1257) theorized that "groups with a TMS will demonstrate greater learning." Accordingly, we hypothesize that:

Hypothesis (H1) *Management team TMS is positively related to team learning.*

As a second downstream team interaction pattern, we suggest that—as a consequence of their team learning patterns—teams with a strong TMS will also engage in more *participative decision-making*, defined as "the degree to which all members are allowed to participate in decisions" (Campion, Medsker, & Higgs, 1993, p. 826). In line with social interdependence theory, a well-developed TMS, as a form of positive interdependence, should not only motivate team members to engage in team learning but team learning should also motivate members of these teams to contribute their specialized knowledge when important decisions are made. In other words, teams with a strong TMS might benefit from team learning, but learning is worthless if some of the interdependent team members refuse to contribute their expertise to inform collective team decisions (cf. Miron-Spektor, Erez, & Naveh, 2011).

We suggest that the joint understanding that teams with a strong TMS generate through team learning enables the inclusion of different team members in the decision-making process (Akgün, Byrne, Keskin, & Lynn, 2006; Fraidin, 2004). In particular, the participation of team members in decision-making becomes possible because all members have the same starting position in terms of knowledge (who knows what), tasks, and expectations resulting from team learning, but simultaneously hold their specific expertise, thereby making a valuable contribution to successful decision-making. Thus, we argue that after a strong TMS has prompted teams to engage in more team learning, team learning will encourage all team members to engage in a joint collaborative form of decision-making. More formally, we hypothesize that:

Hypothesis (H2) *Team learning is positively related to participative team decision-making.*

2.4.2 | Linking TMS, team interaction patterns, and team psychological processes (team identification)

Following social interdependence theory, a well-developed TMS should not only foster positive team interaction patterns but also positive psychological processes. That is, positive interdependence among team members (such as a TMS) also increases positive feelings toward that team (Johnson & Johnson, 2005, 2009). Building on prior research in anesthesia teams (Michinov, Olivier-Chiron, Rusch, & Chiron, 2008), we suggest that one central psychological process emerging from a TMS is *team identification*, defined as the emotional significance that members attach to their team (van der Vegt & Bunderson, 2005). When team identification is high, members feel a strong sense of "oneness" with the team (Ashforth & Mael, 1989). Research from social psychology shows that individuals identify with a team when this team meets their simultaneous psychological needs of *belongingness* and *uniqueness* (Brewer, 1991; Shore et al., 2011). We suggest that a strong TMS (as a form of social interdependence) fulfills these two basic psychological needs and thereby fosters team identification via two important pathways—indirectly and directly.

Relating to the *indirect* pathway, we suggest that team identification results from the favorable team interaction patterns that teams with a strong TMS demonstrate. That is, team identification will evolve from participative decision-making, which is itself a consequence of team learning. Specifically, we posit that participative decision-making fulfills members' need for belongingness, that is, their need to be a valued member of a group (van Dick, van Knippenberg, Kerschreiter, Hertel, & Wieseke, 2008), thereby increasing team identification. The ability of team members to influence decision-making processes is a central factor that determines whether or not they perceive themselves as an important part of the team (Mor Barak, 2000; Mor Barak & Cherin, 1998). Raising one's own ideas and having a say in important team decisions makes individuals feel that they are valuable and contributive members of the team (Shore et al., 2011). Participative decision-making also creates a collective sense of ownership for team decisions (Liu, Wang, Hui, & Lee, 2012). That way, team members develop personal responsibility for the team's success or failure and thus feel "psychologically intertwined with the fate of the group" (Ashforth & Mael, 1989, p. 21). Accordingly, we hypothesize that:

Hypothesis (H3) *Participative team decision-making is positively related to team identification.*

Relating to the *direct* pathway, we suggest that a strong TMS can also immediately enhance team identification by fulfilling team members' basic need for uniqueness (cf. Ashforth & Mael, 1989). Need for uniqueness means that individuals wish to be recognized for their individual idiosyncratic characteristics (Brewer, 1991). One way of achieving uniqueness is to be recognized as an esteemed expert in a certain field of expertise. Teams with a strong TMS are characterized by shared division of knowledge and mutual reliance on that knowledge (Lewis & Herndon, 2011; Ren & Argote, 2011). Each team member thus has the chance to fulfill an expert or specialist role in a certain domain and thus to make a valuable unique contribution to the team (Hollingshead, 2001). A strong TMS thus gives team members the feeling that they can rely on others and their specialized knowledge in difficult or complex tasks (Michinov et al., 2008; Michinov & Michinov, 2009). Taken together, by instilling all team members' need for uniqueness, we expect a TMS to evoke members' collective positive feelings of team identification. We thus hypothesize that:

Hypothesis (H4) *Management team TMS is positively related to team identification.*

2.4.3 | Linking team psychological processes (team identification) and outcomes (EO)

In line with social interdependence theory, a final step of the domino effect of a TMS should be the link between psychological processes and outcomes. We posit that team identification, as a central psychological process determined both directly and indirectly by a TMS, will positively affect EO. Entrepreneurial action within established organizations is a demanding, complex task that requires collective team effort (Parker & Collins, 2010; Rigtering & Weitzel, 2013). We suggest that high team identification motivates team members to perform such coordinated efforts (Ellemers, Kortekaas, & Ouwerkerk, 1999; van Dick et al., 2008). Specifically, we expect team identification to facilitate the emergence of an EO from the management team in the following ways.

First, team identification can help teams take the proactive stance needed for successfully pursuing entrepreneurial endeavors within existing firms. When team identification is high, members attach strong emotional significance to their membership in that team (van der Vegt & Bunderson, 2005) and consequently have a strong interest in making that team successful (Griffin, Neal, & Parker, 2007). Teams with a strong team identification are thus more likely to engage in proactive actions that benefit the whole team (De Jong, Parker, Wennekers, & Wu, 2015; Strauss, Griffin, & Rafferty, 2009), such as the proactive discovery and exploitation of entrepreneurial opportunities. Furthermore, teamwork is associated with more positive feelings when team identification is high (Lin, He, Baruch, & Ashforth, 2017). Members who experience such positive feelings are more likely to see the positive outcomes of

their actions (Parker, Bindl, & Strauss, 2010), which encourages them to initiate new and proactive team behaviors (Den Hartog & Belschak, 2007; Fredrickson, 2001). Second, team identification can lead to higher innovation and creativity within teams as important aspects of EO. A strong sense of "togetherness" within a team provides a safe culture in which members can have the courage to suggest creative and risky ideas (Chang, Jia, Takeuchi, & Cai, 2014; George, 2007). Thus, team identification enables teams to develop more innovative business opportunities (cf. Huber, 1991). Third, we suggest that team identification will also lead to more autonomous acting and decision-making within the team. This is because when team members support and trust each other, they are also more likely to grant each other higher degrees of autonomy (Langfred, 2007; Van Mierlo, Rutte, Vermunt, Kompier, & Doorewaard, 2006), for example, the freedom to seek new opportunities. Fourth, team identification may help teams to engage in more risk-taking behavior, which is also an integral part of EO. Teams with a strong emotional bond are more likely to take risks because their sense of oneness makes them feel that they carry the risk together, thereby reducing the anxiety associated with risk (Wallach, Kogan, & Bem, 1964). Fifth and finally, team identification might also lead to increased competition with groups outside the management team (Ashforth & Mael, 1989; van Knippenberg et al., 2004). This is because teams with high team identification tend to set themselves apart from outside groups (e.g., competitors) in order to be unique and distinctive (Pandza, 2011; Tajfel & Turner, 1986). Taken together, we propose the following hypothesis:

Hypothesis (H5) *Team identification is positively related to unit EO.*

2.4.4 | Overall mediation hypotheses

Taken together, we suggest that combining the knowledge-based view with social interdependence theory can enhance our understanding of how management teams' TMS transforms into EO. Following social interdependence theory, the input from a TMS in terms of specialized, credible, and coordinated knowledge (i.e., positive interdependence) elicits a domino effect of enhanced team learning and enhanced participative decision-making (i.e., positive interaction patterns), as well as enhanced team identification (i.e., positive psychological processes) on EO. We have introduced two different pathways through which a well-developed TMS exerts its beneficial effects on EO.

Taking up the first pathway (combining Hypotheses H1, H2, H3, and H5), we suggest that a strong TMS enables collective learning within teams, which, in turn, enables members to participate in decision-making to solve complex problems. This is likely to increase team members' identification with their respective management team and to create a team environment in which EO is more likely to emerge. We thus propose that:

Hypothesis (H6) *There is a sequential indirect positive relationship between management team TMS and unit EO through team learning, participative team decision-making, and team identification.*

Taking up the second pathway (combining Hypotheses H4 and H5), we additionally suggest that TMS exerts a direct beneficial effect on team identification, which again spurs the development of an EO. We thus hypothesize that:

Hypothesis (H7) *There is an indirect positive relationship between management team TMS and unit EO through team identification.*

3 | METHODS

3.1 | Sample and data collection

We conducted a personalized online survey among the decentralized German branches of a leading international logistics firm. In general, the logistics sector is characterized by a highly competitive market environment with strong

cost pressure, a high level of internationalization, and threats due to new market entries and rapidly changing market rules (e.g., Amazon's same-day or drone delivery), which strongly pressurizes established firms to innovate and compete (Cordon, Garcia-Milà, Ferreiro Vilarino, & Caballero, 2016; Oliver Wyman Group, 2015). Against this backdrop, prior studies have pointed out that knowledge is one of the most crucial factors for logistics innovation (Chapman, Soosay, & Kandampully, 2003; Grawe, 2009). Most logistics firms today use so-called decentralized hub structures in which the units have discretion over operative and strategic decisions. Regarding the firm under examination, its decentralized branches constitute autonomous units geographically distributed throughout Germany. Each unit is controlled by its own management team, which enjoys a relatively high degree of discretion in terms of operative and strategic decisions, for example in terms of their pricing or how they compete for customers. Overall, the above aspects make it an interesting environment to study the emergence of EO in greater detail.

Before conducting the survey, we held an initial meeting with firm representatives to understand its interdisciplinary management team approach. Each unit's management team included members with different functions and expertise, that is, center managers, supervisors, business development managers, human resource managers, and safety and security managers. In total, we individually invited 377 individuals from 73 unit management teams to our survey. Our final sample consists of 56 management teams comprising 255 individual responses, accounting for 76.71% of all units, which is a satisfying response rate and reduces the threat of nonresponse bias (Nulty, 2008). On average the team members' age was 47.22 years, ranging from a minimum age of 37.33 years to a maximum age of 57.25 years, with a standard deviation (*SD*) of 4.03. The average team size was 4.55 members with a minimum of two team members[1] and a maximum of eight team members (*SD* = 1.59). The teams mainly comprised men with an average proportion of 91.45% across all teams (*SD* = 0.12). This is not surprising considering the relatively low proportion of women in (top) management positions in Germany in general and in the specific context of the logistics sector (Destatis, 2018).

3.2 | Measures

To prevent common method bias, we applied a multirespondent approach to measure the study constructs. Information on the independent variables was collected from all management team members and aggregated to the team level. For the dependent variable (EO), we used ratings provided by the key informants (center managers and supervisors) of each unit. The scale items were assessed on a 7-point Likert scale ranging from *totally disagree* (1) to *totally agree* (7).

3.2.1 | Transactive memory system

We applied the 15-item TMS scale by Lewis (2003), which was rigorously developed and has since been validated and recommended as the standard scale for measuring TMSs in field settings (Heavey & Simsek, 2017; Lewis & Herndon, 2011; Ren & Argote, 2011). This measure considers a TMS as a latent, reflective construct consisting of its three manifestations, namely, specialization, coordination, and credibility of knowledge (Lewis & Herndon, 2011). According to its theoretical development and empirical research, all three dimensions covary due to a common underlying factor and hence confirm the presence of a TMS. Vice versa, the presence of a TMS cannot and should not be inferred in the absence of covariation among these manifestations (Heavey & Simsek, 2017; Lewis, 2003). The interpretation of the TMS construct implies that higher values indicate a better developed TMS, which, in turn, implies the presence of differentiated expert knowledge, mutual trust in each other's expert knowledge, and smooth, well-coordinated task processing (Lewis, 2003). Sample items are “each team member has specialized knowledge of a certain domain” (specialization), “I trust that other members' specialized knowledge is credible” (credibility), and “our team works together in a well-coordinated fashion” (coordination). After conducting exploratory and

confirmatory factor analyses, we eliminated three TMS items[2] due to factor loadings below the recommended threshold of .40, and we can confirm a good model fit to the data (chi-square/° of freedom (CMIN/DF) = 1.60; comparative fit index (CFI) = .91; standardized root mean square residual (SRMR) = .07). We can also confirm good reliability and internal scale consistency (Cronbach's alpha [α] = .83) as well as the proposed latent conceptualization with a good model fit (CMIN/DF = 1.33; CFI = .95; SRMR = .07).

3.2.2 | Team learning

We measured team learning with Edmondson's (1999) 7-item measure. This scale was recommended by Kozlowski and Ilgen (2006), particularly because it represents a process view that is consistent with our approach and is one of the few scales developed for and validated in a field study. A sample item is "we regularly take time to figure out ways to improve our team's work processes." Cronbach's alpha for this scale was .84.

3.2.3 | Participative team decision-making

In order to assess the extent of each team member's participation in team decision-making processes, we adapted the work group participation scale developed and validated by Campion et al. (1993). The three items include "as a member of the management team, I have a real say in how the team carries out its work." Cronbach's alpha for this scale was .95.

3.2.4 | Team identification

To assess individuals' identification with their respective work team, we used the team identification scale by van der Vegt, van de Vliert, and Oosterhof (2003), which adapted four items of the Allen and Meyer (1990) affective commitment scale to capture the specific aspects of team identification within work teams. A sample item is "I strongly identify with the other members of my work team." Cronbach's alpha for this scale was .86.

3.2.5 | Entrepreneurial orientation

For unit EO, we asked the center managers and supervisors to report on the EO in their respective units. In so doing, we followed the strategic decision-maker logic that argues for an assessment of EO at the upper-most level of a business unit and the recent recommendation to use aggregated data by the key informants of each business unit (Covin & Wales, 2018). We followed the recommendation of Covin and Wales (2012) to measure EO using standard scales and adapted the Hughes and Morgan (2007) EO scale to our specific research context. This scale comprises the five salient EO manifestations—risk-taking, innovativeness, proactiveness, competitive aggressiveness, and autonomy—as proposed in the seminal work by Lumpkin and Dess (1996). Sample items are "people in our branch are encouraged to take calculated risks with new ideas" (risk-taking), "we actively introduce improvements and innovations in our branch" (innovativeness), "we always try to take the initiative in every situation (e.g., against competitors, in projects and when working with others)" (proactiveness), "our business is intensely competitive" (competitive aggressiveness), and "employees are permitted to act and think without interference" (autonomy).[3] Cronbach's alpha for this scale was .94, and we can confirm the proposed latent conceptualization with a good model fit (CMIN/DF = 1.45; CFI = .94; SRMR = .08).

3.2.6 | Covariates

We included covariates to control for variance caused by extraneous factors that are not subject to our explicit research question. Entrepreneurship, management team, and TMS literature suggest controlling for certain variables. The team size is likely to influence team processes and outcomes (Choi, Lee, & Yoo, 2010; Ren & Argote, 2011). Team tenure may explain relationship building among team members (Hirst, van Knippenberg, & Zhou, 2009; Srivastava, Bartol, & Locke, 2006). Employees' age is likely to influence the proclivity to entrepreneurial behavior (Bosma, Stam, & Wennekers, 2011; Hatak, Harms, & Fink, 2015).

3.2.7 | Aggregation of measures

In accordance with comparable studies (e.g., Heavey & Simsek, 2015), we aggregated the answers of at least two team members of each unit. To justify this aggregation of data at the team level, we assessed the agreement among team members using the r_{wg} statistic (George, 1990; LeBreton & Senter, 2008). For the constructs aggregated to the team level, we observed high agreement among team members (r_{wg} = .92 for TMS, .88 for team learning, .78 for participative team decision-making, .76 for team identification). For EO, which was aggregated from the ratings of center managers and supervisors, these key informants also showed high agreement (r_{wg} = .84). As recommended by LeBreton and Senter (2008), we additionally calculated the average deviation index (AD_M) for the mean rating for each management team to check for the robustness of results. With all AD_M values being considerably below the recommended critical value of .80 (Burke & Dunlap, 2002), we can confirm the appropriateness of data aggregation (Chan, 1998). Overall, using aggregated data helps alleviate single informant bias (Jansen et al., 2006).

3.3 | Common method bias

The present study relies on self-reported data, which is very common in EO research (Rauch, Wiklund, Lumpkin, & Frese, 2009) and integral to investigating team processes (van der Vegt et al., 2003). To mitigate the influence of potential single source or common method bias, we relied on the aggregated responses of at least two respondents, as mentioned above. In addition, scholars have also recommended using both ex ante procedural and ex post statistical techniques to minimize any issues of common source and common method variance (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003; Tepper & Tepper, 1993). We guaranteed all participants confidentiality and anonymity, as recommended by Podsakoff et al. (2003). In addition, we included reversed items in the questionnaire. To further rule out the possibility that common method variance might have biased our results, we used the marker variable technique (Lindell & Whitney, 2001) to confirm that a theoretically unrelated construct shows no significant correlations with the focal study variables. One theoretically unrelated marker variable was “resistance to change,” a construct that captures the team's average inclination to resist change, including, among others, cognitive rigidity, routine-seeking, and short-term focus (cf. Oreg, 2003). As expected, this variable showed nonsignificant, mainly negative correlations with our study variables. After partialling out the smallest correlation coefficient of the marker variable with our focal variables, all statistically significant correlations maintained their significance. Hence, the test confirms the robustness of our measures and reveals that common method variance is unlikely to be a serious threat to our data. Finally, we conducted the commonly used Harman's single factor test (Podsakoff & Organ, 1986) to examine the degree of common method bias, ex post. The results (29.18% variance for the first factor) confirm that no single factor emerged that accounted for the majority of variance among the study variables, thereby also indicating that common method bias is not a major issue in this study.

4 | ANALYSES AND RESULTS

4.1 | Mediator analysis

We used Hayes' (2013) PROCESS macro for SPSS to test the hypothesized mediation effects between TMS and EO. The PROCESS macro is based on ordinary least squares (OLS) regression and uses bootstrapping techniques, which is the recommended method for examining indirect effects (Preacher & Hayes, 2004; Williams & MacKinnon, 2008). This approach is common in both entrepreneurship and management research (Anderson, Covin, & Slevin, 2009; Eshima & Anderson, 2017). We apply PROCESS model 6, which allows to test the entire hypothesized sequential mediation in one model and provides estimates for all total, direct, and indirect effects in this model. Moreover, the PROCESS macro is advantageous because it does not rely on the assumption of a standard normal sample distribution and it leads to stable results, particularly for relatively small samples (Hayes & Preacher, 2010; Preacher & Hayes, 2004, 2008; Zhao, Lynch, & Chen, 2010). We ran the model by using 50,000 bootstrap samples for bias-corrected confidence intervals with a confidence level of 95%.

4.2 | Descriptive statistics

Table 1 presents the descriptive statistics, Cronbach's alpha values, and correlations among the study variables for both team-level data (below the diagonal) and individual-level data (above the diagonal) (Hirst et al., 2009). Any substantial multicollinearity issues among the study variables can be precluded, with variance inflation factors recorded below 3.2 and hence considerably below the benchmark of 10 (Aiken, West, & Reno, 1991; Hair, Black, Babin, Anderson, & Tatham, 2006).

4.3 | Hypotheses tests

Table 2 presents the results of the sequential mediation analysis (PROCESS model 6), including all hypothesized direct and indirect relationships between the variables. Figure 2 further illustrates all direct and indirect path estimates for our hypothesized model. Consistent with Hypotheses H1 and H2, management team TMS was significantly and positively related to team learning (Step 1 in Table 2; β = .57; p < .001) and team learning was significantly and positively related to participative team decision-making (Step 2 in Table 2; β = .65; p < .001). Participative team decision-making was significantly and positively related to team identification (Step 3 in Table 2; β = .37; p < .01), lending support to Hypothesis H3. Consistent with Hypotheses H4 and H5, we also found significant support for a direct positive relationship between management team TMS and team identification (Step 3 in Table 2; β = .34; p < .01) and for a positive link between team identification and unit EO (Step 4 in Table 2; β = .42; p < .01).

Relating to the hypothesized indirect effects, the bootstrapping mediation analysis supported our hypothesized sequential mediation with a significantly positive indirect effect of the TMS on EO through team learning, participative team decision-making, and team identification (β = .06; 95% bias-corrected confidence interval = .01 to .21). Thus, Hypothesis H6 can be confirmed. The mediation analysis further illuminates a significantly positive indirect effect of the TMS on EO through team identification (β = .14; 95% bias-corrected confidence interval = .03 to .35), thereby confirming Hypothesis H7. In order to test whether it is a full or partial mediation, we directly regressed EO on TMS, together with the control variables. The results showed a significantly positive direct effect of TMS on EO (β = .59; p < .001), which becomes nonsignificant after integrating the proposed mediators into our model (Step 4 in Table 2; β = .18; n. s.). Accordingly, we found a full mediation, that is, the effect of TMS on EO can be fully attributed to the employed mediators.

TABLE 1 Descriptive statistics, alpha values, and correlations among study variables

		Min.	Max.	Mean	*SD*	1	2	3	4	5	6	7	8
1	Team size	2.00	8.00	4.55	1.59	(–)	.02	.04	−.17 [a]	−.23 [b]	−.10	−.18 [b]	−.11
2	Team member age	37.33	57.25	47.22	4.03	.05	(–)	.53 [b]	−.04	.16 [a]	.04	.05	.06
3	Team tenure	1.28	19.77	9.84	4.54	.07	.60 [b]	(–)	−.06	.06	−.04	.13 [a]	.04
4	Transactive memory system	3.86	6.62	5.42	0.56	−.31 [a]	.03	−.03	(.83)	.53 [b]	.46 [b]	.52 [b]	.55 [b]
5	Team learning	2.71	6.71	4.92	0.81	−.46 [b]	.23	.10	.67 [b]	(.84)	.54 [b]	.58 [b]	.52 [b]
6	Participative team decision-making	1.56	7.00	5.77	0.99	−.23	.16	−.05	.53 [b]	.69 [b]	(.95)	.54 [b]	.48 [b]
7	Team identification	3.60	6.75	5.67	0.68	−.38 [b]	.01	.00	.69 [b]	.69 [b]	.68 [b]	(.86)	.54 [b]
8	Entrepreneurial orientation	1.00	6.24	4.58	0.85	−.24	.21	.06	.61 [b]	.64 [b]	.61 [b]	.70 [b]	(.94)

Note: N = 56 teams. Descriptives are shown for aggregated values. Team member age and team tenure in years. Alpha values for aggregated scales in parentheses on the diagonal. Individual-level correlations above the diagonal (N = 135–255).

[a]Correlation is significant at the .05 level (two-tailed).

[b]Correlation is significant at the .01 level (two-tailed).

TABLE 2 Results of the mediation analysis (PROCESS, model 6)

	Dependent variable: Team learning				
			Bootstrapped CI [95%]		
Step 1: Mediator variable model	**Coeff.**	***SE***	**LL**	**UL**	***p***
Team size	−.29	.10	−.49	−.09	.00
Team member age	.22	.12	−.01	.46	.06
Team tenure	.00	.12	−.23	.24	.98
Transactive memory system	.57	.10	.37	.77	.00
	Dependent variable: Participative team decision-making				
			Bootstrapped CI [95%]		
Step 2: Mediator variable model	**Coeff.**	***SE***	**LL**	**UL**	***p***
Team size	.11	.11	−.11	.34	.31
Team member age	.12	.13	−.14	.37	.36
Team tenure	−.18	.12	−.43	.06	.14
Transactive memory system	.13	.13	−.14	.40	.33
Team learning	.65	.15	.35	.94	.00
	Dependent variable: Team identification				
			Bootstrapped CI [95%]		
Step 3: Mediator variable model	**Coeff.**	***SE***	**LL**	**UL**	***p***
Team size	−.10	.10	−.30	.09	.31
Team member age	−.17	.11	−.39	.05	.13
Team tenure	.11	.11	−.10	.33	.30
Transactive memory system	.34	.12	.11	.57	.00
Team learning	.19	.15	−.11	.49	.20
Participative team decision-making	.37	.12	.13	.61	.00
	Dependent variable: Entrepreneurial orientation				
			Bootstrapped CI [95%]		
Step 4: Outcome variable model	**Coeff.**	***SE***	**LL**	**UL**	***p***
Team size	.06	.11	−.16	.27	.61
Team member age	.19	.12	−.06	.44	.14
Team tenure	−.05	.12	−.30	.19	.66
Transactive memory system	.18	.14	−.10	.46	.19
Team learning	.13	.17	−.21	.46	.46
Participative team decision-making	.12	.15	−.17	.42	.41
Team identification	.42	.16	.10	.74	.01
Indirect effect of transactive memory system on entrepreneurial orientation through team identification	.14	.08	.03	.35	
Indirect effect of transactive memory system on entrepreneurial orientation through team learning, participative team decision-making and team identification	.06	.04	.01	.21	

Note: $N = 56$ teams. Bootstrap sample size = 50,000.
Abbreviations: CI, confidence interval; LL, lower limit; UL, upper limit.

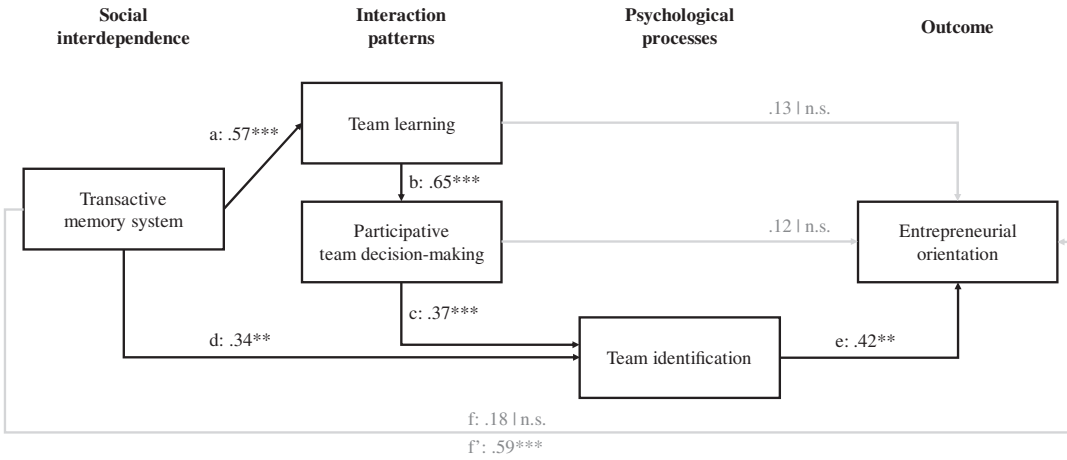

FIGURE 2 Results of the mediation analysis.
Notes: $N = 56$ teams. Standardized regression coefficients. n.s. = not significant. f'= direct effect of TMS on EO without integration of mediators. Indirect effect of path a × b × c × e = .06 | 95% bias-corrected confidence interval: .01 to .21 (50,000 bootstrap samples). Indirect effect of path d × e = .14 | 95% bias-corrected confidence interval: .03 to .35 (50,000 bootstrap samples). For the sake of simplicity, this simplified figure of the actual model under examination does not depict all nonsignificant effects, control variables, and error terms.
$^{*}p < .05$ (one-tailed). $^{**}p < .01$ (one-tailed). $^{***}p < .001$ (one-tailed)

4.4 | Supplementary analyses

In addition to testing our hypothesized effects, we conducted supplementary post hoc analyses to investigate the robustness of our findings. First, considering the dimensionality debate in EO research (cf. George & Marino, 2011), that is, whether EO should by captured by three dimensions following Covin and Slevin (1989) or five dimensions following Lumpkin and Dess (1996), our measurement of the five dimensions might be questioned. We recognize that scholars have recently agreed that neither approach is superior or inferior and that "both are appropriate for study" (Covin & Wales, 2018, p. 2). To corroborate our results, we reestimated the model using only the three EO dimensions suggested by Covin and Slevin (1989). The results were consistent with our initial findings, indicating that they are not limited to a certain approach to EO.

Second, our approach to examine TMS in a unidimensional way reflects the notion that the three TMS dimensions coexist and work together (e.g., Lewis, 2003) and is in line with the approaches of prior studies with management teams (e.g., Heavey & Simsek, 2015). However, a study by Michinov et al. (2008) on the TMS—team identification relationship in anesthesia teams examined the TMS dimensions separately and found that coordination and credibility positively affect team identification, while specialization had no statistically significant effect. In a post hoc analysis, we replicated their analysis and found that all three TMS dimensions positively related to team identification, thereby also confirming the appropriateness of aggregating the TMS dimensions in our study. This difference—that is, the positive effect of specialization in our management team sample—may be due to the even greater dependence on integrating domain-specific expertise in knowledge-worker teams to gain results.

Third, although our study builds on prior findings of a TMS as an antecedent of EO (Dai et al., 2016), it might still be subject to reverse causality due to its cross-sectional research design. To alleviate this concern, we estimated the reverse model, which yielded mostly nonsignificant results for the relationships under study, indicating the appropriateness of our theorized model.[4]

5 | DISCUSSION

Confirming the importance of knowledge specialization and integration in the context of entrepreneurship, the present study demonstrates that a well-developed TMS can foster the emergence of EO within management teams. Supporting the view of social interdependence theory, teams with a strong TMS engage in positive team interaction patterns in order to facilitate each other's success. Their positive knowledge interdependence encourages team learning during which members exchange specialized knowledge and build a collective knowledge base. Such team learning consequently enables all team members to contribute jointly to team decisions (participative team decision-making). Over and above, team identification, as a team psychological process, plays a crucial role in linking TMS and team interaction patterns with EO. By increasing positive feelings toward the team, TMS both directly and indirectly triggers management teams to collectively shape their unit's EO.

5.1 | Theoretical implications

5.1.1 | Implications for the literature on entrepreneurial orientation

This study provides new insights into two important questions that surround the still under-researched genesis of EO. Contributing to the first question—"*where* does EO emerge?"—we turn the spotlight on the role of teams. In demonstrating that EO can also emerge from teams below the top management level (CEOs and/or TMTs), we provide evidence for the pervasiveness of EO within firms (Wales et al., 2011). We show that differences in the level of EO within firms can be attributed to teams and how they structure, integrate, and make use of their collective knowledge. These findings are in line with recent research highlighting the roles of individuals and management teams (Covin et al., 2020; Gupta, Dutta, & Chen, 2014; van Doorn, Heyden, & Volberda, 2016; Wales, Gupta, et al., 2013) and the importance of internal knowledge resources (De Clercq et al., 2013; Wiklund & Shepherd, 2003) for the development of EO. Our results thus support the notion that EO can manifest heterogeneously (i.e., horizontally) across different firm units (Slevin & Terjesen, 2011; Wales et al., 2011), meaning that units of the same firm do not necessarily exhibit the same levels of EO (Covin & Lumpkin, 2011). The finding that units of the same firm can display heterogeneous levels of EO highlights that "shortcuts such as treating the organization as a unitary actor" (Barney & Felin, 2013, p. 148) might lead to erroneous conclusions about a firm's EO. Instead, we concur with the claim to place EO in a more specific and narrower context in order to gain deeper, more meaningful insights into its genesis (Miller, 2011; Wales, 2016; Wales et al., 2011). In this regard, future studies should also pay attention to the power and influence of organizational players and groups below the CEO and TMT level in shaping EO (Covin et al., 2020; Wales et al., 2011).

Over and above, we reveal processes through which teams can foster EO, thereby contributing to the second question "*why* does EO emerge?" Confirming the knowledge-based view and following Miller's (2011) call to connect EO to this view, we find that knowledge resources can be a key input factor for EO and thus competitive advantage (Grant, 1996a). Extending the knowledge-based view, we additionally specify the exact processes through which teams transform their knowledge resources into entrepreneurial activity. Our study shows that complementing the knowledge-based view with team processes based on social interdependence theory (Deutsch, 1949) helps to shed light into the black box linking TMSs and EO. That way, we demonstrate that it is not only the team's *possession* of specialized knowledge resources but, especially, the *integration* of such knowledge within teams that helps to foster EO. Notably, our results indicate that team identification can be particularly beneficial for EO emergence from teams as it is a key psychological process directly triggered by a TMS and also indirectly enhanced through the TMS and team interaction patterns (team learning and participative team decision-making). A well-developed TMS thus helps management teams to build a strong team identity and to evoke positive feelings of belonging and togetherness. These positive psychological feelings, in turn, provide a climate that facilitates the development and enactment of

entrepreneurial activities within teams. In this regard, we expand the scarce prior research considering the joint effects of knowledge resources and social interdependencies for the emergence of EO (e.g., De Clercq et al., 2013; De Clercq et al., 2015).

5.1.2 | Implications for the literature on teams and transactive memory systems

Contributing to team literature, our findings suggest that well-designed and well-managed teams play an important role in supporting a firm's overall strategic orientation (Cummings, 2004). Our study shows that teams with specialized members and a shared understanding of who knows what can be the driving force that facilitates EO. More particularly, our findings highlight the importance of a team's TMS as the starting point for EO genesis. Integrating insights from social interdependence theory (Deutsch, 1949), teams with a strong TMS benefit from a positive domino effect of positive team interaction patterns (enhanced team learning and participative decision-making) and positive team psychological processes (enhanced team identification). That way, our study also answers calls to consider the importance of psychological process variables that translate TMSs into outcomes by using the I-P-O logic (DeChurch & Mesmer-Magnus, 2010; Michinov & Juhel, 2018; Mol, Khapova, & Elfring, 2015).

This study also contributes to research on TMSs in two important ways. First, it identifies outcomes of TMSs in field research; such findings are still rare because most TMS research has been conducted within laboratory settings, temporary teams, or student samples, rather than real management teams in the field (Choi et al., 2010; Lewis & Herndon, 2011). This article therefore offers empirical evidence of the outcomes of TMSs in real management team settings within established firms.

Second, we expand TMS research by offering insights into how TMS can be connected to strategic outcomes (Heavey & Simsek, 2017; Mol et al., 2015; Ren & Argote, 2011) and especially answer the calls of Ren and Argote (2011) who suggest linking TMS research with entrepreneurial outcomes. Our results suggest that management teams with a strong TMS are better equipped to rapidly and flexibly meet the diverse challenges of today's uncertain and complex environment in the context of entrepreneurial endeavors (Ren & Argote, 2011). This is because members can rely on each other's knowledge resources and build on them to discover new links and facilitate the entrepreneurial process (Cohen & Levinthal, 1990; Kozlowski & Ilgen, 2006). Accordingly, future research should consider TMSs in entrepreneurial contexts and should continue investigating TMS outcomes in relation to strategy.

5.2 | Practical implications

This study gives rise to practical implications, especially for firms aiming to develop or maintain high levels of EO. Our finding that organizational units can differ in their level of EO should encourage executives and decision-makers to guide their view toward management teams below the executive level. Especially within multiunit firms, EO might be less of a homogenous but more of a heterogenous phenomenon that develops at the grassroots of the organization—that is, in its units (Slevin & Terjesen, 2011; Wales et al., 2011). For executives, seeing or even "dictating" EO solely from a top-level view may thus be too shortsighted because it disregards the peculiarities of the different units and the dynamics within the management teams of these units (Covin et al., 2020). Instead, allowing decentralized units to develop their own EO might enable multiunit firms to better respond to different local environments and conditions of competition (cf. Jansen et al., 2006). Hence, we would advise these firms grant their organizational units sufficient autonomy in their independent development of entrepreneurial initiatives.

Firms seeking to foster EO throughout their organization should especially support their management teams in developing a strong TMS, which we identified as a key starting point for EO. With knowledge specialization being the core of a TMS, firms should design and staff management teams in an interdisciplinary manner with individuals

specialized in different fields and from various business areas. Thus, when hiring new members for management teams, recruiters should target talent with a range of expertise and knowledge. In addition, training programs can be used to equip team members with specialized knowledge and with discussion and decision-making techniques, which can, in turn, benefit the entire team (Carlile & Rebentisch, 2003). Leaders within management teams should encourage all team members to engage in constant knowledge exchange and to communicate their expertise and knowledge (Dai et al., 2016). Another important factor for success is fostering a trusting atmosphere within the management team, perhaps through team building events. Thus, organizations should not only set the conditions for management teams to develop a strong TMS through staffing and training but also actively support the positive team processes necessary to transform the TMS into subsequent EO.

5.3 | Limitations and future research

Every study contains inherent limitations worth noting, while simultaneously offering opportunities for future research. A first limitation is that we used self-reported survey data, which may be subject to both common method and common source bias. To alleviate these potential biases, we used aggregated data reported independently by different team members and separated responses for the independent and dependent variables (Klein, Knight, Ziegert, Lim, & Saltz, 2011; Van Dyne & LePine, 1998). Future studies could replicate our findings using data from different firms, industries, or countries to improve the generalizability of our findings. Nonetheless, the logistics sector is a dynamic and innovative environment marked by strong competitive pressure (Chapman et al., 2003; Cordon et al., 2016) and is therefore well suited to our research model for investigating the antecedents of EO. Moreover, we think that our single-firm approach offers deep-level insight into our core research assumption that EO can emerge from management teams located at lower levels of one and the same firm. This approach also allowed us to control for firm-, industry-, and country-specific factors, which could have otherwise masked significant effects (Jansen et al., 2005, 2006).

Second, although our sample size might be considered a limitation, it is important to note that similar, and even smaller samples, are common in research exploring teams (Bunderson & Sutcliffe, 2003; Miron-Spektor et al., 2011). Nonetheless, studies replicating our findings with larger samples would potentially have greater statistical power.

Finally, we use cross-sectional data, which, though very common in both EO and TMS research (Choi et al., 2010; Rauch et al., 2009), may still pose a limitation to our study. We developed our research model by applying established theoretical approaches that support causality and additionally estimated the reversed model, but our research design does not allow us to completely eliminate concerns regarding reverse causality or the presence of any bi- or opposite-directional relationships. Future research could therefore employ a longitudinal study design to enhance the understanding of underlying causality in the proposed relationship; this would also enhance the understanding of possible differences in the strength of the relationships over time.

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ENDNOTES

[1] Units were included when at least one key decision-maker (center manager or supervisor) and at least one further supervisor or other management team member (business development manager, human resource manager, safety and security manager) responded.

[2] As a robustness check, we also ran the hypotheses tests including the scale items with low factor loadings. The results did not significantly differ from what is presented here and are available from the authors upon request.

[3] We excluded one autonomy item from the original Hughes and Morgan (2007) EO scale to better balance the overall construct. We selected the item with the lowest factor loadings in their study ("employees have access to all vital information").

[4] The results of all supplementary post hoc analyses are available from the authors upon request.

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