Ambidexterity: Size matters! Reflexive climate and organizational TMS's influence and the contingent effect of size

van Neerijnen, P.; Figge, P.; Tempelaar, M.P.; Schippers, M.C.

DOI
10.1080/00472778.2021.1981917

Publication date
2023

Document Version
Final published version

Published in
Journal of Small Business Management

Journal of Small Business Management

ISSN: (Print) (Online) Journal homepage: www.tandfonline.com/journals/ujbm20

Ambidexterity: Size matters! Reflexive climate and organizational TMS's influence and the contingent effect of size

Pepijn van Neerijnen, Patrick Figge, Michiel P. Tempelaar & Michaéla Schippers

To cite this article: Pepijn van Neerijnen, Patrick Figge, Michiel P. Tempelaar & Michaéla Schippers (2023) Ambidexterity: Size matters! Reflexive climate and organizational TMS's influence and the contingent effect of size, Journal of Small Business Management, 61:6, 3121-3154, DOI: 10.1080/00472778.2021.1981917

To link to this article: https://doi.org/10.1080/00472778.2021.1981917

JOURNAL OF SMALL BUSINESS MANAGEMENT
2023, VOL. 61, NO. 6, 3121–3154
https://doi.org/10.1080/00472778.2021.1981917

Routledge
Taylor & Francis Group

Ambidexterity: Size matters! Reflexive climate and organizational TMS's influence and the contingent effect of size

Pepijn van Neerijnen[a], Patrick Figge[b], Michiel P. Tempelaar[a], and Michaéla Schippers[c]

[a]Amsterdam Business School, University of Amsterdam, The Netherlands; [b]School of Business, Economics, and Information Systems, University of Passau, Germany; [c]Rotterdam School of Management, Erasmus University, The Netherlands

ABSTRACT

Previous research has implicitly assumed that integration mechanisms are universally applicable to achieve ambidexterity. However, when pursuing ambidexterity, organizations of different sizes face different challenges when they attempt to foster integration, that is, cooperation and coordination. Therefore, we investigate whether small organizations can use a reflexive climate "to feel big", and large organizations can use a transactive memory system "to feel small". Using a sample of 101 companies in six industries, we show that both mechanisms positively affect ambidexterity. As hypothesized, a reflexive climate is more effective for small organizations. A transactive memory system, however, seems effective regardless of size.

KEYWORDS

Ambidexterity; reflexive climate; organizational transactive memory system

Introduction

Organizational ambidexterity is key to sustained performance (Benner & Tushman, 2003). Ambidextrous organizations exploit existing competencies both to be successful in the short-term, as well as explore new competences to ensure long-term viability. However, exploitation and exploration require distinct ways of organizing (for example, Benner & Tushman, 2003; O'Reilly & Tushman, 2004). As a result, ambidextrous organizations are characterized by their heterogeneity in terms of expertise, identities, processes, and systems (March, 1991; O'Reilly & Tushman, 2013). In terms of an organization's efforts to become ambidextrous, heterogeneity carries with it both advantages and disadvantages. Greater heterogeneity promises greater potential for the realization of new (re-)combinations of explorative and exploitative knowledge. Such synergistic combinations are a key causal mechanism driving organizational

CONTACT Pepijn van Neerijnen p.vanneerijnen@uva.nl Amsterdam Business School, University of Amsterdam, PO Box 15953, Amsterdam 1001 NL, The Netherlands

Supplemental data for this article is available online at https://doi.org/10.1080/00472778.2021.1981917.

performance associated with ambidexterity (Jansen et al., 2009; Junni et al., 2013). At the same time, searching within a distributed knowledge landscape (Becker, 2001; Tsoukas, 1996) and transferring and integrating knowledge across syntactic, semantic and pragmatic boundaries becomes more challenging (Carlile, 2004). Relatedly, engaging in exploitation and exploration inevitably reveals gaps in the preexisting knowledge base (Cao et al., 2009; Smith & Lewis, 2011). Therefore, how organizations navigate these knowledge boundaries and gaps is key to creating ambidexterity.

As such, a key challenge for ambidextrous organizations is to foster integration (for example, Jansen et al., 2009), that is, realize cooperation (for example, Gibson & Birkinshaw, 2004) and coordination (for example, Jansen et al., 2009) across these internal knowledge boundaries. In general, enabling cooperation, that is, the alignment of interest, and coordination, that is, the alignment of action, are central functions of any organization, as they constitute the means by which overarching goals can be pursued (Lawrence & Lorsch, 1967). As the latter is an important organizational trait for ambidexterity (O'Reilly & Tushman, 2008), we specify two informal mechanisms that stimulate a relatively greater degree of cooperation or coordination, respectively, in the pursuit of ambidexterity: a reflexive climate for cooperation, and an organizational transactive memory system for coordination.

A reflexive climate is characterized by: "a concern with reviewing and reflecting upon objectives, strategies, and work processes, in order to adapt to the wider environment" (Patterson et al., 2005, p. 386). It encourages organizational members to discuss, refine, but also radically rethink, organizational processes, goals, and strategies (Schippers et al., 2015). The discursive nature of this process helps members to become more knowledgeable and supportive concerning key outcomes, such as the goals that are to be pursued and the means to do so (Schippers et al., 2014). A reflexive climate, therefore, inspires cooperation as it increases the willingness of organizational members to coalesce around the future state of the organization, as well as around potential pathways to achieving this state. An organizational transactive memory system (TMS) consists of: "a network of interdependent work groups that use each other as external cognitive aids to accomplish shared tasks" (Peltokorpi, 2012, p. 17). TMS "facilitate quick and coordinated access to [. . .] task-relevant knowledge [that] is brought to bear on collective tasks" (Lewis & Herndon, 2011, p. 1254). A TMS, thus, helps organizations to connect experts with tasks, thereby coordinating dispersed knowledge and expertise across internal knowledge boundaries (McGrath & Argote, 2001; Mell et al., 2014).

Both a reflexive climate and an organizational TMS are socio-cognitive, informal integration mechanisms that support learning behaviors among organizational members, albeit in different ways. While a reflexive climate stimulates organizational members to construct a renewed understanding of the organization's explorative and exploitative knowledge base (and the

tension between them), an organizational TMS yields a greater awareness of the existing knowledge base (Peltokorpi, 2012) and enables the recombination of explorative and exploitative knowledge. This capacity for organizational learning, combined with the ability to sustain continuous feedback and engage in adjustment behavior, makes these socio-cognitive integration mechanisms well suited to the pursuit of ambidexterity (Jansen et al., 2009; Martinez & Jarillo, 1989; Mom et al., 2009).

However, small and large organizations that pursue ambidexterity may benefit differently from a reflexive climate and transactive memory systems. Typically, larger organizations tend to have specialized subsystems (Lawrence & Lorsch, 1967), are more decentralized (Child, 1973), and are more differentiated and complex (Blau, 1970; Hall et al., 1967). Being more differentiated can limit oversight of a firm's dispersed knowledge (Becker, 2001; Tsoukas, 1996) and might hinder synergies due to the potentially greater degree of cognitive distance present in these organizations (Nooteboom et al., 2007), resulting in high coordination costs (Rawley, 2010). Thus, the ability to effectively and efficiently coordinate across this richly distributed knowledge base is a key driver of ambidexterity in larger organizations. In contrast, smaller organizations tend to have a narrower range of knowledge, and specialization in units and staff is more difficult to achieve (Fourné et al., 2019; Gupta et al., 2006). Owing to their limited scale, they are less able to support exploration activities by structurally separating them from exploitation (Lubatkin et al., 2006). However, smaller organizations are more maneuverable and can more easily mobilize their members (Fourné et al., 2019). Therefore, in order to optimize mobilization for ambidexterity, a key determinant of success for smaller organizations is allowing members to converge on the synergistic value of exploitation and exploration. Despite these striking differences, the literature offers only few insights into the effectiveness of integration mechanisms for organizations of varying size, which has resulted in explicit calls for research on this topic (Andriopoulos & Lewis, 2009, 2010; Csaszar, 2013). Against this backdrop, the goal of this paper is to examine how the impact of a reflexive climate and transactive memory systems on ambidexterity are moderated by organizational size.

We contribute to the ambidexterity literature in two ways. First, we add to the growing stream of literature that places socio-cognitive determinants at the forefront of ambidexterity research (Jansen et al., 2016; Kauppila & Tempelaar, 2016). We specify extant ambidexterity insights by conceptualizing informal mechanisms that stimulate a relative greater degree of alignment of interest, or cooperation, and alignment of action, or coordination, in the form of a reflexive climate and TMS respectively. Despite the importance of interest- and action-alignment for organizations, ambidexterity research has not yet explicitly conceptualized integration mechanisms as such. We show that a reflexive climate and organizational transactive memory systems are

important drivers of organizational ambidexterity. In doing so, we broaden our understanding of socio-cognitive factors that play a role in organizational ambidexterity.

Second, we investigate a fundamental contingency, namely size, that may impact the efficacy of TMS and reflexivity in relation to ambidexterity. We build on the work of Andriopoulos and Lewis (2010) and propose that a well-developed TMS makes large organizations "feel small," as it increases both awareness of the location of expertise and the ability to integrate that expertise across internal boundaries (Argote & Ren, 2012; Faraj & Sproull, 2000). In contrast, small organizations profit more from a reflexive climate, as the associated learning activities (Gavetti & Levinthal, 2001; Schippers et al., 2014; Vashdi et al., 2007) stimulate organizational members to collectively consider the viability of existing knowledge in relation to adapting to future organizational challenges. This helps them identify gaps and prompts the search for, and integration of, novel knowledge making small organizations "feel larger." This leads us to examine whether or not the effects of TMS and reflexive climate are contingent on organizational size. In doing so, we combine insights from socio-cognitive theory with organization theory to come to a richer understanding of the various ways in which organizations may pursue ambidexterity.

Theory and hypotheses

Organizational ambidexterity

The performance and survival of organizations of all sizes are driven by their capacity to adapt to their environment (McGrath, 2001; Van De Ven, 1986). Organizations do this through the exploration of new options and the exploitation of existing business (March, 1991). Here, exploitation is associated with the refinement of existing knowledge and, thus revolves around local knowledge sets (Levinthal & March, 1993). Exploration, however, involves the pursuit of novelty, which requires distant knowledge (Levinthal & March, 1993). This results in exploration and exploitation activities diverging in terms of purpose, ways of organizing, culture, pay-off structures, and knowledge type (Benner & Tushman, 2002; He & Wong, 2004; Tushman & O'Reilly, 1996). To become ambidextrous, firms need to realize high levels of exploration and exploitation simultaneously and foster (re)combinations of both explorative and exploitative knowledge (Jansen et al., 2009; Simsek et al., 2009). The simultaneous pursuit of exploration and exploitation makes ambidextrous firms inherently heterogeneous, as it both broadens their knowledge spectrum (Carlile, 2004) and gives rise to tensions, as firms seek to differentiate and integrate explorative and exploitative knowledge (Andriopoulos & Lewis, 2010; Smith & Tushman, 2005).

Antecedents to organizational ambidexterity

As indicated by past research, ambidexterity is driven by a variety of formal and informal integration mechanisms, such as cross-functional interfaces (Jansen et al., 2009), reward structures (Burgers et al., 2009), shared vision (Jansen et al., 2008), connectedness (Jansen et al., 2009), learning culture (Nemanich & Vera, 2009) and top management team behavioral integration (Halevi et al., 2015). While formal integration mechanisms are pre-established interfaces with a preconceived purpose, informal integration mechanisms are emergent and social (Jansen et al., 2009). When it comes to realizing ambidextrous outcomes, informal integration mechanisms are valuable antecedents, as their emergent nature is symbiotic with the unpredictable character of future synergies between exploration and exploitation (Smith & Lewis, 2011). This effectively allows these mechanisms to function as an overlay on the formal organization.

Formal and informal integration mechanisms both foster the ability of organizational actors to learn, develop, and share new knowledge (Grant, 1996). Without learning, these actors may get stuck in self-referential loops that are often produced as a result of specialized explorative or exploitative efforts within firms (Lewis, 2000; Smith, 2014). Integration mechanisms allow individuals to acquire supplementary knowledge that may broaden their understanding and stimulate novel ways of thinking (Jansen et al., 2009). This helps organizational actors in their efforts to develop a common understanding and to see explorative and exploitative knowledge as complementary and interwoven, as opposed to incompatible (Smith & Tushman, 2005). Existing ambidexterity literature has not yet linked these mechanisms to the fundamental organizational mechanisms of cooperation and coordination, in spite of the fact that they are central to creating this common understanding. Cooperation refers to the alignment of interest among actors, while coordination denotes the alignment of action (Castañer & Oliveira, 2020; Gulati et al., 2012; Kretschmer & Vanneste, 2017). The former induces members to jointly pursue certain tasks and learn together, while the latter prompts them to divide work and build on existing expertise (Grant, 1996). Previous research on exploration-exploitation integration can be categorized according to its focus on either cooperation or coordination. With regard to cooperation, Gibson and Birkinshaw (2004) highlight how shared ambition, identity and attributing personal meaning to the way in which individuals contribute to the overarching purpose of an organization, help individuals to move beyond their personal tasks and associated goals and knowledge. Likewise, Jansen et al. (2008) indicate how senior-team group contingency rewards help executives to look beyond their designated unit's interests and allocate resources across exploratory and exploitative units. In terms of coordination, past research has highlighted the role of cross-functional coordination, for instance, through which organizational members coordinate across exploration-exploitation

boundaries (Jansen et al., 2009). Lubatkin et al. (2006) underscore the importance of "synchronizing the social and task processes associated with collaborative behavior" (p. 651) through behavioral integration in SMEs that pursue ambidexterity. While a clear emphasis on either cooperation or coordination may be inherent in certain mechanisms, it should be noted that many of these mechanisms relate to both organizational challenges. This is a good thing, since creating ambidexterity is as much about defining aspirations and intent as it is about coordinating action. However, the conceptual separation of integration mechanisms into mechanisms that emphasize a relatively greater degree of cooperation and coordination allows us to highlight different benefits for small and large firms in their pursuit of ambidexterity.

Different playing fields for small and large ambidextrous organizations

With all else being equal, larger organizations exhibit a greater degree of local task specialization (Blau, 1970). As organizations grow, they will be inclined to divide labor into separate (simpler) tasks to gain scale and scope advantages (Lawrence & Lorsch, 1967; Weber, 1924). Given that organizations are prone to pooling similar activities (Grant, 1996; Simon, 1981; Thompson, 1967), larger organizations will enjoy a more varied, yet specialized, set of activities, compared to smaller organizations (Blau, 1970). In general, a greater number of different activities increases the complexity of larger organizations, due to the degree of occupational specialization (Hage, 1965), and due to the complexity introduced by the need to supervise, coordinate and control these more differentiated and specialized activities (Kahn et al., 1964). As such, large organizations tend to cultivate tight relationships within specialized units, while organizing "weak" interactions between them (Thompson, 1967), for example, in the form of targeted cross-functional coordination mechanisms. However, the greater diversity of knowledge and expertise afforded to larger organizations provides them with a greater number of potential exploratory and exploitative (re)combinations. As such, large firms seeking to realize ambidextrous outcomes tend to benefit more from coordination mechanisms that help them tap into their existing, distributed expertise.

In contrast, smaller organizations tend to be characterized by a higher degree of cooperation as organizational members are more involved in daily operations, and more knowledgeable about available competencies and markets, which enables small organizations to be quicker and more flexible in their responses (Chen & Hambrick, 1995; Dean et al., 1998; Lubatkin et al., 2006). This flexibility is a strength of smaller organizations, as it allows them to draw on a large share of members in the pursuit of novel knowledge. This capability is essential for smaller firms, as it allows them to compensate for a smaller and less-varied resource base. As such, smaller firms lean more heavily on relational and human capital to pursue novel knowledge (Lowik et al., 2012; McGuirk et al., 2015). Small firms, therefore, are likely to profit more from

mechanisms that encourage members to rethink the potential use of existing knowledge and incorporate new knowledge and expertise into their activities (Nooteboom, 1994). Both small and large organizations seeking ambidexterity may benefit from a variety of coordination and cooperation mechanisms. We argue, however, that large organizations typically benefit more from an organizational TMS as it allows them to tap into their richer knowledge base. Smaller organizations, however, gain more from a reflexive climate in which mutual learning is fostered to cope with the challenges of ambidexterity. With this in mind, we first establish a baseline by examining the direct effects of reflexive climate, an integration mechanism that can be typified as a cooperative mechanism, and a transactive memory system, an integration mechanism with a strong coordination focus, on organizational ambidexterity. Then, we investigate how each effect is moderated by organizational size.

An organizational reflexive climate

In general, an organizational climate is a manifestation of culture and has a specific behavioral orientation such as efficiency, innovation, tradition or employee welfare (Patterson et al., 2005; Schneider, 1975; Schneider et al., 2013). It represents the "shared perceptions of and the meaning attached to the policies, practices, and procedures employees experience and the behaviors they observe getting rewarded and that are supported and expected" (Schneider et al., 2013, p. 362). This helps organizational members understand which behaviors are sought-after and encouraged. Accordingly, we draw on reflexivity theory (for a recent review see Schippers et al., 2020) and argue that a reflexive organizational climate primes and incentivizes organizational members to behave reflexively and align around an envisioned future state of the organization.

Based in social cognitive theory (Bandura, 1989), a reflexive climate stimulates organizational members to consider organizational challenges surrounding adaptation to changing environmental circumstances (Patterson et al., 2005). To support this, members accumulate and evaluate information about the past, present and the future regarding goals, tasks, processes and strategies, and discuss this information with their peers (Konradt et al., 2016; Van Ginkel et al., 2009; West, 2000). This discursive aspect of a reflexive climate allows organizational members to cross-validate information by considering different perspectives (counterfactual thinking) and to actively seek feedback on performance outcomes and processes, thus enhancing systematic learning (Ellis et al., 2014; Schippers et al., 2014). New ideas are formed at the individual level. However, it is the communal nature of systematic learning that aids in the development of a shared understanding of the perceived causes of a challenge, its consequences, a subsequent course of action and, crucially, goals and plans to connect the present with the future (Konradt et al., 2016;

Lubatkin et al., 2006; Nonaka, 1994; Phielix et al., 2011). Given the collective and evaluative nature of reflexive discussions in which organizational members actively participate, organizational members are likely to be more knowledgeable and supportive concerning key outcomes of this deliberative process such as the goals that are to be pursued and the means by which this should be done (Schippers et al., 2014). This increases their willingness and agreement to strive for and act in service of the realization of these goals, as their interests are likely to be more aligned (Castañer & Oliveira, 2020; Gulati et al., 2012; Kretschmer & Vanneste, 2017). We contend that a reflexive climate influences organizational ambidexterity for three reasons.

An organizational reflexive climate as antecedent to ambidexterity

First, a reflexive climate's systematic learning activities facilitate the reinterpretation of perceived tensions between explorative and exploitative efforts (Grant, 1996; Smith & Lewis, 2011). Here, more shallow reflection amongst organizational members provides an important source of experiential learning (Gavetti & Levinthal, 2001) in which historical feedback is used to optimize current activities (Schippers et al., 2007). In contrast, during deeper reflection, organizational members move beyond optimization and actively consider the goals, decision-making rules and assumptions underlying exploration and exploitation (Lüscher & Lewis, 2008; Schippers et al., 2007; Vashdi et al., 2007). This results in deliberation on and creation of alternative developmental paths and more profound learning (Lewis, 2000). Through reflection, members are likely to become more knowledgeable about interdependencies and interrelationships between the future state of an organization, that is exploration, and its current state of affairs, that is exploitation (Smith & Tushman, 2005).

Second, this newly generated understanding among organizational members reveals the limitations of an organization's knowledge base, while simultaneously increasing members' awareness of the specific types of knowledge that are necessary to connect the existing state of the organization to the collectively envisioned future goals (Schippers et al., 2015). Consequently, organizational members, thusly influenced, are motivated to engage in targeted external search activities to acquire the sought-after knowledge required to enhance the potential of the organization's knowledge base. Effective use of external knowledge broadens the possibilities for current and novel knowledge to be recombined (Fleming, 2001; Kiss et al., 2020; Rosenkopf & Nerkar, 2001).

Third, the greater alignment of goals and the shared understanding of the means to reduce the discrepancy between the current and envisioned state creates a common direction (Konradt et al., 2016; Schippers et al., 2015), that is interest, and inspires unity in resolve among organizational members to overcome the tensions that emerge when seeking synergies between exploration

and exploitation. Prior work has shown that overarching goals (Smith & Tushman, 2005) or a shared vision among top-management team members (Jansen et al., 2008; O'Reilly & Tushman, 2008) are powerful means to reconcile the conflicting demands of exploration and exploitation; this is a boon for realizing ambidextrous outcomes. With this in mind, we hypothesize that:

Hypothesis 1: A reflexive climate has a positive effect on organizational ambidexterity.

However, the beneficial influence of a reflexive climate is not universal; we argue that small firms profit more from an overarching reflexive climate than large firms do. First of all, the greater understanding of the explorative and exploitative knowledge base, combined with the reinterpretation of the perceived tensions that a reflexive climate tends to generate is *relatively* more impactful for small firms. As the knowledge base of small firms is likely to be less diversified and less affluent (Cao et al., 2009; Chen & Hambrick, 1995), these firms will tend to have less generative material, constraining their ability to generate synergistic combinations. The newly constructed understanding of the potential of the organization's existing knowledge base that is offered by a reflexive climate is, therefore, particularly valuable within the context of smaller firms.

Second, the targeted external search activities encouraged by a reflexive climate will tend to have a greater impact in smaller organizations. While acquiring new external knowledge will impact the variety of the existing knowledge base of both small and large firms, the relative contribution will be greater for smaller organizations given their more modest knowledge base (Fourné et al., 2019). Likewise, within smaller organizations, members are more prone to feeling the pressure to acquire sought-after knowledge as members of smaller organizations tend to be more involved in general operations within their organization (Lubatkin et al., 2006). This is amplified by the more limited resource endowments of small organizations that provide only limited buffering from environmental pressures (George, 2005).

Third, compared to large organizations, small organizations tend to be characterized by a greater density of internal social networks with employees being closer to each other (Nooteboom, 1994; Prajogo & McDermott, 2014). As dense organizational networks tend to be perceived as providing greater psychological safety, organizational members may be more willing to openly share their thoughts (Edmondson, 1999; Obstfeld, 2005). This, in turn, increases the impact reflexive discussions tend to have on ambidextrous outcomes in smaller organizations. These same interpersonal bonds motivate members to spend time and energy on reflexive discussions with others (Reagans & McEvily, 2003). Therefore, it is likely that within the context of

small organizations, reflexive outcomes are more profound, thus increasing the potential to realize novel combinations between existing explorative and exploitative knowledge domains.

In contrast, the capacity of a reflexive climate to help realize ambidextrous outcomes will be relatively lower in larger organizations. As organizations pursuing ambidexterity grow larger they tend to structurally separate exploration and exploitation (Lubatkin et al., 2006). This leads to a greater degree of differentiation between sub-units as they are inclined to specialize in either explorative or exploitative knowledge (Jansen et al., 2009; O'Reilly & Tushman, 2013). As a result, organizational members will tend to find themselves in sub-units that are either more explorative or exploitative in nature. In general, as a consequence of departmentalization (Fayol, 1937), organizational members in larger organizations tend to be more focused on the local tasks of their own organizational unit rather than on the organization's as a whole (Lawrence & Lorsch, 1967). In line with this, it is likely that reflexive discussions tend to be more focused on the goals, strategies and processes of their own unit, rather than those of the wider organization. Consequently, the relatively more local orientation of reflexive discussions, combined with more structurally differentiated explorative and exploitative knowledge, makes the reinterpretation of tensions between explorative and exploitative knowledge less effective.

Moreover, the more loosely coupled nature of between-unit relationships in larger organizations also diminishes the quality and frequency of interactions between specialized units (Benner & Tushman, 2002). This is likely to negatively affect the degree to which organizational participants view inter-departmental relationships as close and trustful (Maurer et al., 2011; Mom et al., 2015; Moran, 2005), subsequently dampening the perceived level of psychological safety among organizational members (Edmondson, 1999). These conditions make it more challenging for organizational members to freely express themselves and resolve potential conflicts (Edmondson, 1999; Peterson & Behfar, 2003; Schippers et al., 2014). This makes productive reflexive discussions in large organizations a less effective antecedent to ambidexterity.

To conclude, the design features of larger firms seeking ambidexterity reduce the impact of ongoing, organization-wide, reflexive discussions on firm-level ambidexterity. To put this more formally:

Hypothesis 2: Firm size negatively moderates the relationship between organizational reflexive climate and ambidexterity (stronger for smaller firms and weaker for larger firms).

Organizational TMS

An organization that seeks to become ambidextrous may benefit from an organizational transactive memory system (TMS). A TMS is a social, informal system used to codify, embed and extract knowledge and expertise from different domains (Argote & Ren, 2012; Wegner, 1987). An organizational TMS consists of "a network of interdependent work groups that use each other as external cognitive aids to accomplish shared tasks" (Peltokorpi, 2012, p. 17). An organizational TMS provides organizational members with a greater direct and indirect awareness of the location of specific expertise, a greater trust in the quality of that expertise, a willingness of organizational members in general to share that knowledge, and a greater capacity for task-knowledge coordination (Faraj & Sproull, 2000; Kanawattanachai & Yoo, 2007; Moreland & Argote, 2003; Peltokorpi, 2012). Through an organizational TMS, members are better able to match certain members with certain tasks (McGrath & Argote, 2001), and synchronize and sequence member actions in time and space (McGrath et al., 2000), thus playing a key role in the coordinative network of the organization. Collectively, this leads to an organizational capability with which the organization can realize synergies between explorative and exploitative knowledge (Argote & Ren, 2012; Heavey & Simsek, 2017). This capability helps align individual action between members and fosters the ability to find and apply specialized knowledge in an organization with ambidextrous inclinations. Accordingly, we argue that an organizational TMS increases the efficiency *and* effectiveness with which the integration of explorative and exploitative knowledge is achieved, thus increasing the likelihood of ambidextrous outcomes (Argote & Ren, 2012; Helfat & Peteraf, 2003).

An organizational TMS as an antecedent to ambidexterity

First, an organizational TMS is likely to influence the efficiency with which ambidexterity can be realized. Personnel in organizations with a mature TMS benefit from shorter path lengths (Gulati et al., 2012). Given the greater awareness of expertise in a well-developed TMS, the search and transfer costs involved with both "pushing" and "pulling" knowledge across explorative and exploitative boundaries are reduced, as experts can be identified and contacted much more rapidly (Akgün et al., 2005; Moreland, 1999; Ren et al., 2006). According to the knowledge-based view, this facilitates more efficient knowledge integration (Grant, 1996). Pursuing both exploration and exploitation makes knowledge boundaries more pronounced within a firm (Carlile, 2004; Jansen et al., 2009). Therefore, a TMS that cultivates a coordinative capability to efficiently integrate exploratory and exploitative knowledge benefits firms seeking ambidexterity.

Furthermore, an organizational TMS enhances the effectiveness of the coordination of explorative and exploitative knowledge (Argote & Ren, 2012). First, due to their mutual expertise awareness, organizational members are better able to divide work appropriately, enabling organizational members to align their actions (Argote & Ren, 2012; Brandon & Hollingshead, 2004; Faraj & Sproull, 2000; Kanawattanachai & Yoo, 2007). This increases the ability of the organization to coordinate tasks among its members in such a way that experts that are most likely to possess or construct the required expertise to realize novel combinations of explorative and exploitative activities are assigned to the task (Argote & Ingram, 2000; Jackson & Klobas, 2008; Littlepage et al., 2008). Second, an organizational TMS greatly expands the search horizon of organizational participants (Argote & Ren, 2012; Rau, 2006), as it creates provisional linkages between organizational members with non-overlapping knowledge (Miller et al., 2007). Organizational members initiate these temporal connections by their own initiative when they make use of the collective awareness of "who knows what" (Faraj & Sproull, 2000; Heavey & Simsek, 2017; Wegner, 1987). This emergent and self-organizing aspect of an organizational TMS forms a key aspect of the coordinative capacity of the organization (Okhuysen & Bechky, 2009) and facilitates the generation of fluid adaptive responses (Schreyögg & Sydow, 2010). The intra-organizational knowledge flow that is generated by an organizational TMS opens up the possibility of combining previously unrelated explorative and exploitative knowledge in synergetic ways. This increases the chances of realizing organizational ambidexterity (Garud & Nayyar, 1994; Jansen et al., 2009; O'Reilly & Tushman, 2008). In combination with one another, these arguments lead us to hypothesize that:

Hypothesis 3: An organizational TMS has a positive effect on organizational ambidexterity.

Next, we argue that this particular effect of an organizational TMS is conditional upon organizational size. In their pursuit of ambidexterity, smaller firms benefit less from an organizational TMS than do larger firms. As smaller organizations are less departmentalized (Ebben & Johnson, 2005; Lawrence & Lorsch, 1967; Voss & Voss, 2013) in comparison to larger organizations, employees in small firms are less likely to be subjected to task specialization (Blau, 1970; Thompson, 1965). This makes it less likely that organizational participants in smaller firms will acquire unique, non-overlapping knowledge as a result of an organizational TMS; the resource base of smaller organizations tends to be less specialized in nature, resulting in more knowledge redundancies. Though this facilitates mutual understanding and knowledge integration in smaller organizations, these organizations remain more limited in their potential to generate valuable recombinations compared to organizations that

can tap into a more heterogeneous knowledge base (Grant, 1996; Miller et al., 2007). Moreover, owing to the greater network density within smaller organizations (Prajogo & McDermott, 2014), information and ideas spread more quickly (Obstfeld, 2005), which can lead to a greater convergence around mental models (Perry-Smith, 2006). While this suggests that TMS make knowledge recombination much easier within the typical context of a smaller firm, the more limited scope makes them less effective, as they are unlikely to yield explorative innovations or synergetic combinations. This diminishes the potential of a TMS as a driver of ambidexterity in small organizations.

In larger firms, an organizational TMS enables organizations to take advantage of their more varied knowledge base, even though these resources might be highly distributed (Becker, 2001; Tsoukas, 1996). Here, the impact of a TMS on the reduction of search cost is significant and will greatly reduce path lengths within the organization. This results in a more coordinated and thus more effective and efficient use of existing knowledge. In essence, a TMS facilitates the alignment of organizational members' actions, as it enables organizational members to coordinate tasks among members (Argote & Ingram, 2000), which, in turn, allows larger organizations to capitalize on the variety of knowledge and expertise present within the firm. As such, because the pursuit of exploration and exploitation creates knowledge heterogeneity and because ambidexterity benefits from coordinated effort on the part of the various members and their associated expertise, we argue that large firms can make better use of a TMS. This line of reasoning leads us to hypothesize that:

Hypothesis 4: Firm size positively moderates the relationship between organizational TMS and ambidexterity (weaker for smaller firms and stronger for larger firms).

Research method

Data

Our dataset is based on data from a survey study of Dutch companies. We sampled organizations at random within each of the six targeted industries (more on this below), which led to the inclusion of a wide range of organizations in terms of size. Managers with specific job profiles received an invitation to participate in the survey to ensure that they were able to provide reflective and accurate answers, as these individuals are more knowledgeable and motivated to do so. Furthermore, respondents were guaranteed anonymity and a personalized comparison of their answers with a comparison group was

provided to them. The invitation to participate was received by 1,363 managers from 121 organizations. Two weeks later, we sent another invitation to those who had not yet replied. The response rate after those two waves was 19%. After removing respondents that did not provide complete answers from our analysis, 192 responses (14% of the contacted individuals) from 101 companies (83% of the contacted companies) remained. For 72% of the companies, we received more than one response, on average 1.9 responses per company. The managers that answered our survey were split roughly equally between executives (29%), senior (33%), and middle (38%) management.

Though our response rates were comparatively high and non-response bias was likely not an issue, we compared answers in the first surveys returned with those returned last. This is often done under the assumption that answers returned later more closely resemble non-respondents (Armstrong & Overton, 1977). Using different cutoff values (first/last 10% of answers, first/last 20%), we found no statistically significant differences between any of the variables with one exception: in the earliest 10% of returned surveys, TMS was scored significantly higher ($p < .05$). Overall, this empirically reinforces our assumption that non-response bias is not an issue in our analysis.

The organizations in our sample have between three and over 160,000 employees, with the median at 925. We identified industries in which innovation plays a major role as ambidexterity is most important for companies in these industries (for example, Junni et al., 2013; O'Reilly & Tushman, 2013). We used expenses for innovation divided by revenue as a selection criterion. Table 1 shows the distribution of companies across industries (see notes).

Measures and validity

A complete overview of the measurement items is available as an online supplement to this article. Here we also provide a complete overview of fit statistics, factor loadings, and reliability scores.

Ambidexterity

We measured ambidexterity, that is the ability to concurrently engage in explorative and exploitative innovation, by adapting the scales by Jansen et al. (2006). Exploration was measured using a three-item scale ($\alpha = 0.67$) and refers to the extent to which innovations are focused on meeting emerging client and market needs and the degree to which they deviate from the current knowledge base of the organization (Jansen et al., 2006). The three-item scale for exploitative innovation ($\alpha = 0.68$) captures the degree to which innovations are incremental in nature, being based on refinements of the present knowledge base of the organization, and are intended to meet the needs of existing clients and markets (Jansen et al., 2006). In the literature, ambidexterity has

Table 1. Means, *SD*, and correlations.

		Mean	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Ambidexterity	7.38	.95													
2	Reflexivity	3.93	.49	.38***												
3	TMS	3.65	.40	.47***	.41***											
4	Org. size$^{(log)}$	7.20	2.15	.01	−.06	.04										
5	Patents	134	920	.12	.09	−.10	−.10									
6	Cross-funct. coll.	3.28	.67	.09	.01	−.03	.07	−.03								
7	ICT maturity	3.04	.77	.23*	.21*	.47***	.11	−.16	−.08							
8	Ambiguity	2.88	.64	−.13	−.06	−.35***	−.02	.11	.24*	−.32**						
9	Machinery[a]	.17	–	.06	.04	.11	−.00	−.05	.07	−.05	.13					
10	Instruments[a]	.17	–	−.12	.09	.00	−.02	−.04	.05	−.09	.01	−.20*				
11	Transportation[a]	.22	–	.09	−.10	−.13	−.14	−.07	.01	.07	.03	−.24*	−.24*			
12	Electrical[a]	.12	–	.21*	.07	.16	.04	−.04	−.12	.24*	−.05	−.17	−.17	−.19		
13	Communications[a]	.07	–	−.16	.02	−.09	.10	.03	.04	−.11	−.10	−.12	−.12	−.14	−.10	
14	Chemical[a]	.26	–	−.09	−.08	−.04	.07	.15	−.05	−.06	−.04	−.26**	−.26**	−.31**	−.22*	−.16

n = 101. [a]Indicates dummy variables; (log) indicates logarithmized variables. *$p < .05$ **$p < .01$ ***$p < .001$. Distribution of organizations across industries: chemicals (26.6%), communications (6.4%), machinery (15.6%), electrical (11%), transportation (22.9%), and instruments (17.4%).

been operationalized as the multiplication of exploration and exploitation (Cao et al., 2009; He & Wong, 2004), the sum of exploration and exploitation (Jansen et al., 2009; Lubatkin et al., 2006) or as the absolute difference between exploration and exploitation (Cao et al., 2009; He & Wong, 2004). We adopted the procedures suggested by Edwards (1994), which involve a test that is commonly used to choose the most easily interpreted operationalization of ambidexterity (for example, Jansen et al., 2009; Lubatkin et al., 2006). As such, we compared the R_2 values of the different constrained operationalizations of ambidexterity to an unconstrained model in which exploration and exploitation are treated as separate variables (this functioned as a base model) when regressed on the financial performance of the organization. In addition, we calculated the *F*-values based on these R_2 differences. Given the strong relationship between ambidexterity and performance growth (Junni et al., 2013), and in line with the standard approach, performance is used to verify our choice of operationalization. We used a two-item financial performance measure (sales and profit growth) as a dependent variable (in line with Li & Atuahene-Gima, 2001). Based on our comparison with the unconstrained model (R^2 = .121), the additive model proved to be preferable (R^2 = .113) to the multiplicative (R^2 = .004) and subtractive models (R^2 = .000). The *F*-test for the additive model did not show a significant loss of information compared to the unconstrained model, a result that is common in ambidexterity research (Jansen et al., 2016). To prevent potential multicollinearity for the multiplicative operationalization of ambidexterity, the exploration and exploitation scales were mean centered before their product was obtained (Cao et al., 2009; He & Wong, 2004).

Organizational reflexive climate (α = 0.70)

The three-item scale that we used to measure an organizational reflexivity climate are based on the scales developed by Patterson et al. (2005) and Schippers et al. (2007). It captures the degree to which organizational members consciously reflect on and communicate about objectives, behavior, processes, assumptions and performance in order to adapt to the wider environment (Patterson et al., 2005; Schippers et al., 2013; West, 2000).

Organizational transactive memory systems (α = 0.79)

This measurement pertains to the extent to which employees can efficiently and effectively use each other as a source of expertise awareness (Peltokorpi, 2012; Ren & Argote, 2011; Wegner, 1987). Our nine-item measurement for organizational TMS is reflected by three dimensions. First, an organizational TMS indirectly aids in the *localization* of expertise within the organization (Faraj & Sproull, 2000). Second, an organizational TMS leads to *coordination* of knowledge integration and, third, it enhances perceived

credibility of associated members (Faraj & Sproull, 2000; Lewis, 2003). The expected three-factor structure was replicated in an exploratory factor analysis in which all the factor-loadings (> 0.6) and cross-loadings (< 0.3) met their respective threshold levels (DeVellis, 2003). The individual reliability scores of the three different sub-dimensions of organizational TMS were α = 0.75 for coordination, α = 0.68 for localization and α = 0.78 for credibility.

Organizational size

In line with previous studies (Cao et al., 2009) we took the natural logarithm of the number of full-time employees as the basis for our organizational size measure to correct for its log-normal distribution.

Control variables

First, we control for ambiguity using a two-item scale that captures uncertainty about the current state and outcomes of actions in the business environment (Levinthal & March, 1993; Mosakowski, 1997). This has an influence on the extent to which firms engage in exploration over exploitation (Jansen et al., 2006). Second, we control for ICT maturity using a three-item scale (α = 0.84). This measure captures the sophistication of the technical systems and tools used by the firm to encode, store, retrieve, and communicate information. Such systems may support integration within firms, thus increasing their ability to become ambidextrous. Third, we control for the degree of organizational cross-functional collaboration using a two-item scale. Possessing the means required for cross-functional collaboration (such as interdisciplinary task forces or cross-functional teams) has been shown to have a large positive influence on organizational ambidexterity (Jansen et al., 2009). Fourth, because environmental dynamics may be sector-specific, we controlled for industry effects by including a dummy for each industry, using the chemicals and allied products manufacturing industry as the reference group.

Aggregation and measurement analysis

As our theory and measurements are aimed at the organizational level of analysis, we determined the inter-rater agreement scores ($R_{wg(j)}$) (James et al., 1984) prior to aggregating individual responses at the organizational level. All our scales proved to have a "good" fit as they were well above the 0.7 threshold level (James et al., 1993). More specifically, the average inter-rater agreements were 0.83 for exploitation, 0.74 for exploration, 0.92 for organizational reflexive climate and 0.93 for organizational TMS.

To demonstrate the convergent and discriminant validity of our measurements, we conducted several tests. First, factor analyses using principal component analysis with varimax (exploration, exploitation and organizational

reflexivity) or promax (organizational TMS) rotation were employed. The criteria prescribed by DeVellis (2003) were used to assess the items: (1) commonality higher than 0.3; (2) dominant loading greater than 0.5; (3) cross-loading lower than 0.3; and (4) satisfactory scree plot criterion. All items satisfied these criteria. Second, an integrated confirmatory factor analysis was performed. In AMOS 25 we specified a model in which all items relating to ambidexterity, organizational TMS, reflexive climate and organizational size loaded on their corresponding constructs. The model demonstrated an "excellent" fit (χ^2 = 178.3, DF = 160, CFI = 0.97, RMSEA = 0.033; 90% CI-RMSEA: 0.000–0.056.) for models of this complexity and number of observations (Hair et al., 2006; Mathieu & Taylor, 2006). The average of the standardized factor loadings was 0.69, with individual loadings ranging from 0.4 to 0.9. All item loadings were highly significant ($p < .01$). We further assessed the discriminant validity of our scales by comparing the constrained and unconstrained model fit for each possible pair of constructs in our model (Anderson and Gerbing, 1988; Hair et al., 2006). We constrained the covariance between the latent constructs and limited the variance of the latent constructs themselves to 1. As the χ^2 difference test returned a superior fit for the freely estimated model ($p < .01$) for each of the comparisons, the discriminant validity of the variables in our model is further supported (Hair et al., 2006).

Common method variance

We took great care to both prevent and assess the potential of common method variance (CMV). First, we took various steps to reduce the risk of CMV based on the recommendations of Podsakoff et al. (2003). We tested the survey among target respondents, included an introduction with our survey to clarify its purpose, guaranteed anonymity, and finally, promised and provided a summary of the study's findings to respondents to stimulate more reflective answers. Second, we statistically verified whether or not there was common method variance in the data. As there are different ways to assess the presence of CMV, each with its respective advantages and disadvantages (Podsakoff et al., 2003; Richardson et al., 2009), we employed the Harmon one-factor test (Podsakoff & Organ, 1986), the partial correlation procedure (Podsakoff et al., 2003) and the correlational marker technique (Lindell & Whitney, 2001), which together provide a good indication of the presence or absence of CMV. For the Harmon one-factor test, we ran an exploratory factor model including all items in our model: the test extracted six factors in total, cumulatively explaining 63% of the variance. Here the greatest single variance (26.8%) was accounted for by the factor "coordination" (one of the factors of TMS). As this first factor did not account for the majority of the variance and the dependent and independent items loaded on different factors, we conclude that it is unlikely that common method variance presents

a problem for our analysis (Heavey & Simsek, 2017). For the partial correlation procedure, we ran an exploratory factor analysis including the main constructs in our model. We subsequently included the saved, first unrotated factor score as a control variable in a regression model alongside our other control variables. The outcomes proved to be robust, once again indicating that CMV does not seem to be a cause for concern. In the context of the correlational marker technique, we used education as a marker variable, as it is theoretically unrelated to the main constructs in our model and unrelated to ambidexterity in particular (Heavey & Simsek, 2017). We used the equation put forward by Lindell and Whitney (2001) to remove the shared variance between the marker and the main variables in our model. All correlations between the main variables remained highly significant ($p < .01$), indicating that a bias is not present in the data (Lindell & Whitney, 2001; Richardson et al., 2009). Finally, it is worth pointing out that, given the significant interaction within our model, it is unlikely that CMV is present in the data, as this would have required respondents to have taken account of this interaction effect while answering the survey (Heavey & Simsek, 2017; Krishnan et al., 2006). In sum, these outcomes lead us to conclude that CMV has not influenced our findings.

Results

Table 1 depicts the main descriptive statistics and a pairwise correlation matrix. To rule out issues related to multicollinearity, we checked variance inflation factors. The highest value (that is, 1.76) does not exceed the commonly used threshold of 10 (Kutner et al., 2005, p. 409). The tests of our hypotheses are presented in Table 2.

We first analyze the effects of reflexive climate (Hypothesis 1) and TMS (Hypothesis 3). As predicted in Hypothesis 1, reflexive climate increases organizational ambidexterity. The coefficient for reflexivity is positive and significant (Table 2, model 2: $\beta = .35$, $p < .01$). We also find that the coefficient for TMS is positive and significant (Table 2, model 3: $\beta = .47$, $p < .001$), which lends support for Hypothesis 3. These effects hold when both integration mechanisms are investigated at the same time, that is both coefficients remain positive and significant (compare Table 2, model 4). Therefore, both integration mechanisms add value in the presence of the other, rather than being substitutes.

We now turn to analyzing the two moderation hypotheses (Hypothesis 2 and Hypothesis 4). We find support for Hypothesis 2: the effect of reflexive climate is, indeed, moderated by organizational size. As hypothesized, the effect is weaker for larger organizations (Table 2, model 5: $\beta = -.24$, $p < .01$). We find no support for our hypothesis that the effect of organizational TMS is

Table 2. Regressions on organizational ambidexterity (OLS).

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Interactions							
Reflexivity* Organizational size$^{(log)}$					−.24**		−.24**
TMS* Organizational size$^{(log)}$						−.09	.00
Independent Variables							
Reflexivity		.35**		.23*	.19*	.21*	.19*
TMS			.47***	.38***	.35**	.39***	.35**
Control Variables							
Organizational size$^{(log)}$	.03	.06	.04	.05	.06	.04	.06
Patents	.19***	.15**	.19***	.16***	.16***	.17***	.16***
Cross-functional collaboration	.16	.15	.13	.13	.11	.13	.11
ICT maturity	.15	.06	−.04	−.06	−.02	−.07	−.02
Ambiguity	−.16	−.16	−.04	−.06	−.03	−.04	−.03
Machinery[a]	.14	.11	.07	.06	.09	.06	.09
Instruments[a]	−.02	−.07	−.04	−.07	−.04	−.06	−.04
Transportation[a]	.15	.17	.20*	.20*	.21*	.20*	.21*
Electrical[a]	.23	.20	.19	.19*	.22*	.19*	.22*
Communications[a]	−.12	−.15	−.09	−.12	−.08	−.12	−.08
R^2	.18	.29	.34	.38	.43	.38	.43
Adjusted R^2	.09	.21	.25	.29	.35	.29	.34
F-value	7.51***	6.90***	11.31***	9.21***	16.40***	9.27***	15.39***

n = 101. Standardized regression (β) coefficients are reported. *$p < .05$ **$p < .01$ ***$p < .001$
[a]Indicates dummy variables; reference group is the chemical industry. $^{(log)}$Indicates logarithmized variables.

stronger for larger organizations (Table 2, model 6: β = −.09, n.s.). The results remain robust when both interaction terms are included in the same model (compare Table 2, model 7).

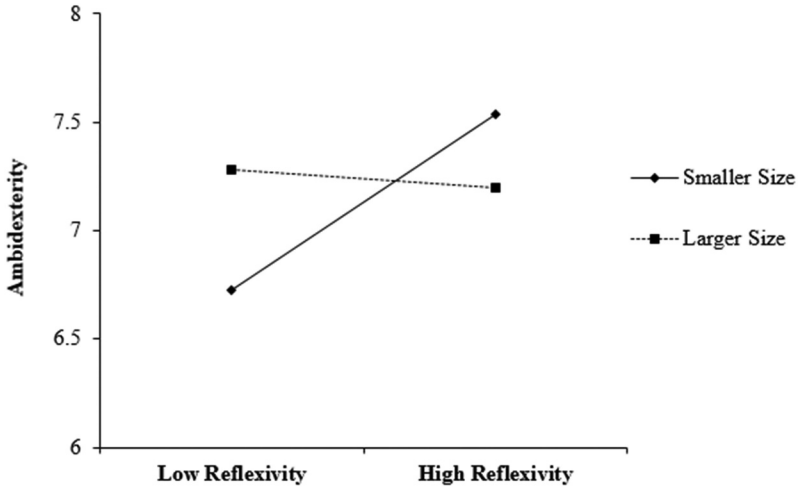

Figure 1. Plot of interaction between organizational size and reflexivity. Vertical axis is shown for values of ambidexterity between first and third quartile. Smaller (larger) organizational size and low (high) values of reflexivity are one standard deviation below (above) the mean.

We show the significant moderation effect (Hypothesis 2) in Figure 1. While controlling for TMS, this graph illustrates the difference in values for ambidexterity for organizations with low or high (one standard deviation below or above the mean value) reflexivity. Smaller organizations (solid line) profit more from higher levels of reflexivity than larger organizations (dotted line). Interestingly, reflexivity not only fails to increase ambidexterity in larger organizations (dotted line does not increase) but, for low values of reflexivity, ambidexterity is already higher, compared to smaller organizations. This is likely a result of alternative mechanisms by which larger organizations are able to become ambidextrous. In contrast, smaller, but highly reflexive firms, are able to match the ambidextrous performance of larger organizations, despite having fewer means with which to achieve structural differentiation and integration.

In summary, with increasing firm size the benefits of promoting reflexivity will be lower and, eventually, ambidexterity will no longer benefit from higher reflexivity. While larger organizations achieve higher ambidexterity at low levels of reflexivity, smaller organizations may compensate for not having the same alternatives as larger organizations to promote ambidexterity (for example, resource base) by promoting a more reflexive climate.

Discussion

In this paper, we draw attention to the problem that, while both small and large organizations may need to become ambidextrous, they differ in their capacity to do so (Lubatkin et al., 2006; Voss & Voss, 2013). Interestingly enough, and despite explicit calls for research on this particular topic (Andriopoulos & Lewis, 2009, 2010; Csaszar, 2013; Voss & Voss, 2013), the literature to date has devoted only minimal attention to the effectiveness of different integration mechanisms in relation to ambidexterity, while at the same time accounting for dissimilarities between organizations of varying size. In an effort to address this gap, we argue that in general all organizations seeking to become ambidextrous profit from greater integration (that is, greater cooperation and coordination) across explorative and exploitative knowledge domains. However, small and large organizations benefit *differently* from a reflexive climate and organizational TMS, two integration mechanisms that relate more to cooperation and coordination, respectively. In doing so, we contribute to the emerging stream within the ambidexterity literature that adopts a socio-cognitive perspective (for example, Jansen et al., 2016; Kauppila & Tempelaar, 2016).

Theoretical implications

Our study has several theoretical implications. First, implicit in most work on ambidexterity is the assumption that integration mechanisms are universally applicable (for example, Burgers et al., 2009; Hill & Birkinshaw, 2014; Jansen et al., 2009; Kauppila, 2010; Lubatkin et al., 2006). We contribute to the ambidexterity literature by adding much needed nuance to this line of reasoning. Although both small and large organizations face the same pressures to explore and exploit, their capacity to realize ambidextrous outcomes is remarkably different. Drawing on organizational theory, we provide further theoretical clarification as to why and how different circumstances within small and large organizations are likely to influence the effectiveness of two of such integration mechanisms depending on their respective characteristics.

Second, we demonstrate that organizational-level, socio-cognitive integration mechanisms can be powerful antecedents of organizational ambidexterity (Schreyögg & Sydow, 2010). Previous work in the ambidexterity literature that has taken a socio-cognitive perspective has predominantly focused on team- and individual-level socio-cognitive factors (for example, Kauppila & Tempelaar, 2016; Mom et al., 2019; Tempelaar & Rosenkranz, 2019). As a rare exception, Jansen et al. (2016) discuss organizational-level supportive leadership as a moderating factor in the direct relationships between team cohesion and team efficacy on team ambidexterity. Following this train of thought, we argue that two informal, socio-cognitive integration mechanisms (an organizational TMS and a reflexive climate) are particularly powerful antecedents of the realization of synergetic combinations of explorative and exploitative resources, as they support greater cooperation (alignment of interest) or coordination (alignment of actions) between organizational members. Although organizations, in general, stand to benefit from achieving greater cooperation and coordination, we argue that the specific characteristics of a reflexive climate and organizational TMS and their propensity to induce greater cooperation or coordination matters in terms of their ability to realize ambidextrous outcomes for organizations of varying size. We propose that an organizational reflexive climate makes a small organization "feel big" as it enables organizational members to align around rethinking the potential of their, generally speaking, more homogenous knowledge base and potentially expand it. An organizational TMS makes a large organization "feel small" as it enables organizational members to coordinate the integration of their existing, but more widely distributed explorative and exploitative knowledge (Becker, 2001; Tsoukas, 1996).

Our study extends the Andriopoulos and Lewis (2010) comparative case study, which indicates that different sized organizations seem to rely on different integration and splitting (differentiation) practices. We find that for smaller organizations, a reflexive climate is an effective means of realizing

ambidextrous outcomes. As organizational members are stimulated to discuss their strategies, goals and processes, they are triggered to rethink and refine their assumptions about and understanding of the world (Patterson et al., 2005; Schippers et al., 2015). This makes them more knowledgeable about the background of this renewed understanding, as well as that of the revised goals and plans to achieve them, thereby increasing the willingness of organizational members to collectively strive for these goals (that is, align their interests). A reflexive climate enables small firms to create variety from a more homogenous knowledge base as it enables organizational members to become more knowledgeable about the interdependencies and interrelationships between explorative and exploitative knowledge. At the same time, it also increases their awareness of the limitation of the organization's knowledge base and drives them to expand their external knowledge, which together provide an important boost to ambidexterity. In contrast, further investigation of the moderating influence of organizational size on the relationship between a reflexive climate and ambidexterity by means of the Johnson–Neyman technique in PROCESS (Hayes, 2018) reveals that for the largest organizations, the relationship with a reflexive climate becomes negative (although it is no longer statistically significant). We would argue that based on this outcome, the ongoing discursive aspect of a reflexive climate runs counter to a large-scale ambidextrous organizational design that encourages tight coupling *within* exploratory and exploitative units and loose coupling *between* them. Alignment of interest (cooperation) is best created through other means, perhaps top-down articulated firm-wide interests such as shared vision, mission and purpose. These means would not interfere with the structurally separated ambidextrous design.

Contrary to our expectations, the strong and positive effect of an organizational TMS is not affected by organizational size. This indicates that while some integration mechanisms indeed need to be carefully selected with regard to the organization's size (including an organizational reflexive climate), others may be more universally beneficial. This finding might be explained by the notion that large-firm TMS and small-firm TMS lead to a greater alignment of action that promotes ambidexterity, but they do so in different ways. The dense social networks that characterize small organizations are akin to the social contexts of groups. As such, TMS within small organizations might be based on a direct shared awareness of expertise, as was previously observed within group-level TMS (Brandon & Hollingshead, 2004; Lewis et al., 2005). Within larger organizations, this shared awareness is unlikely to exist at the organizational level. Here, expertise awareness is more likely to be indirect, given the lower (for example, between-unit) network density (Krackhardt, 1994; Peltokorpi, 2012). Locating expertise may depend on asking colleagues for a referral to someone who might not have the required expertise themselves, but may be more aware of how to identify the correct location of such expertise. However, if our

speculation regarding the resemblance of small organization's TMS to group-level TMS holds, it would seem that this would also lead (as it does in group TMS) to cognitive task specialization among members of the TMS in a smaller organization (Lewis, 2003; Moreland, 1999; Wegner, 1987). This might mitigate the lower internal variety we hypothesized to be present based on organizational theory (for example, Chen & Hambrick, 1995; Grant, 1996; Lawrence & Lorsch, 1967; Miller et al., 2007). Future research might uncover whether members' behavior in well-developed TMS does, indeed, vary depending on contextual factors, like the scale and scope of an organization.

Finally, we refine our understanding of the value of informal integration mechanisms. These differ from formal integration mechanisms, like cross-functional teams (Burgers et al., 2009), as they are ad hoc in nature, follow a non-linear logic and support adaptive behavior (Schreyögg & Sydow, 2010). Both mechanisms are ad hoc in the sense that they are triggered by local needs and there is no hierarchical supervision. In organizations that have a well-developed reflexive climate or an organizational TMS, organizational members are stimulated to reflect on and act in response to problems and opportunities they discover, thereby creating important sources of organizational responsiveness. Moreover, these mechanisms are non-linear, as the integration systems are not "designed" to meet specific demands, as is the case with the formal integration mechanisms that are part of the technical system of the organization (Scott, 2003). As such, they are not intended to operate within a preconceived future state that may or may not come to pass. As a consequence, both an organizational reflexive climate and an organizational TMS provide important additional adaptive capacity that runs parallel to (and is likely to trigger the usage of) conventional integration mechanisms, such as cross-functional teams.

Managerial implications

Managers who pursue ambidextrous outcomes are likely to benefit from taking note of the size of their organization when selecting socio-cognitive informal integration mechanisms (such as a reflexive climate and an organizational TMS) with which they intend to support synergetic combinations between explorative and exploitative knowledge. Their capacity to contribute to ambidexterity will depend on the size of the organization.

There are various ways in which managers can develop an organizational TMS or a reflexive climate. An organizational TMS can be supported by, for instance, the usage of temporary job placement in which members belonging to one sub-unit "work-along" members of another unit, the usage of cross-functional teams, or career paths involving employees working at different sub-units (for example, traineeships), which help develop an organizational

awareness of "who knows who and who knows what." More advanced tools for social network analysis and HR-analytics may also provide an important stimulus for the advancement of an organizational TMS.

Because a reflexive climate has a behavioral orientation, it's development can be influenced by altering the perception of the behaviors that get rewarded, are supported, and expected. For instance, organizations can integrate and incentivize "reflection moments"; such interventions have been shown to be very effective in relation to resolving paradoxical tensions (Lüscher & Lewis, 2008), as well as in the facilitation of learning (Schippers et al., 2015; Vashdi et al., 2013).

Limitations and suggestions for future research

There are a number of limitations of our study, as well as avenues for future research, that deserve attention. First, as there have already been calls for more research on the multi-level intricacies of organizational ambidexterity (Birkinshaw & Gupta, 2013; Simsek, 2009), it would be valuable to consider the multi-level implications of an organizational TMS and a reflexive climate. After all, both a TMS and reflexivity are driven by individuals and have an impact on individuals. This creates an interesting dynamic in which individual characteristics and higher-order characteristics may positively or negatively affect the pursuit of ambidexterity. Second, though we do not have the longitudinal data required for such an inquiry, exploring the way in which socio-cognitive mechanisms, such as an organizational reflexive climate and an organizational TMS, co-evolve with ambidexterity would be a rewarding avenue of academic pursuit. Looking at potential feedback and feedforward effects would be of particular interest here. Third, for a reflexive climate, our model implies the use of external knowledge to facilitate ambidexterity. It would be interesting to explore how exactly reflexive organizations may use specific sources. For instance, Sidhu et al. (2007) have pointed out differences between the supply-side and demand-side search for knowledge and their impact on exploration and exploitation. It would be interesting to see whether or not these results hold for reflexive organizations. For instance, demand-side search may push firms toward exploitation (Sidhu et al., 2007). However, if reflexivity is present, this might be mitigated. Finally, while our paper provides substantial insights that advance our understanding of why, when and how size matters to the effectiveness of two specific socio-cognitive integration mechanisms with regard to realizing ambidextrous outcomes, future research should explore the extent to which size affects other integration mechanisms, as well. A related and potentially fruitful area of empirical investigation lies in the

question of how integration mechanisms interact with each other in organizations of varying size.

Disclosure statement

No potential conflict of interest was reported by the authors.

References

Akgün, A. E., Byrne, J., Keskin, H., Lynn, G. S., & Imamoglu, S. Z. (2005). Knowledge networks in new product development projects: A transactive memory perspective. *Information & Management*, *42*(8), 1105–1120. https://doi.org/10.1016/j.im.2005.01.001

Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, *103*(3), 411–423. https://doi.org/10.1037/0033-2909.103.3.411

Andriopoulos, C., & Lewis, M. W. (2009). Exploitation-exploration tensions and organizational ambidexterity: Managing paradoxes of innovation. *Organization Science*, *20*(4), 696–717. https://doi.org/10.1287/orsc.1080.0406

Andriopoulos, C., & Lewis, M. W. (2010). Managing innovation paradoxes: Ambidexterity lessons from leading product design companies. *Long Range Planning*, *43*(1), 104–122. https://doi.org/10.1016/j.lrp.2009.08.003

Argote, L., & Ingram, P. (2000). Knowledge transfer: A basis for competitive advantage in firms. *Organizational Behavior & Human Decision Processes*, *82*(1), 150–169. https://doi.org/10.1006/obhd.2000.2893

Argote, L., & Ren, Y. (2012). Transactive memory systems: A micro-foundation of dynamic capabilities. *Journal of Management Studies*, *49*(8), 1375–1382. https://doi.org/10.1111/j.1467-6486.2012.01077.x

Armstrong, J. S., & Overton, T. S. (1977). Estimating nonresponse bias in mail surveys. *Journal of Marketing Research*, *14*(3), 396–402. https://doi.org/10.1177/002224377701400320

Bandura, A. (1989). Human agency in social cognitive theory. *American Psychologist*, *44*(9), 1175–1184. https://doi.org/10.1037/0003-066X.44.9.1175

Becker, M. C. (2001). Managing dispersed knowledge: Organizational problems, managerial strategies, and their effectiveness. *Journal Management Studies*, *38*(7), 1037–1051. https://doi.org/10.1111/1467-6486.00271

Benner, M. J., & Tushman, M. (2002). Process management and technological innovation: A longitudinal study of the photography and paint industries. *Administrative Science Quarterly*, *47*(4), 676–707. https://doi.org/10.2307/3094913

Benner, M. J., & Tushman, M. (2003). Exploitation, exploration, and process management: The productivity dilemma revisited. *Academy of Management Review*, *28*(2), 238–256. https://doi.org/10.5465/amr.2003.9416096

Birkinshaw, J., & Gupta, K. (2013). Clarifying the distinctive contribution of ambidexterity to the field of organization studies. *Academy of Management Perspectives*, *27*(4), 287–298. https://doi.org/10.5465/amp.2012.0167

Blau, P. M. (1970). A formal theory of differentiation in organizations. *American Sociological Review*, *35*(2), 201–218. https://doi.org/10.2307/2093199

Brandon, D. P., & Hollingshead, A. B. (2004). Transactive memory systems in organizations: Matching tasks, expertise, and people. *Organization Science*, *15*(6), 633–644. https://doi.org/10.1287/orsc.1040.0069

Burgers, J. H., Jansen, J. J., Van Den Bosch, F. A., & Volberda, H. W. (2009). Structural differentiation and corporate venturing: The moderating role of formal and informal integration mechanisms. *Journal of Business Venturing*, *24*(3), 206–220. https://doi.org/10.1016/j.jbusvent.2009.01.006

Cao, Q., Gedajlovic, E., & Zhang, H. (2009). Unpacking organizational ambidexterity: Dimensions, contingencies, and synergistic effects. *Organization Science*, *20*(4), 781–796. https://doi.org/10.1287/orsc.1090.0426

Carlile, P. R. (2004). Transferring, translating, and transforming: An integrative framework for managing knowledge across boundaries. *Organization Science*, *15*(5), 555–568. https://doi.org/10.1287/orsc.1040.0094

Castañer, X., & Oliveira, N. (2020). Collaboration, coordination, and cooperation among organizations: Establishing the distinctive meanings of these terms through a systematic literature review. *Journal of Management*, *46*(6), 965–1001. https://doi.org/10.1177/0149206320901565

Chen, M. J., & Hambrick, D. C. (1995). Speed, stealth, and selective attack: How small firms differ from large firms in competitive behavior. *Academy of Management Journal*, *38*(2), 453–482. https://doi.org/10.5465/256688

Child, J. (1973). Predicting and understanding organization structure. *Administrative Science Quarterly*, *18*(2), 168–185. https://doi.org/10.2307/2392061

Csaszar, F. A. (2013). An efficient frontier in organization design: Organizational structure as a determinant of exploration and exploitation. *Organization Science*, *24*(4), 1083–1101. https://doi.org/10.1287/orsc.1120.0784

Dean, T. J., Brown, R. L., & Bamford, C. E. (1998). Differences in large and small firm responses to environmental context: Strategic implications from a comparative analysis of business formations. *Strategic Management Journal*, *19*(8), 709–728. https://doi.org/10.1002/(SICI)1097-0266(199808)19:8<709::AID-SMJ966>3.0.CO;2-9

DeVellis, R. F. (2003). *Scale development. Theory and applications* (2nd ed.). Sage.

Ebben, J. J., & Johnson, A. C. (2005). Efficiency, flexibility, or both? Evidence linking strategy to performance in small firms. *Strategic Management Journal*, *26*(13), 1249–1259. https://doi.org/10.1002/smj.503

Edmondson, A. (1999). Psychological safety and learning behavior in work teams. *Administrative Science Quarterly*, *44*(2), 350–383. https://doi.org/10.2307/2666999

Edwards, J. R. (1994). The study of congruence in organizational behavior research: Critique and a proposed alternative. *Organizational Behavior and Human Decision Processes*, *58*(1), 51–100. https://doi.org/10.1006/obhd.1994.1029

Ellis, S., Carette, B., Anseel, F., & Lievens, F. (2014). Systematic reflection: Implications for learning from failures and successes. *Current Directions in Psychological Science*, *23*(1), 67–72. https://doi.org/10.1177/0963721413504106

Faraj, S., & Sproull, L. (2000). Coordinating expertise in software development teams. *Management Science*, *46*(12), 1554–1568. https://doi.org/10.1287/mnsc.46.12.1554.12072

Fayol, H. (1937). *The administrative theory in the state*. Papers on the Science of Administration, 99–114.

Fleming, L. (2001). Recombinant uncertainty in technological search. *Management Science*, *47*(1), 117–132. https://doi.org/10.1287/mnsc.47.1.117.10671

Fourné, S. P., Rosenbusch, N., Heyden, M. L., & Jansen, J. J. (2019). Structural and contextual approaches to ambidexterity: A meta-analysis of organizational and environmental contingencies. *European Management Journal*, *37*(5), 564–576. https://doi.org/10.1016/j.emj.2019.04.002

Garud, R., & Nayyar, P. R. (1994). Transformative capacity: Continual structuring by intertemporal technology transfer. *Strategic Management Journal*, *15*(5), 365–385. https://doi.org/10.1002/smj.4250150504

Gavetti, G., & Levinthal, D. (2001). Bringing cognition back in and moving forward. *Journal of Management and Governance*, *5*(3/4), 213–216. https://doi.org/10.1023/A:1014019600252

George, G. (2005). Slack resources and the performance of privately held firms. *Academy of Management Journal*, *48*(4), 661–676. https://doi.org/10.5465/amj.2005.17843944

Gibson, C. B., & Birkinshaw, J. (2004). The antecedents, consequences, and mediating role of organizational ambidexterity. *Academy of Management Journal*, *47*(2), 209–226. https://doi.org/10.2307/20159573

Grant, R. M. (1996). Toward a knowledge-based theory of the firm. *Strategic Management Journal*, *17*(S2), 109–122. https://doi.org/10.1002/smj.4250171110

Gulati, R., Wohlgezogen, F., & Zhelyazkov, P. (2012). The two facets of collaboration: Cooperation and coordination in strategic alliances. *Academy of Management Annals*, *6*(1), 531–583. https://doi.org/10.5465/19416520.2012.691646

Gupta, A. K., Smith, K. G., & Shalley, C. E. (2006). The interplay between exploration and exploitation. *Academy of Management Journal*, *49*(4), 693–706. https://doi.org/10.5465/amj.2006.22083026

Hage, J. (1965). An axiomatic theory of organizations. *Administrative Science Quarterly*, *10*(3), 289–320. https://doi.org/10.2307/2391470

Hair, J. F., Black, B., Babin, B., Anderson, R. E., & Tatham, R. L. (2006). *Multivariate data analysis* (6th ed.). Pearson Prentice Hall.

Halevi, M. Y., Carmeli, A., & Brueller, N. N. (2015). Ambidexterity in SBUs: TMT behavioral integration and environmental dynamism. *Human Resource Management*, *54*(S1), 223–238. https://doi.org/10.1002/hrm.21665

Hall, R. H., Johnson, N. J., & Haas, J. E. (1967). Organizational size, complexity, and formalization. *American Sociological Review*, *32*(6), 903–912. https://doi.org/10.2307/2092844

Hayes, A. F. (2018). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach* (2nd ed.). Guilford Press.

He, Z., & Wong, P. (2004). Exploration vs. exploitation: An empirical test of the ambidexterity hypothesis. *Organization Science*, *15*(4), 481–494. https://doi.org/10.1287/orsc.1040.0078

Heavey, C., & Simsek, Z. (2017). Distributed cognition in top management teams and organizational ambidexterity: The influence of transactive memory systems. *Journal of Management*, *43*(3), 919–945. https://doi.org/10.1177/0149206314545652

Helfat, C. E., & Peteraf, M. A. (2003). The dynamic resource-based view: Capability lifecycles. *Strategic Management Journal*, *24*(10), 997–1010. https://doi.org/10.1002/smj.332

Hill, S. A., & Birkinshaw, J. (2014). Ambidexterity and survival in corporate venture units. *Journal of Management*, *40*(7), 1899–1931. https://doi.org/10.1177/0149206312445925

Jackson, P., & Klobas, J. (2008). Transactive memory systems in organizations: Implications for knowledge directories. *Decision Support Systems*, *44*(2), 409–424. https://doi.org/10.1016/j.dss.2007.05.001

James, L. R., Demaree, R. G., & Wolf, G. (1984). Estimating within-group interrater reliability with and without response bias. *Journal of Applied Psychology*, *69*(1), 85–98. https://doi.org/10.1037/0021-9010.69.1.85

James, L. R., Demaree, R. G., & Wolf, G. (1993). An assessment of within-group interrater agreement. *Journal of Applied Psychology*, *78*(2), 306–309. https://doi.org/10.1037/0021-9010.78.2.306

Jansen, J. J. P., George, G., Van Den Bosch, F. A. J., & Volberda, H. W. (2008). Senior team attributes and organizational ambidexterity: The moderating role of transformational leadership. *Journal of Management Studies*, *45*(5), 982–1007. https://doi.org/10.1111/j.1467-6486.2008.00775.x

Jansen, J. J. P., Kostopoulos, K. C., Mihalache, O. R., & Papalexandris, A. (2016). A socio-psychological perspective on team ambidexterity: The contingency role of supportive leadership behaviours: A socio-psychological perspective on team ambidexterity. *Journal of Management Studies*, *53*(6), 939–965. https://doi.org/10.1111/joms.12183

Jansen, J. J. P., Tempelaar, M. P., Van Den Bosch, F. A. J., & Volberda, H. W. (2009). Structural differentiation and ambidexterity: The mediating role of integration mechanisms. *Organization Science*, *20*(4), 797–811. https://doi.org/10.1287/orsc.1080.0415

Jansen, J. J. P., Van Den Bosch, F. A. J., & Volberda, H. W. (2006). Exploratory innovation, exploitative innovation, and performance: Effects of organizational antecedents and environmental moderators. *Management Science*, *52*(11), 1661–1674. https://doi.org/10.1287/mnsc.1060.0576

Junni, P., Sarala, R. M., Taras, V., & Tarba, S. Y. (2013). Organizational ambidexterity and performance: A meta-analysis. *Academy of Management Perspectives*, *27*(4), 299–312. https://doi.org/10.5465/amp.2012.0015

Kahn, R. L., Wolfe, D. M., Quinn, R. P., Snoek, J. D., & Rosenthal, R. A. (1964). *Organizational stress: Studies in role conflict and ambiguity*. John Wiley.

Kanawattanachai, P., & Yoo, Y. (2007). The impact of knowledge coordination on virtual team performance over time. *MIS Quarterly*, *31*(4), 783–808. https://doi.org/10.2307/25148820

Kauppila, O. P. (2010). Creating ambidexterity by integrating and balancing structurally separate interorganizational partnerships. *Strategic Organization*, *8*(4), 283–312. https://doi.org/10.1177/1476127010387409

Kauppila, O. P., & Tempelaar, M. P. (2016). The social-cognitive underpinnings of employees' ambidextrous behaviour and the supportive role of group managers' leadership: The underpinnings of employees' ambidextrous behaviour. *Journal of Management Studies*, *53*(6), 1019–1044. https://doi.org/10.1111/joms.12192

Kiss, A. N., Libaers, D., Barr, P. S., Wang, T., & Zachary, M. A. (2020). CEO cognitive flexibility, information search, and organizational ambidexterity. *Strategic Management Journal*, *41*(12), 2200–2233. https://doi.org/10.1002/smj.3192

Konradt, U., Otte, K.-P., Schippers, M. C., & Steenfatt, C. (2016). Reflexivity in teams: A review and new perspectives. *The Journal of Psychology*, *150*(2), 153–174. https://doi.org/10.1080/00223980.2015.1050977

Krackhardt, D. (1994). Graph theoretical dimensions of informal organizations. In K. Carley & M. Prietula (Eds.), *Computational organization theory* (pp. 89–111). Lawrence Erlbaum Associates.

Kretschmer, T., & Vanneste, B. S. (2017). Collaboration in strategic alliances: Cooperation and coordination. In L. Mesquita, R. Ragozzino, & J. Reuer (Eds.), *Collaborative strategy* (pp. 53–62). Edward Elgar Publishing Limited.

Krishnan, R., Martin, X., & Noorderhaven, N. G. (2006). When does trust matter to alliance performance? *Academy of Management Journal*, *49*(5), 894–917. https://doi.org/10.5465/amj.2006.22798171

Kutner, M. H., Nachtsheim, C. J., Neter, J., & Li, W. (2005). *Applied linear statistical models* (5th ed.). McGraw-Hill Irwin.

Lawrence, P. R., & Lorsch, J. W. (1967). Differentiation and integration in complex organizations. *Administrative Science Quarterly*, *12*(1), 1–47. https://doi.org/10.2307/2391211

Levinthal, D. A., & March, J. G. (1993). The myopia of learning. *Strategic Management Journal*, *14*(S2), 95–112. https://doi.org/10.1002/smj.4250141009

Lewis, K. (2003). Measuring transactive memory systems in the field: Scale development and validation. *Journal of Applied Psychology*, *88*(4), 587–604. https://doi.org/10.1037/0021-9010.88.4.587

Lewis, K., & Herndon, B. (2011). Transactive memory systems: Current issues and future research directions. *Organization Science*, *22*(5), 1254–1265. https://doi.org/10.1287/orsc.1110.0647

Lewis, K., Lange, D., & Gillis, L. (2005). Transactive memory systems, learning, and learning transfer. *Organization Science*, *16*(6), 581–598. https://doi.org/10.1287/orsc.1050.0143

Lewis, M. W. (2000). Exploring paradox: Toward a more comprehensive guide. *Academy of Management Review*, *25*(4), 760–776. https://doi.org/10.5465/amr.2000.3707712

Li, H., & Atuahene-Gima, K. (2001). Product innovation strategy and the performance of new technology ventures in China. *Academy of Management Journal*, *44*(6), 1123–1134. https://doi.org/10.5465/3069392

Lindell, M. K., & Whitney, D. J. (2001). Accounting for common method variance in cross-sectional research designs. *Journal of Applied Psychology*, *86*(1), 114–121. https://doi.org/10.1037/0021-9010.86.1.114

Littlepage, G. E., Hollingshead, A. B., Drake, L. R., & Littlepage, A. M. (2008). Transactive memory and performance in work groups: Specificity, communication, ability differences, and work allocation. *Group Dynamics: Theory, Research, and Practice*, *12*(3), 223–241. https://doi.org/10.1037/1089-2699.12.3.223

Lowik, S., van Rossum, D., Kraaijenbrink, J., & Groen, A. (2012). Strong ties as sources of new knowledge: How small firms innovate through bridging capabilities. *Journal of Small Business Management*, *50*(2), 239–256. https://doi.org/10.1111/j.1540-627X.2012.00352.x

Lubatkin, M. H., Simsek, Z., Ling, Y., & Veiga, J. F. (2006). Ambidexterity and performance in small- to medium-sized firms: The pivotal role of top management team behavioral integration. *Journal of Management*, *32*(5), 646–672. https://doi.org/10.1177/0149206306290712

Lüscher, L. S., & Lewis, M. W. (2008). Organizational change and managerial sensemaking: Working through Paradox. *Academy of Management Journal*, *51*(2), 221–240. https://doi.org/10.5465/amj.2008.31767217

March, J. G. (1991). Exploration and exploitation in organizational learning. *Organization Science*, *2*(1), 71–87. https://doi.org/10.1287/orsc.2.1.71

Martinez, J. I., & Jarillo, J. C. (1989). The evolution of research on coordination mechanisms in multinational corporations. *Journal of International Business Studies*, *20*(3), 489–514. https://doi.org/10.1057/palgrave.jibs.8490370

Mathieu, J. E., & Taylor, S. R. (2006). Clarifying conditions and decision points for mediational type inferences in organizational behavior. *Journal of Organizational Behavior*, *27*(8), 1031–1056. https://doi.org/10.1002/job.406

Maurer, I., Bartsch, V., & Ebers, M. (2011). The value of intra-organizational social capital: How it fosters knowledge transfer, innovation performance, and growth. *Organization Studies*, *32*(2), 157–185. https://doi.org/10.1177/0170840610394301

McGrath, J. E., & Argote, L. (2001). Group processes in organizational contexts. In M. A. Hogg & R. S. Tindale (Eds.), *Blackwell handbook of social psychology: Group processes* (pp. 603–627). Blackwell Publishers Ltd.

McGrath, J. E., Arrow, H., & Berdahl, J. L. (2000). The study of groups: Past, present, and future. *Personality and Social Psychology Review*, *4*(1), 95–105. https://doi.org/10.1207/S15327957PSPR0401_8

McGrath, R. G. (2001). Exploratory learning, innovative capacity, and managerial oversight. *Academy of Management Journal*, *44*(1), 118–131. https://doi.org/10.5465/3069340

McGuirk, H., Lenihan, H., & Hart, M. (2015). Measuring the impact of innovative human capital on small firms' propensity to innovate. *Research Policy*, *44*(4), 965–976. https://doi.org/10.1016/j.respol.2014.11.008

Mell, J. N., Van Knippenberg, D., & Van Ginkel, W. P. (2014). The catalyst effect: The impact of transactive memory system structure on team performance. *Academy of Management Journal*, *57*(4), 1154–1173. https://doi.org/10.5465/amj.2012.0589

Miller, D. J., Fern, M. J., & Cardinal, L. B. (2007). The use of knowledge for technological innovation within diversified firms. *Academy of Management Journal*, *50*(2), 307–326. https://doi.org/10.5465/amj.2007.24634437

Mom, T. J., Chang, Y. Y., Cholakova, M., & Jansen, J. J. (2019). A multilevel integrated framework of firm HR practices, individual ambidexterity, and organizational ambidexterity. *Journal of Management*, *45*(7), 3009–3034. https://doi.org/10.1177/0149206318776775

Mom, T. J., Van Den Bosch, F. A., & Volberda, H. W. (2009). Understanding variation in managers' ambidexterity: Investigating direct and interaction effects of formal structural and personal coordination mechanisms. *Organization Science*, *20*(4), 812–828. https://doi.org/10.1287/orsc.1090.0427

Mom, T. J., van Neerijnen, P., Reinmoeller, P., & Verwaal, E. (2015). Relational capital and individual exploration: Unravelling the influence of goal alignment and knowledge acquisition. *Organization Studies*, *36*(6), 809–829. https://doi.org/10.1177/0170840615580009

Moran, P. (2005). Structural vs. relational embeddedness: Social capital and managerial performance. *Strategic Management Journal*, *26*(12), 1129–1151. https://doi.org/10.1002/smj.486

Moreland, R. L. (1999). Transactive memory: Learning who knows what in work groups and organizations. In L. L. Thompson, J. M. Levine, & D. M. Messick (Eds.), *Shared cognition in organizations: The management of knowledge* (pp. 3–32). L. Erlbaum.

Moreland, R. L., & Argote, L. (2003). Transactive memory in dynamic organizations. In R. S. Peterson & E. A. Mannix (Eds.), *Leading and managing people in the dynamic organization* (pp. 135–162). L. Erlbaum.

Mosakowski, E. (1997). Strategy making under causal ambiguity: Conceptual issues and empirical evidence. *Organization Science*, *8*(4), 414–442. https://doi.org/10.1287/orsc.8.4.414

Nemanich, L. A., & Vera, D. (2009). Transformational leadership and ambidexterity in the context of an acquisition. *The Leadership Quarterly*, *20*(1), 19–33. https://doi.org/10.1016/j.leaqua.2008.11.002

Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization Science*, *5*(1), 14–37. https://doi.org/10.1287/orsc.5.1.14

Nooteboom, B. (1994). Innovation and diffusion in small firms: Theory and evidence. *Small Business Economics*, *6*(5), 327–347. https://doi.org/10.1007/BF01065137

Nooteboom, B., Van Haverbeke, W., Duysters, G., Gilsing, V., & van den Oord, A. (2007). Optimal cognitive distance and absorptive capacity. *Research Policy*, *36*(7), 1016–1034. https://doi.org/10.1016/j.respol.2007.04.003

O'Reilly, C. A., & Tushman, M. L. (2004). The ambidextrous organization. *Harvard Business Review*, *82*(4), 74–83. https://search.ebscohost.com/login.aspx?direct=true&db=buh&AN=12774665&site=ehost-live&scope=site

O'Reilly, C. A., III, & Tushman, M. L. (2008). Ambidexterity as a dynamic capability: Resolving the innovator's dilemma. *Research in Organizational Behavior*, *28*, 185–206. https://doi.org/10.1016/j.riob.2008.06.002

O'Reilly, C. A., & Tushman, M. L. (2013). Organizational ambidexterity: Past, present, and future. *The Academy of Management Perspectives*, *27*(4), 324–338. https://doi.org/10.5465/amp.2013.0025

Obstfeld, D. (2005). Social networks, the tertius iungens orientation, and involvement in innovation. *Administrative Science Quarterly*, *50*(1), 100–130. https://doi.org/10.2189/asqu.2005.50.1.100

Okhuysen, G. A., & Bechky, B. A. (2009). Coordination in organizations: An integrative perspective. *Academy of Management Annals*, *3*(1), 463–502. https://doi.org/10.5465/19416520903047533

Patterson, M. G., West, M. A., Shackleton, V. J., Dawson, J. F., Lawthom, R., Maitlis, S., Robinson, D. L., & Wallace, A. M. (2005). Validating the organizational climate measure: Links to managerial practices, productivity and innovation. *Journal of Organizational Behavior*, *26*(4), 379–408. https://doi.org/10.1002/job.312

Peltokorpi, V. (2012). Organizational transactive memory systems: Review and extension. *European Psychologist*, *17*(1), 11–20. https://doi.org/10.1027/1016-9040/a000044

Perry-Smith, J. E. (2006). Social yet creative: The role of social relationships in facilitating individual creativity. *Academy of Management Journal*, *49*(1), 85–101. https://doi.org/10.5465/amj.2006.20785503

Peterson, R. S., & Behfar, K. J. (2003). The dynamic relationship between performance feedback, trust, and conflict in groups: A longitudinal study. *Organizational Behavior and Human Decision Processes*, *92*(1–2), 102–112. https://doi.org/10.1016/S0749-5978(03)00090-6

Phielix, C., Prins, F. J., Kirschner, P. A., Erkens, G., & Jaspers, J. (2011). Group awareness of social and cognitive performance in a CSCL environment: effects of a peer feedback and reflection tool. *Computers in Human Behavior*, *27*(3), 1087–1102. https://doi.org/10.1016/j.chb.2010.06.024

Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, *88*(5), 879–903. https://doi.org/10.1037/0021-9010.88.5.879

Podsakoff, P. M., & Organ, D. W. (1986). Self-reports in organizational research: Problems and prospects. *Journal of Management*, *12*(4), 531–544. https://doi.org/10.1177/014920638601200408

Prajogo, D., & McDermott, C. M. (2014). Antecedents of service innovation in SMEs: Comparing the effects of external and internal factors. *Journal of Small Business Management*, *52*(3), 521–540. https://doi.org/10.1111/jsbm.12047

Rau, D. (2006). Top management team transactive memory, information gathering, and perceptual accuracy. *Journal of Business Research*, *59*(4), 416–424. https://doi.org/10.1016/j.jbusres.2005.07.001

Rawley, E. (2010). Diversification, coordination costs, and organizational rigidity: Evidence from microdata. *Strategic Management Journal*, *31*(8), 873–891. https://doi.org/10.1002/smj.838

Reagans, R., & McEvily, B. (2003). Network structure and knowledge transfer: The effects of cohesion and range. *Administrative Science Quarterly*, *48*(2), 240–267. https://doi.org/10.2307/3556658

Ren, Y., & Argote, L. (2011). Transactive memory systems 1985–2010: An integrative framework of key dimensions, antecedents, and consequences. *The Academy of Management Annals*, *5*(1), 189–229. https://doi.org/10.5465/19416520.2011.590300

Ren, Y., Carley, K. M., & Argote, L. (2006). The contingent effects of transactive memory: When is it more beneficial to know what others know? *Management Science*, *52*(5), 671–682. https://doi.org/10.1287/mnsc.1050.0496

Richardson, H. A., Simmering, M. J., & Sturman, M. C. (2009). A tale of three perspectives: Examining post hoc statistical techniques for detection and correction of common method variance. *Organizational Research Methods*, *12*(4), 762–800. https://doi.org/10.1177/1094428109332834

Rosenkopf, L., & Nerkar, A. (2001). Beyond local search: Boundary-spanning, exploration, and impact in the optical disk industry. *Strategic Management Journal*, *22*(4), 287–306. https://doi.org/10.1002/smj.160

Schippers, M. C., Den Hartog, D. N., & Koopman, P. L. (2007). Reflexivity in teams: A measure and correlates. *Applied Psychology*, *56*(2), 189–211. https://doi.org/10.1111/j.1464-0597.2006.00250.x

Schippers, M. C., Edmondson, A. C., & West, M. A. (2014). Team reflexivity as an antidote to team information-processing failures. *Small Group Research*, *45*(6), 731–769. https://doi.org/10.1177/1046496414553473

Schippers, M. C., Edmondson, A. C., & West, M. A. (2020). Team reflexivity. In J. M. Levine & L. Argote (Eds.), *The Oxford Handbook of Group and Organizational Learning* (pp. 175–193). New York, NY: Oxford University Press.

Schippers, M. C., Homan, A. C., & van Knippenberg, D. (2013). To reflect or not to reflect: Prior team performance as a boundary condition of the effects of reflexivity on learning and final team performance. *Journal of Organizational Behavior*, *34*(1), 6–23. https://doi.org/10.1002/job.1784

Schippers, M. C., West, M. A., & Dawson, J. F. (2015). Team reflexivity and innovation: The moderating role of team context. *Journal of Management*, *41*(3), 769–788. https://doi.org/10.1177/0149206312441210

Schneider, B. (1975). Organizational climates: An essay. *Personnel Psychology*, *28*(4), 447–479. https://doi.org/10.1111/j.1744-6570.1975.tb01386.x

Schneider, B., Ehrhart, M. G., & Macey, W. H. (2013). Organizational climate and culture. *Annual Review of Psychology*, *64*(1), 361–388. https://doi.org/10.1146/annurev-psych-113011-143809

Schreyögg, G., & Sydow, J. (2010). Organizing for fluidity? Dilemmas of new organizational forms. *Organization Science*, *21*(6), 1251–1262. https://doi.org/10.1287/orsc.1100.0561

Scott, W. R. (2003). *Organizations: Rational. natural, and open systems*. Prentice Hall.

Sidhu, J. S., Commandeur, H. R., & Volberda, H. W. (2007). The multifaceted nature of exploration and exploitation: Value of supply, demand, and spatial search for innovation. *Organization Science*, *18*(1), 20–38. https://doi.org/10.1287/orsc.1060.0212

Simon, H. A. (1981). *The sciences of the artificial* (2nd ed.). MIT Press.

Simsek, Z. (2009). Organizational ambidexterity: Towards a multilevel understanding. *Journal of Management Studies*, *46*(4), 597–624. https://doi.org/10.1111/j.1467-6486.2009.00828.x

Simsek, Z., Heavey, C., Veiga, J. F., & Souder, D. (2009). A typology for aligning organizational ambidexterity's conceptualizations, antecedents, and outcomes. *Journal of Management Studies*, *46*(5), 864–894. https://doi.org/10.1111/j.1467-6486.2009.00841.x

Smith, W. K. (2014). Dynamic decision making: A model of senior leaders managing strategic paradoxes. *Academy of Management Journal*, *57*(6), 1592–1623. https://doi.org/10.5465/amj.2011.0932

Smith, W. K., & Lewis, M. W. (2011). Toward a theory of paradox: A dynamic equilibrium model of organizing. *Academy of Management Review*, *36*(2), 381–403. https://doi.org/10.5465/amr.2009.0223

Smith, W. K., & Tushman, M. L. (2005). Managing strategic contradictions: A top management model for managing innovation streams. *Organization Science*, *16*(5), 522–536. https://doi.org/10.1287/orsc.1050.0134

Tempelaar, M. P., & Rosenkranz, N. A. (2019). Switching hats: The effect of role transition on individual ambidexterity. *Journal of Management*, *45*(4), 1517–1539. https://doi.org/10.1177/0149206317714312

Thompson, J. D. (1967). *Organizations in action: Social science bases of administration. Organizations in action: Social science bases of administration*. Mc. Graw-Hill Book Company.

Thompson, V. A. (1965). *Modern organization*. Knopf.

Tsoukas, H. (1996). The firm as a distributed knowledge system: A constructionist approach. *Strategic Management Journal*, *17*(S2), 11–25. https://doi.org/10.1002/smj.4250171104

Tushman, M. L., & O'Reilly, C. A., III. (1996). Managing evolutionary and revolutionary change. *California Management Review*, *38*(4), 8–28. https://doi.org/10.2307/41165852

Van De Ven, A. H. (1986). Central problems in the management of innovation. *Management Science*, *32*(5), 590–607. https://doi.org/10.1287/mnsc.32.5.590

Van Ginkel, W., Tindale, R. S., & van Knippenberg, D. (2009). Team reflexivity, development of shared task representations, and the use of distributed information in group decision making. *Group Dynamics: Theory, Research, and Practice*, *13*(4), 265–280. https://doi.org/10.1037/a0016045

Vashdi, D. R., Bamberger, P. A., & Erez, M. (2013). Can surgical teams ever learn? The role of coordination, complexity, and transitivity in action team learning. *Academy of Management Journal*, *56*(4), 945–971. https://doi.org/10.5465/amj.2010.0501

Vashdi, D. R., Bamberger, P. A., Erez, M., & Weiss-Meilik, A. (2007). Briefing-debriefing: Using a reflexive organizational learning model from the military to enhance the performance of surgical teams. *Human Resource Management*, *46*(1), 115–142. https://doi.org/10.1002/hrm.20148

Voss, G. B., & Voss, Z. G. (2013). Strategic ambidexterity in small and medium-sized enterprises: Implementing exploration and exploitation in product and market domains. *Organization Science*, *24*(5), 1459–1477. https://doi.org/10.1287/orsc.1120.0790

Weber, M. (1924). *The theory of economic and social organization* (A. M. Henderson and Talcott Parsons, Trans.). Oxford University Press.

Wegner, D. M. (1987). Transactive memory: A contemporary analysis of the group mind. In B. Mullen & G. R. Goethals (Eds.), *Theories of group behavior* (pp. 185–208). Springer.

West, M. A. (2000). Reflexivity, revolution and innovation in work teams. In M. M. Beyerlein, D. A. Johnson, & S. T. Beyerlein (Eds.), *Product development teams* (pp. 1–29). JAI Press.