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Disentangling the antecedents of ambidexterity: Exploration and exploitation

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ABSTRACT

We view ambidexterity as a paradox whereby its components, exploration and exploitation, generate persistent and conflicting demands on an organization. Drawing on the attention based view of the firm (ABV), we examine three antecedents of organizational ambidexterity that reflect ABV's three principles − the principle of focus of attention; the principle of situated attention; and the principle of structural distribution of attention. Specifically, we examine the influence of top management team (TMT) composition, whether or not the firm has a clear written vision, and the extent to which organizational attention is focused on investments in R&D, and continuous improvement. We empirically validate our model on a sample of 422 small and medium-sized enterprises in the UK and find that ambidexterity is supported by a blend of integration and differentiation approaches.

1. Introduction

Organizational ambidexterity has been a subject of enduring interest to management scholars. Ambidexterity refers to an organization's ability to manage current demands while being adaptable to changes in the environment (Duncan, 1976; Gibson and Birkinshaw, 2004; Tushman and O'Reilly, 1996). It has long been recognized that firms should "engage in enough exploitation to ensure the organization's current viability and engage in enough exploration to ensure its future viability" (Levinthal and March 1993, p. 105). Indeed, organizational ambidexterity has been linked to technological innovation, organizational learning, competitive advantage and organizational survival (Benner and Tushman, 2003; Siggelkow and Levinthal, 2003).

A key research stream in scholarship on ambidexterity has examined the antecedents of ambidexterity and their interactions (Auh and Menguc, 2005; Jansen et al., 2006). The antecedents of ambidexterity are interesting to scholars because of the challenge of developing a capability with two underlying components, exploration and exploitation, which emerge from distinct knowledge processing capabilities (Baum et al., 2000; Floyd and Lane, 2000).

Recent research into ambidexterity recognises that exploration and exploitation form a paradoxical relationship (Andriopoulos and Lewis, 2010; Raisch and Zimmermann, 2017; Smith and Lewis, 2011) as they require substantially different structures, processes, strategies and capabilities (Benner and Tushman, 2003; Chang et al., 2009; McGrath, 2001; Siggelkow and Levinthal, 2003). Although exploration and exploitation are complementary forces which tend to be mutually reinforcing when they co-occur over time (Raisch et al., 2009), they also generate persistent organizational tensions (Lubatkin et al., 2006; Smith and Lewis, 2011).

The paradox view of ambidexterity suggests that the persistent tensions arising from the contradictory nature of the components of ambidexterity are difficult to resolve (Andriopoulos and Lewis, 2009). Instead, such tensions need to be addressed through various integrative and differentiating approaches (Andriopoulos and Lewis, 2009; Gotsi et al., 2010; Smith, 2015). Integrative approaches stress interdependence between seemingly contradictory activities and call for coordination (Andriopoulos and Lewis, 2009) and synergies (Lewis, 2000) while differentiating approaches direct attention to either explorative or exploitative aspects of organizational activities (Puranam et al., 2006; Tushman and O'Reilly, 1996).

In this paper, we build on previous ambidexterity-as-a-paradox research by exploring which antecedents of exploration and exploitation tend to be integrative or differentiating. In so doing, we attempt to

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reconcile the fact that while some common antecedents of ambidexterity as an overarching construct have been identified (see Raisch and Birkinshaw, 2008 for review), its constituent components – exploration and exploitation − tend to be associated with diametrically opposing factors. Indeed, exploration has long been associated with organic structures, improvisation and autonomy (Rosenkopf and Nerkar, 2001); whereas exploitation has been associated with mechanistic structures, path dependence and routinization (Beckman et al., 2004; Benner and Tushman, 2003; March 1991).

We posit that managing ambidexterity and engaging in the right combination of exploitation and exploration activities requires dynamically shifting between the two practices by adopting an organizational paradox mindset (cf. Miron-Spektor et al., 2017). Adopting an organizational paradox mindset predicated on constant readjustment between the tension-generating extremes, necessitates a better understanding of the antecedents of the components of ambidexterity − exploration and exploitation. More specifically, identification of which antecedents are integrating and which are differentiating would help firms devise better strategies for dealing with ambidexterity.

Drawing on the attention based view (Ocasio, 1997, 2011) and cognitive approaches to strategic management (Gavetti and Levinthal, 2000), we view the development of explorative and exploitative capability to be a consequence of the focus of managerial attention. Attention denotes “noticing, interpreting, and focusing of time and effort” (Ocasio, 1997, p.188). We examine three antecedent factors that reflect the three key principles of the attention-based view (Ocasio, 1997): the principle of focus of attention; the principle of situated attention; and the principle of structural distribution of attention. Specifically, we examine the influence of top management team (TMT) composition in terms of heterogeneity and size (Alexiev et al., 2010; Nielsen and Nielsen, 2013; Nielsen, 2010), whether or not the firm has a clear written vision (Jansen et al., 2008; Pearce and Ensley, 2004), and the extent to which organizational attention is focused on investments in R &D and continuous improvement.

Our study makes several contributions to the literature. First, our paper shows that ambidexterity can be achieved through a combination of differentiating and integrating approaches to managing ambidexterity. Contrary to expectations, we find that continuous improvement capability is integrative, while written vision, TMT heterogeneity and size, and R&D intensity are differentiating. Second, our paper contributes to the theoretical development of ambidexterity by examining the impact of managerial attention on exploration and exploitation. In so doing, we address a call by Yukl (2009) for more comprehensive models of the impact of leadership on exploration and exploitation. Third, we contribute to the discussion of how team composition and vision impact exploration and exploitation. Most prior studies that have linked organizational ambidexterity with team composition have examined TMT characteristics, such as heterogeneity (Mannix and Neale, 2005; Mueller, 2012) and group size (Haleblian and Finkelstein, 1993; Jackson et al., 1991), on their own and not interactively. The interactive effect of different TMT characteristics may illustrate how these characteristics support and reinforce each other. Any studies that have considered a combination of the two factors were done in a fairly specific context – that of research collaborations (e.g. (Chompalov et al., 2002; Cummings et al., 2013) where other characteristics might have influenced the outcomes. Likewise, although agreed vision has received scholarly attention, it has not been systematically examined in relation to organizational ambidexterity and its components. Conceptualizing vision as a mechanism that shapes the way a firm responds to its changing context facilitates a better understanding of a firm’s efforts to achieve ambidexterity.

Examining the potentially differential effects of key antecedents to ambidexterity on exploration and exploitation highlights the tensions and trade-offs that form a part of managing ambidexterity in organizations. As organizational ambidexterity may imply a differential focus on exploration and exploitation activities in line with the firm’s strategic priorities, a clearer understanding of the role played by each antecedent in fostering exploration and exploitation capabilities would enable firms to make more informed decisions with regards to managing their innovation and strategic decision-making process.

2. Theoretical development

The capability of ambidexterity has long been linked to firms’ short-run and long-run performance (Gibson and Birkinshaw, 2004; He and Wong, 2004; Lubatkin et al., 2006). The difficulty of developing a capability for organizational ambidexterity originates in the fact that exploration and exploitation stem from different learning capabilities (Baum et al., 2000; Floyd and Lane, 2000). Indeed, “exploitation refers to learning gained via local search, experiential refinement, and selection and reuse of existing routines. Exploration refers to learning gained through processes of concerted variation, planned experimentation, and play” (Baum et al., 2000, p. 768). Exploration and exploitation also place different requirements on organizations in terms of organizational structure and processes (Gibson and Birkinshaw, 2004; Tushman et al., 2010; Tushman and O'Reilly, 1996). Traditionally, scholars have recommended focusing on either exploration or exploitation (Barney, 1991; Porter, 1985) so as to avoid the risk of being mediocre at both (March 1991); although subsequently, the notion of balancing these two types of activities to ensure superior performance has gained greater recognition (Gibson and Birkinshaw, 2004; O'Reilly and Tushman, 2013; Raisch and Birkinshaw, 2008).

Despite the ongoing debate on the appropriate way to balance exploration and exploitation, and the realization that these two activities are conceptually distinct, most studies have not explicitly disentangled the common and distinct antecedents of exploration and exploitation. A notable exception is the work of Beckman (2006) who focused on the impact of the top management team members’ prior company affiliations on the firm explorative and exploitative behaviors. In this paper we follow the lead of Beckman (2006) and argue that there is a need for a closer and more systematic examination of antecedents of exploration and exploitation.

A more recent conceptualization of ambidexterity as a paradox (Jansen, 2008; Lewis, 2000; Papachroni et al., 2014) characterized by persistent tensions (Andriopoulos and Lewis, 2009) calls for a dynamic management of exploration-exploitation tensions (Smith, 2015). A paradox involves “contradictory yet interrelated elements that exist simultaneously and persist over time” (Smith & Lewis, 2011, p. 382). One mechanism of managing a paradox in the context of ambidexterity that has begun receiving scholarly attention is a combination of integration and differentiation approaches (Smith, 2015). According to Smith and Tushman (2005), differentiating involves separating distinct elements and cultivating unique aspects of each, while integrating emphasises synergies and linkages. Differentiation and integration could be seen in organizational designs (Tushman and O'Reilly, 1996) and organizational practices (Andriopoulos and Lewis, 2009; Locke and Latham, 1990; Smith and Tushman, 2005).

We address the gap of unpicking distinct and common antecedents of exploitation and exploration by examining some key leadership-based and contextual antecedents of ambidexterity, namely, TMT composition (heterogeneity and size), the existence of a written vision, and the learning and innovation activities of continuous improvement and R&D. Our rationale for selecting these three variables is found in the attention-based view (ABV) of the firm and the managerial cognition literature.

The ABV (Ocasio, 1997) builds upon the foundations of the behavioral theory of the firm (Cyert and March, 1963), which holds that bounded rationality leads to the creation of organizational structures and processes that both shape and are shaped by these human cognitive limitations. The ABV advances this perspective to address how attention influences organizational adaptation (Ocasio, 2011). Here we focus on two aspects of attention: attentional perspective and attentional

engagement. Attentional perspective is defined as "top-down cognitive (and motivational) structures that generate heightened awareness and focus over time to relevant stimuli and responses" (Ocasio, 2011, p.1288). In contrast, attentional engagement involves the focus of resources such as time and energy on a selected set of stimuli and responses, such as, for example, the need to adapt radical new solutions to new threats, versus the need to incrementally improve upon current activities.

ABV is an attractive theoretical lens through which to consider the phenomenon of ambidexterity. Sustaining an optimal mix of exploitation and exploration at any given time is one of the most important demands on a managers' attention (Smith and Tushman, 2005). Attaining ambidexterity hinges on both the knowledge within the firm and the outside of it (March 1991). The search for knowledge is underpinned by what the managers focus their attention on and how they ensure this attention is embedded in the organization.

The key premises of the ABV are that attention is significantly driven by, yet not limited to, the aspects upon which senior management focus their attention; and that attention is inherently situated in social context, and distributed throughout the organization (Ocasio, 1997). We have selected three antecedents of exploration and exploitation to collectively reflect these three premises. In this research, organizational attention is focused on a particular way of supporting firm's innovation activities (e.g. whether or not to focus on R&D and continuous improvement). The principle of situated attention suggests that the focus of attention is situated and dependent on the context. The way to address the context a firm finds itself in is gleaned from management's communication of their vision and strategy. According to Vissa and Chacar (2009, p. 1182), "strategic consensus shapes the salience that individual team members attach to specific information". Written vision is intended to communicate these commonly agreed priorities and in so doing enable the relevant information to become salient to employees and management' actions.

Furthermore, the TMT composition influences the extent to which this attention is distributed throughout the organization through processes of communication, such as the communication of strategic vision (Ocasio and Joseph, 2008). Our focus on the internal aspects of ambidexterity, on organizational or contextual ambidexterity (Gibson and Birkinshaw, 2004) highlights the key actors and the social processes within the firm (Ghoshal and Bartlett, 1997). This emphasises how key actors manage the social processes that enable members of the organization to behave ambidextrously.

The attention-based view is instrumental for our understanding of how organizational attention dynamically shifts between strategic contradictions because it reflects how the TMT signals to organization members. Taking this perspective, we identify three variables that are reflective of these features. TMT composition highlights the significance of the social context for establishing the attentional 'set' of the organization (reflecting existing knowledge embedded in the TMT based on its composition). TMT is crucial for signalling where organizational attention needs to be deployed in an effort to achieve ambidexterity. The focus of organizational attention on innovation activities is reflected in the investments made in R&D and the commitment to continuous improvement. Finally, management communication of strategic vision creates a significant channel through which control of organizational attention is enhanced (Ocasio and Wohlgezogen, 2010).

2.1. TMT characteristics

Both the ABV and upper-echelon theory suggest that TMT characteristics are highly salient to the focusing of organizational attention. According to upper-echelon theory (Hambrick and Mason, 1984), top management team (TMT) characteristics affect organizational outcomes because top executives make strategic decisions for organizations (Thompson, 1967). Underlying this theory is the idea that cognitive characteristics of top executives influence decisions they make (Nielsen, 2010; Smith et al., 1994) with the resultant impact on organizational outcomes (Carpenter et al., 2004). The ABV considers a broader range of factors that determine what decision makers focus on ("attention structures"), moving beyond top managers' backgrounds to firm-level factors (Souitaris and Maestro, 2010). Such firm-level attention structures may include culture, resources and social relationships (Ocasio and Joseph, 2005). Pertinent to our study, ABV is well suited for analyzing the top management's resource allocation decisions and their communication of their strategic priorities.

The impact of TMT characteristics on organizational ambidexterity has received significant scholarly attention (Beckman, 2006; Cao et al., 2009; Lubatkin et al., 2005). Top management teams influence firm behavior as they act as the "gatekeepers of (the) firms information processing and strategy making" (Cao et al., 2009, p. 127). TMT composition has been a key construct within upper echelons theory as the events within teams are seen as a reflection of the number and the type of people who are its members (Kozlowski and Bell, 2003). TMT heterogeneity reflects cognitive and information processing capabilities of TMTs (Pegels et al., 2000), and TMT size is a reflection of the team's capabilities and resources (Haleblian and Finkelstein, 1993; Vyakarnam and Handelberg, 2005). Both of these characteristics are expected to influence the focus of managerial attention.

We now develop our argumentation about the effect of TMT heterogeneity on exploration and exploitation. We begin with the direct effects, but then expand to consider how the effect of team size will moderate the relationship as we argue that the effects of TMT heterogeneity can only be fully understood in the context of TMT size. In considering the influence of TMT heterogeneity on exploration and exploitation capabilities we focus on two dimensions of the relationship, the knowledge resources of the team and also the potential for conflict. We begin by considering the role of knowledge resources.

Heterogeneity provides TMTs with different types of knowledge and decision-making styles and a greater variety of professional perspectives. All else equal, heterogeneity of a group will reduce the strength of shared values in guiding and aligning behavior, and will weaken the possibility of using social sanctions and cultural enforcement to penalize deviance. As a result, heterogeneity weakens the focus of attention. These effects will also broaden the scope of the information that is collected and stimulate differences in the interpretation of situations and in the proposed solutions to problems (Knight et al., 1999; Pitcher and Smith, 2001), which in turn facilitates team reflectivity, or a team's consideration of its own functioning, and leads to learning (Schippers et al., 2003). A greater variety of professional perspectives also helps to counteract team-level biases and errors in decision making (Schippers et al., 2014). Overall, heterogeneity appears beneficial in management processes that require judgment and creative thinking, such as those characteristic of exploration activities. Thus TMT heterogeneity is likely to widen the focus of management attention.

TMT Heterogeneity, however, also leads to the emergence of conflicts both in terms of task conflict and emotional conflict. Task conflicts constitute disagreements and debates regarding task content that revolve around what actions are necessary to complete the task (Amason, 1996), which facilitate the exchange of information among the top management team members and the development of shared understanding (Amason and Sapienza, 1997). TMT heterogeneity, through the elaboration of task-relevant information and task-related conflicts, enhances problem solving, judgment, and decision-making capabilities of the team (Van Knippenberg et al., 2004; Van Knippenberg and Schippers, 2007). Task conflict is particularly beneficial when working complex, non-routine tasks without standard solutions (De Dreu and Weingart, 2003). In those situations, task conflict encourages deliberate discussion and processing of task-relevant information, which fosters learning and the development of new insights (Jehn, 1995). Routine tasks, on the other hand, such as those involved in exploitation activities, typically conform to standard operating procedures, requiring a narrow focus of attention. Therefore, in these situations, task conflict is

likely to interfere with those procedures (see also Amason, 1996; De Dreu and Weingart, 2003). Indeed, Jehn (1995) found that the impact of task conflict on performance was moderated by task routineness.

In contrast, emotional conflict, defined as the onset of negative emotions such as irritation, frustration or anger in team interactions, may have a detrimental effect on group functioning (Van Knippenberg and Schippers, 2007) and team performance (Jehn, 1995). This suggests that TMT heterogeneity may exert a negative influence upon tasks requiring high levels of focus and alignment. Exploitation activities, involving routine tasks and coordinated local search for incremental improvements, are dependent upon building high levels of shared understanding, cooperation and attention to this goal. Such activities are more likely to be undermined by the emotional conflicts resulting from TMT heterogeneity.

We argue that the relationships between TMT heterogeneity and exploration and exploitation will be moderated by team size. In engaging in exploration, larger heterogeneous TMTs will be able to access more resources such as time, attention and expertise, facilitating team performance (Kozlowski and Bell, 2003). Where teams are heterogeneous, having a larger team may prove useful in dealing with more complex problems and operating in more difficult environmental conditions. We would expect the influence of team size and heterogeneity to magnify each other as they affect the quantity and the breadth of resources affecting decision making quality and team processes. In other words, TMT heterogeneity with its benefits of broader search and multiple perspectives may have a particularly marked effect on exploration in larger teams. A larger pool of managerial resources would amplify the positive effects of diversity on non-routine exploratory tasks. Hence, we suggest that TMT heterogeneity will positively moderate the relationship between TMT size and exploration.

Based on the discussion above we propose the following hypothesis.

Hypothesis 1a. *TMT heterogeneity will have a positive impact on a firm's exploration capability, and the relationship will be positively moderated by team size.*

In contrast, when dealing with more routine tasks scholars have argued that task conflict and emotional conflict may have a negative effect on team effectiveness (Amason, 1996; De Dreu and Weingart, 2003; Jehn, 1997). Effective exploitation activities require routine tasks which focus on efficiency, refinement and execution (March 1991). TMT heterogeneity is commonly assumed to be negatively related to firm exploitation activities because the focus on execution, thought to be at the heart of exploitation, requires cohesion within the management team that is undermined by TMT heterogeneity (Ndofor et al., 2015). Moreover, according to social identity theory (Tajfel and Turner, 1979), TMT heterogeneity encourages members to categorize other team members into 'in-group' and 'out-group' and the greater the various shared demographic and information-based attributes, the greater the identification with the 'in-group'. This split leads to the formation of fault lines within the TMT (Li and Hambrick, 2005), reducing effectiveness when the task requires cohesion, coordination and cooperation (see also Bourgeois and Eisenhardt (1988)).

Larger heterogeneous teams might experience problems related to dispersion of responsibility and coordination (Latane et al., 1979). Hence, larger heterogeneous teams are more likely to suffer the negative consequences of emotional and task conflict in the context of more routine, exploitation activities. Larger team sizes will exacerbate this problem through coordination difficulties and dispersion of responsibility which in turn would reduce the effectiveness of executing pre-existing strategy (Finkelstein and Hambrick, 1996; Pitcher and Smith, 2001).

We suggest that the arguments against TMT heterogeneity in tasks related to exploitation have been over-emphasized because the designing and implementing effective exploitation activities is more cognitively complex task than it is usually considered (Katila and Ahuja, 2002). As March noted, "…the essence of exploitation is the refinement and extension of existing competencies, technologies, and paradigms" (March 1991, p. 85). Often, exploitation involves carrying out activities in streamlined and coordinated sets of processes and implementing some improvements (Benner and Tushman, 2003). The latter, in turn, requires problem-solving heuristics and a good understanding of the firms' existing technological boundaries and organizational capabilities so as to optimize the local search.

At the heart of the divergent views on the relationship between TMT heterogeneity and exploitation lies the fact that two different conceptualizations of exploitation exist. Some scholars maintain that exploitation refers solely to the use of past knowledge (Rosenkopf and Nerkar, 2001; Vermeulen and Barkema, 2001) whilst others argue that it also refers to the pursuit and acquisition of new knowledge, albeit of a different nature to that involved in exploration (Baum et al., 2000; Benner and Tushman, 2003). We support the latter view and believe that learning, improvement, and acquisition of new knowledge are central to both exploitation and exploration. This would suggest a positive relationship between TMT heterogeneity and exploitation. At the same time, as exploitation activities often occur alongside a known trajectory, if TMT is relatively large, coordination difficulties may ensue which would curtail the benefits of heterogeneity. We argue, therefore, that TMT size would negatively moderate the relationship between TMT heterogeneity and firms' exploitation.

Hypothesis 1b. *TMT heterogeneity will have a positive impact on a firm's exploitation capability, and the relationship will be negatively moderated by team size.*

2.2. Written vision

Vision is a key concept in the strategy and leadership literatures (Avolio et al., 2004; Baum et al., 1998; Elenkov et al., 2005). Vision reflects a communications channel through which attention is focused and control exerted throughout the organization (Ocasio and Wohlgezogen, 2010). Researchers have argued that leaders can inspire action by articulating a clear vision for an organization (Avolio and Bass, 1995; Pieterse et al., 2010). Indeed, some scholars have suggested that communicating purpose is the most central of all leader behaviors, because it provides meaning and direction (Nemanich and Keller, 2007).

Vision provides meaning to firms activities (Hart, 1992), and creates a general sense of purpose and direction to guide the actions taken by organizational members (Johnson, 1988). Gupta et al. (2004) argue that "[entrepreneurial] leadership […] creates visionary scenarios that are used to assemble and mobilize a supporting cast of participants who become committed by the vision to the discovery and exploitation of strategic value creation" (Gupta et al., 2004, p. 242). The literature on entrepreneurial vision generally focuses on its importance for the venture's creation and growth (Baum and Locke, 2004; Baum et al., 1998). For instance, Baum and Locke (2004) posit that vision communicated to employees is a significant predictor of growth of new firms. Ensley and Pearce (2001) show that the top management team process of building a unified vision allows team members to share dissenting views while maintaining focus by reducing the negative effects of conflict.

Arguments also support the benefits of vision for exploration and consequently for ambidexterity (O'Reilly and Tushman, 2008; O'Reilly and Tushman, 2004). To unpack the effects of vision on exploration and exploitation, we turn to what constitutes vision. It has generally been agreed that vision presents a mental image of a firm's future – its products, services and organization that a leader wants to achieve (Ruvio et al., 2010). Vision plays a crucial role in motivating the followers towards achieving this image of the future. Vision instils order by providing a long-term direction to guide short-term action on the part of organizational members (Nonaka, 1988). It communicates the rules of the game, influencing attention by shaping the situation in

terms of defining context, participants, and resources (Ocasio and Wohlgezogen, 2010) and overcomes distributed attention on the part of employees. By infusing senior teams with common goals and shared values (Larwood et al., 1995), vision facilitates better integration of riskier, explorative actions into daily operations. This is especially valuable when explorative actions become more risky and innovative and further removed from core activities (Jansen et al., 2008). In this way, vision can aid explorative activities, although these benefits might be greater in large organizations where exploration activities are decentralized.

As a channel for influencing attention, vision is relevant for activities that focus on promoting efficiency by regularizing decision making (Ocasio and Wohlgezogen, 2010). Indeed, research has shown that clearly defined goals contribute to team effectiveness (Guzzo and Shea, 1992). Team effectiveness is particularly relevant in case of exploitation activities, which are geared towards a reduction in variance and efficiency. We argue, therefore, that the strategic management aspect of vision is positively associated with exploitation.

It is important to recognize that to affect follower outcomes, organizational leaders need to communicate their vision (House, 1977). Kouzes and Posner (1987) specify that the vision must be communicated to others, both through written statements as well as through personal communication, in order to convince them to support it. Although our arguments emphasize the benefits of vision for exploitation, based on the above, we argue that written vision is likely to be relevant for both exploration and exploitation, albeit for different underlying reasons.

Hypothesis 2a. *Written vision will be positively related to exploration.*

Hypothesis 2b. *Written vision will be positively related to exploitation.*

2.3. Innovation activities

At their core, exploration and exploitation reflect two different learning orientations that, according to the organizational ambidexterity perspective, need to be balanced. Underlying these orientations are distinct approaches to innovative activity. Integrating the upper-echelons perspective with the attention-based view of the firm, Cho and Hambrick (2006) argue that TMT's shifting attention patterns determine firms' strategic choices, including the focus of their innovation activities (Talke et al., 2010). In this view, R&D has a dual role – that of signalling the strategic importance of more daring innovations through deploying resources to innovation and that of an input into the innovation process. The members of the organization look to the TMT for cues concerning the strategic priorities that will be supported as organizational members pay close attention to the actions of their TMT (e.g. Hermalin, 1998; Vera and Crossan, 2004).

Investments in R&D exert a positive influence on a firm's exploration capabilities through the enhanced internal development of new discoveries as well as the flow of new information into the firm. The relationship, however, will be subject to diminishing returns as we suggest that the initial investments in R&D will have the greatest effect on a firm's ability to engage in exploration. As a firm's R&D intensity increases, the marginal returns in terms of firms' exploration capabilities are expected to fall as a result of the identification, and subsequent pursuit of the lowest hanging fruit. That is, as novel opportunities for development are identified in the R&D process, the first satisfactory ones are most likely to be pursued, diverting resources away from further research. Our argumentation is consistent with evidence that there are diminishing returns from R&D in relation to the value of the firm (Mank and Nystrom, 2001; Zenger, 1994).

In contrast, we suggest that R&D investments will have a negative effect on a firm's exploitation capabilities. It is thought that R&D is very costly for small companies, which tend to lack the capital and extensive resources of their larger counterparts (Schumpeter, 1942). If undertaken, the systematic and deliberate investment in R&D be likely to raise the cost base of the firm. Consequently, a focus on R&D may lead to underinvestment in assets and resources complementary to those funded by the R&D expenditure. Underinvestment in complementary assets, such as the skills relating to exploitation, may reduce the value that can be extracted from the strategic assets created through already-funded R&D projects (Dierickx and Cool, 1989). Hence, firms with high levels of R&D intensity run the risk of overly engaging in the exploration of new opportunities at the expense of being able to generate complementary assets and processes to exploit them.

On the basis of our argumentation above we present the following hypotheses:

Hypothesis 3a. *R&D intensity will be positively related to exploration capability, however, the relationship will be subject to diminishing returns.*

Hypothesis 3b. *R&D intensity will be negatively related to exploitation.*

A second broad category of innovation activity that may be undertaken is continuous improvement. Continuous improvement is defined as "a company-wide process of focused and continuous incremental innovation" (Bessant et al., 1994, p.18). Rather than focusing on identifying new avenues for development, continuous improvement is explicitly focused on the elimination of waste across the organization in its systems and processes. As such, it is closely related to the incremental improvements and movements along the learning curve that are characteristic of exploitation. Continuous improvement supports firm performance and growth (Bessant and Francis, 1999; Koryak et al., 2015; Reed, 1996). Of particular relevance to the ABV is that continuous improvement is a form of innovation that is widely dispersed throughout the organization, and depends significantly upon cultural controls, as well as more concrete behavioral controls to influence attention (Ocasio and Wohlgezogen, 2010).

Behavioral controls are a core part of the process of continuous improvement. Practices such as six-sigma, kaizen and the 'lead toolbox' focus attention throughout the organization by programming step by step behavioral control. Behavioral controls are highly specific and yet when activated across the organization create a high degree of attention selectivity so that all eyes focus on the goal of incremental improvements. Cultural controls on organization attention tend to be more universally relevant, in the sense that they apply to a variety of specific situations. Cultural controls help identify the priorities and principles to be used in decision-making. Cultural reinforcement of continuous improvement norms has a dual effect on selective attention towards this goal: first, through the creation of strong shared norms and values around continuous improvement; and second, through the tendency for actors in a system to police one another's behaviors to enforce conformity. The emphasis on continuous improvement in an organization is expected to directly support exploitation, as it reflects the type of knowledge acquisition that leads to the improvement in routines, reduction of waste, and moving the firm down the learning curve (Martínez-Costa and Jiménez-Jiménez, 2009).

The selective and limited nature of organizational attention, however, implies that a positive focus on continuous improvement may also undermine other forms of innovative activity, potentially to the detriment of exploration. Benner and Tushman (2003) argued that the firms exploratory activities need to be shielded from process management activities such as continuous improvement for several reasons. First, process management techniques like continuous improvement are designed to reduce variation, to streamline and standardize processes; whereas explorative activities increase variation; hence continuous improvement is detrimental to exploration activity (March 1991). Second, although implementing process management techniques initially boost innovation as the organizational codifies routines (Brown and Duguid, 1991), the effect is to focus innovation on incremental exploitative activities that benefit existing customers rather than gain new customers. Third, success with continuous improvement processes

tends to encourage further uses of continuous improvement fostering new applications of the process particularly when there are newly trained or hired personnel. The incremental development focus that reduces variation targeted on existing customers and the personnel interests all suggest the continuous improvement undermines exploration capability.

Our argumentation suggests the following hypotheses:

Hypothesis 4a. *A focus on continuous improvement will be positively related to exploitation capability.*

Hypothesis 4b. *A focus on continuous improvement will be negatively related to exploration capability.*

3. Data and method

Our study combines data collected from a telephone survey of top executives of small and medium enterprises (20–250 employees) in the UK, with financial, director and ownership data drawn from the Fame database. The sampling frame originally consisted of 8137 SME firms, of which 2126 firms were unavailable during the fieldwork (could not be reached due to the wrong number or were defunct), leaving a final sampling frame of 6011 firms. Since small firms are substantially more frequent in the population, we chose a stratified random sampling strategy to ensure sufficient numbers of larger SMEs were included within the final sample. We therefore stratified by size (20–50; 51–100 and 101–250). We continued randomly selecting firms from these strata until we had achieved 500 responses (this number being derived from a power analysis to ensure sufficient statistical power was achieved). Of the 500 responses, 78 were incomplete or could not be successfully matched to secondary data, leaving a sample of 422 for our analysis. Aside from size, the final sample is representative in terms of sectors and geographical distribution within the UK (England, Scotland and Wales).[2]

To minimize non-response and social desirability biases we adopted measures recommended by Dillman (2007). First, we used previously validated measures and pre-tested the questionnaire to verify the terminology, instruction and response formats using 25 firms. Second, we promised the participants full confidentiality.

When contacting the firms we sought to interview the CEO as they are generally deemed to be most knowledgeable about issues such as TMT processes and firm performance (Hmieleski et al., 2012; Simsek et al., 2005). In case of repeated difficulties to do so, we requested to speak to another director involved in the strategic management of the firm, thereby alleviating concerns about informer reliability (Zhang and Li, 2010). Within our sample, 85% of the key informers were either CEOs or CFOs of the firms, the remaining being other directors of the firm, involved in the strategic management of the firm.

Following recent convention, we also gathered data from fellow TMT members of a subset of firms to assess the reliability and validity of the primary TMT member's assessments. We solicited responses from identifiable members of TMT at every venture for which we had already received a response. In total, we secured 47 s respondents, which accounted for 9.6% of the firms in the final sample. Analysis of the data suggests that there are no significant differences between the 47 firms for which we obtained a second respondent and the remainder of the sample for our model and control variables. The inter-rater agreement scores ranged from 0.77 to 0.84 indicating high overall agreement and leading us to believe that single informant bias is not a problem within our sample (James et al., 1993). In addition, to test the reliability of our key informants, we calculated intra-class correlation coefficients of the first and second respondents. The intra-class correlation coefficients for all of our variables were significant suggesting a strong level of interrater reliability (Jones et al., 1983).

We believe that our reliance on a second respondent for only a sample of firms is adequate for the following reasons. First, the TMTs of the respondent firms are relatively small, with the mean and the median reported size of the team being 4.5 and 4.3 individuals respectively. Gerhart et al. (2000) argue that single respondents are particularly reliable within smaller organizations due to the homogeneity of policies and interpretations. Second, utilizing multiple informants from a single firm/team when a single respondent is most knowledgeable can create unnecessary problems (Glick et al., 1990). Finally, relying on a second respondent for only a sample of firms follows established research practice (Van Doorn et al., 2013).

Several procedural steps to mitigate the potential common method bias were employed. We employed proximal separation of the questions related to the dependent and independent variables within our survey, reverse-coded some items, and utilized both survey and secondary data in our analysis. Our confirmatory factor analysis has shown that the variables loaded onto 4 factors, as expected, suggesting that common method variance is unlikely to be a problem. We followed convention (Love and Roper, 2013; Nell and Ambos, 2013) in conducting a one-factor Harman test on items from TMT heterogeneity, continuous improvement capability as well as the items included in exploration and exploitation scales. Harman's one-factor test for common method bias using confirmatory factor analysis indicates a factor that explains only 29.7% of the variance. In addition, we have performed a latent method factor analysis, described in Podsakoff et al. (2003), p. 894. To control for the common latent factor analysis, we allowed all items to load on their theoretical constructs, as well as on a latent common methods variance factor. We found that all significant relationships remained significant after controlling for the latent common methods variance factor. The model fit of the model was good (the chi-square statistic was 220.984 ($p < 0.001$) and the RMSEA was 0.034. The CFI was 0.975 and the TLI was 0.97, suggesting a good fit. Overall, the model fit remains essentially similar after the inclusion of a common latent factor (model without common latent factor: $\chi 2/\text{d.f.} = 1.41$, model with common latent factor: $\chi 2/\text{d.f.} = 1.52$) (Podsakoff et al., 2003). This suggests that common method variance is not an issue in this study.

3.1. Dependent variables

To measure ambidexterity, we used the 12-item scale developed by Lubatkin et al. (2006), which builds on the scale of He and Wong (2004) employing insights from Benner and Tushman (2003). This measure has 12 items for which respondents were asked to assess their firm's orientation during the past 3 years using a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). Two items were eliminated due to cross-loading. All the items are listed in the Appendix A. The measures for exploitation and exploration were constructed by performing a principle component factor analysis in STATA using varimax rotation. These measures show good reliabilities for both exploitation ($\alpha = 0.79$) and exploration ($\alpha = 0.84$). We added a fixed number to each variable to turn each value positive to ensure sufficient range of resulting ambidexterity variable. The latter was derived as a multiplicative combination of exploration and exploitation in line with the majority of the recent research, reflecting the arguments reflecting our argument that these two capacities are non-substitutable and synergetic (Gibson and Birkinshaw, 2004).

3.2. Independent variables

3.2.1. TMT heterogeneity

This construct is measured with four items relating to task-related heterogeneity within the senior team, as per Van Doorn et al. (2013). Van Doorn et al. (2013) adopted three of the items relating to heterogeneity in expertise and backgrounds, as well as complementarity between competencies of team members as per Campion et al. (1993a). In

[2] N.B. Northern Ireland firms were excluded from the sampling frame.

addition, they added one item pertaining to the extent to which TMT members have different levels of professional experience, which has been argued to be an important aspect of task-related heterogeneity (Pelled et al., 1999). The items are listed in the Appendix A.

3.2.2. TMT size

To measure TMT size we asked respondents: "How many other individuals in your business would fulfill at least two of the following three criteria: (a) they own at least a 10% equity stake in the business and (b) they are actively engaged in setting the strategic direction of the business and (c) they are actively engaged in implementing the strategic direction of the business.

3.2.3. Vision

Following Baum and Locke (2004) respondents were asked two questions about the firm's vision: 'Does your company have a written vision?' and "Have you talked to your employees about your vision for the company in the last 6 months?". Each of the questions was assigned a dummy variable (0 = No; 1 = Yes). The two variables were summed up to form a measure of communicated vision ranging from 0 to 2.

3.2.4. R&D intensity

Consistent with other studies using R&D intensity to conceptualize innovation activity we asked respondents to state their average proportion of sales dedicated to R&D over the last three years.

3.2.5. Continuous improvement

we measured continuous improvement capability using a measure by Peng et al., (2008). This measure is used in operations management literature where it is one of the key constructs. It has been developed by combining existing scales from prior research (Cua et al., 2001; Flynn et al., 1999) and is listed in the Appendix A.

3.3. Control variables

3.3.1. Firm age

We controlled for firm age because it has been associated with the institutional routines that engender inertia (Tushman and Romanelli, 1995)

3.3.2. Firm size

Firm size was measured by the natural logarithm of its number of employees in 2012 (the latest available data for most of the firms in FAME database). We included size as a control variable as it may be associated with inertia, the difficulty of processing information related to changing resources and adapting to changing resource conditions (Hannan and Freeman, 1984). In addition, as Penrose (1959) argues, larger firms have ongoing advantages over smaller, newer firms including a management team that has learnt how to grow, with an accumulating amount of tacit knowledge that enables growth to be sustained. Given that exploration and exploitation underlie growth (He and Wong, 2004; Lubatkin et al., 2006), firm size is likely to affect these capabilities.

We constructed sectoral control variables and more fine grained industry level effects in relation to environmental dynamism and munificence to control for industry structure effects in line with prior research (e.g. Hmieleski and Baron, 2008).

3.3.3. Environmental dynamism

Dynamic environments are characterized by unpredictable and rapid change, which increases uncertainty for firms operating within such environments (Dess and Beard, 1984). It is thought that environmental dynamism forms a fertile ground for the emergence of entrepreneurial opportunities (Hayek, 1945; Kirzner, 1997; Shane and Venkataraman, 2000). This would suggest that environmental dynamism would have a positive effect on exploration capability of firms, which is aided by the availability of opportunities. On the other hand, dynamic environments make strategy formation more complex (Priem et al., 1995) and more affected by time pressures (Baum and Wally, 2003; Heavey et al., 2009). Hence, environmental dynamism is likely to negatively affect firms' exploitation capability.

Environmental dynamism was measured as the degree, frequency, and unpredictability of change among environmental elements (Child, 1972; Randolph and Dess, 1984). In line with prior research (Castrogiovanni, 2002; Dess and Beard, 1984; Sharfman and Dean, 1991), we conceptualized environmental dynamism as the rate of unpredicted change and measured it as the standard errors of the regression slopes of the key environmental variables. Information from the UK Office for National Statistic's Annual Business Survey for 2012 (Office for National Statistics, 2014) was used to get the data for the components of the environmental variables, namely, (i) the number of enterprises, (ii) total turnover and (iii) the average gross value added, as per Castrogiovanni (2002). To calculate the measure of environmental dynamism, for each 4-digit industry code, we followed the procedure in Sharfman and Dean (1991), later used by Hmieleski and Baron (2008) and Ensley et al. (2006), among others. Using an EFA, the 3 indicators load on 1factor, explaining 58% of the variance.

3.3.4. Environmental munificence

Environmental munificence is the extent to which the environment provides enough resources to support established organizations and new entrants, and to enable them to grow and prosper (Randolph and Dess, 1984; Starbuck, 1976). To calculate the measure of munificence, we followed the procedure in Ensley et al. (2006). Following prior research (Castrogiovanni, 2002), both munificence and dynamism were assessed over 5-year intervals (2008–2012).

3.3.5. Manufacturing

We included a dummy variable for low-tech and high-tech manufacturing, which we grouped into a manufacturing dummy. This variable captures all industry codes within Section C of the UK SIC 2007.

3.3.6. Knowledge intensive services

We included a dummy for knowledge intensive services, the base group being other (i.e. non-knowledge intensive) services. The knowledge-intensive services measure is based on the SIC codes of the businesses at two-digit levels. Knowledge-based services are those that are based on a degree of codified, certificated, often professionalized knowledge: including telecommunications (sic 61) digital creative and information services (59, 60, 62, 63, 90), business services including civil engineering (42), legal (69), architectural (71), research and development (72), advertising (73) and other business services (74) as well as education (85).

4. Empirical findings

We began our analysis by examining the means, standard deviations (SD), and correlations for our variables − see Table 1. Of note, the two components of ambidexterity, exploration and exploitation are not correlated with one another; TMT heterogeneity is positively related to ambidexterity and its components, but size is not; vision is positively related to ambidexterity and its components; and R&D intensity is only positively related to ambidexterity and exploration. The variance inflation factors (VIFs) ranged between 1.06 and 1.32. As these numbers were much lower than 10, multicollinearity is unlikely to be a problem in this study (Belseley et al., 1980).

Next, we conducted exploratory and confirmatory factor analyses. The exploratory factor analysis was conducted using a principal components analyses with varimax (orthogonal rotation) (Hair et al., 2006) in which we included all items for all scale-based variables in our regression analyses. Four factors were extracted, showing similarity to the theoretical constructs they were intended to measure (see Table 2). The

Table 1
Descriptive statistics and correlation matrix.

		Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11
1	Ambidexterity	0.00	1.41											
2	Exploration	0.00	1.00	.707[b]										
3	Exploitation	0.00	1.00	.696[b]	0.000									
4	Firm Age	2.94	0.80	0.009	0.012	0.000								
5	Firm Size	4.22	0.64	0.047	0.019	0.047	−0.003							
6	Market dynamism	9.73	1.84	0.008	0.069	−0.057	0.049	−0.056						
7	Munificence	0.02	0.08	0.033	−0.027	0.074	−0.051	−0.001	.169[b]					
8	TMT heterogeneity	0.00	1.00	.367[b]	.254[b]	.268[b]	−0.063	−0.004	−0.009	−0.021				
9	TMT size	3.41	2.27	0.050	0.085	−0.014	0.001	.181[b]	.112[a]	0.039	−0.030			
10	Written Vision	0.50	0.50	.248[b]	.113[a]	.238[b]	−0.002	.120[b]	0.032	0.010	.112[a]	.107[a]		
11	R&D Intensity	4.78	11.19	.140[b]	.249[b]	−0.054	−0.025	−0.035	.136[b]	0.089	0.078	−0.012	0.049	
12	Cont improvement	0.00	1.00	.607[b]	.409[b]	.443[b]	−0.024	0.071	−0.012	−0.050	.336[b]	−0.027	.201[b]	.142[b]

[a] Correlation is significant at the 0.05 level (2-tailed).
[b] Correlation is significant at the 0.01 level (2-tailed).

extracted factors accounted for 58% of the total variance and there were no cross-loadings above 0.35. The Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy was 0.89, and Bartlett's test of sphericity was 3124.215 ($p < 0.001$). The confirmatory factor analysis confirmed the results of the exploratory factor analysis. In our model, the chi-square statistic was 228.28 ($p < 0.001$) and the RMSEA was 0.035. The CFI was 0.97, the SRMR was 0.037, and the TLI was 0.96, suggesting a good fit.

All items in our confirmatory factor analysis loaded significantly on the factors, thereby supporting convergent validity (Anderson and Gerbing, 1988). Convergent validity is further supported by three reliability indices (see Table 2). Cronbach alphas are all above the recommended minimum of 0.70. Furthermore, Bagozzi's reliability index (Bagozzi, 1980) was also above the threshold of 0.70. Third, we utilized Fornell and Larcker's (1981) $\rho_{vc}(\eta)$. All constructs had values greater than or equal to 0.50 (apart from exploitation), which meant that the variance captured by each construct was greater than the variance due to measurement error.

We further assessed the constructs' discriminant validity. Each construct's $\rho vc(\eta)$ significantly exceeded the squared correlation with the other constructs, thereby indicating discriminant validity (Fornell and Larcker, 1981).

Table 2
Construct Reliability Measures.

	Cronbach's	Bagozzi's	Fornell and Larcker's
	α	ρ	$\rho vc(\eta)$
TMT heterogeneity	0.78	0.80	0.50
Continuous improvement	0.81	0.82	0.63
Exploitation	0.79	0.81	0.42
Exploration	0.84	0.80	0.51

4.1. Hypothesis testing

We tested our hypotheses using hierarchical regression models in which we entered the control variables in the first step, and then the predictor variables in successive steps. To reduce the impact of multicollinearity, we mean centered the independent variables that were used in the interaction terms (Aiken and West, 1991).

We begin by presenting the regression models for exploration (see Table 3). In the model with the control variables (model 1), we found positive and statistically significant parameter estimates for industry (manufacturing and knowledge-intensive services ($p < 0.001$). Models 2–5 introduce the variables addressing H1a, H2a, H3a and, H4a culminating with the full model (model 6). In the full model (adjusted R-square of 0.288), we found a positive and statistically significant interaction between TMT heterogeneity and TMT size on firm exploration ($p < 0.0001$), which supports H1a. In addition, both the main effects of TMT heterogeneity and size were positive and statistically significant ($p < 0.05$). The interaction graph is shown in Fig. 1. Second, the result for vision in the full model was not statistically significant and does not support H2a. Third, R&D intensity was positively related to exploration ($p < 0.001$). Furthermore, the quadratic term has a negative coefficient, which is also statistically significant ($p < 0.001$), indicating that there are diminishing returns to the relationship which supports H3a. Fourth, counter to hypothesis H4a, continuous improvement was positively associated with exploration ($p < 0.001$).

We next present the regression models for exploitation (Table 4). In terms of the model with the control variables (model 7: adjusted R-square = 0.01), we found statistically significant parameter estimates for munificence ($p < 0.05$). Models 8–12 introduce the model variables addressing H1b, H2b, H3b and H4b. The full model (model 12: adjusted R-Square = 0.286) revealed a negative and marginally significant interaction effect between TMT heterogeneity and TMT size on firm exploitation ($p < 0.1$), which provides limited support for H1b. In terms of the main effects, TMT heterogeneity was positive and significant ($p < 0.001$), however, the TMT size parameter was negative and insignificant. Second, the relationship between R&D intensity and exploitation was statistically insignificant, not offering support for H3b. Third, continuous improvement was positively associated with exploitation ($p < 0.001$), supporting H4a.

Based on the findings above it is clear that there are significant differences between the effects of the antecedents of TMT heterogeneity and team size, and R&D intensity on exploration and exploitation. However, counter to our theorization we found that continuous improvement had a positive effect on both. To further explore the findings, and demonstrate the importance of separating out the dimensions of exploration and exploitation from the aggregate construct of ambidexterity, we also present an analysis of Tables 3 and 4 using the aggregate ambidexterity construct as presented in Table 5. For this analysis, we use a measure of ambidexterity constructed as a product of exploration and exploitation sub-scales, in line with much of the prior empirical literature and reflecting the argument that these two capabilities are non-substitutable and interdependent (Gibson and Birkinshaw, 2004).

The full model (model 18) has an adjusted R-square of 0.461, and it is interesting to note that the parameter for the direct effect of TMT heterogeneity is positive and statistically significant ($p < 0.01$), but the interaction effect with TMT size is cancelled out; the direct and quadratic effects for R&D intensity are positive and statistically significant ($p < 0.001$) and negative and statistically significant ($p < 0.001$) respectively; and continuous improvement remains positive and statistically significant ($p < 0.001$). Reading Tables 3–5

Table 3
Regression models for the antecedents of exploration.

VARIABLES	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Age	0.069	0.063	0.078	0.047	0.076	0.060
	(0.062)	(0.062)	(0.058)	(0.060)	(0.057)	(0.055)
Size (employees)	0.059	0.038	0.031	0.080	−0.006	−0.002
	(0.076)	(0.077)	(0.075)	(0.070)	(0.069)	(0.067)
Manufacturing	0.402***	0.384**	0.398***	0.346**	0.392***	0.342***
	(0.110)	(0.110)	(0.107)	(0.105)	(0.098)	(0.094)
Knowledge intensive services	0.472***	0.424**	0.442***	0.307*	0.422***	0.287*
	(0.126)	(0.129)	(0.124)	(0.121)	(0.117)	(0.113)
Environmental Dynamism	0.029	0.030	0.015	0.027	0.027	0.012
	(0.022)	(0.022)	(0.021)	(0.022)	(0.019)	(0.020)
Munificence	−0.434	−0.443	−0.310	−0.483	−0.198	−0.202
	(0.557)	(0.589)	(0.524)	(0.567)	(0.497)	(0.512)
Written Vision		0.128*				0.005
		(0.052)				(0.046)
TMT Heterogeneity			0.229**			0.100*
			(0.046)			(0.045)
TMT size			0.045*			0.045*
			(0.020)			(0.018)
TMT Heterogeneity x TMT size			0.044**			0.041**
			(0.014)			(0.013)
R&D Intensity				0.061***		0.043***
				(0.009)		(0.009)
R&D Intensity squared				−0.001***		−0.000**
				(0.000)		(0.000)
Continuous Improvement Capability					0.407***	0.324***
					(0.044)	(0.046)
Constant	5.011***	5.021***	5.102***	4.861***	5.314***	5.235***
	(0.414)	(0.414)	(0.390)	(0.396)	(0.381)	(0.363)
Observations	422	422	422	422	422	422
R-squared	0.059	0.073	0.136	0.161	0.226	0.310
Adjusted R-squared	0.0455	0.0571	0.117	0.144	0.213	0.288
F test	4.500***	5.170***	11.50***	9.855***	18.94***	17.80***

Robust standard errors in parentheses.
*** p < 0.001, ** p < 0.01, * p < 0.05, † p < 0.1

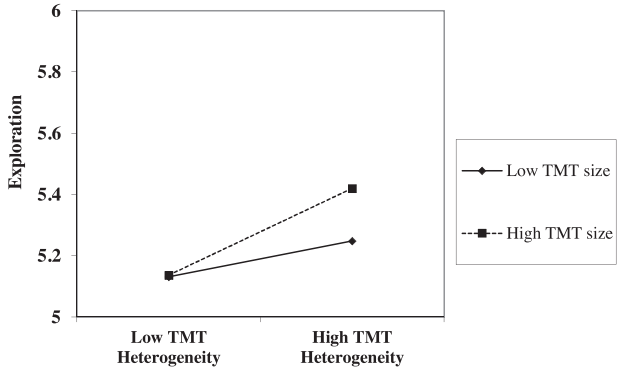

Fig. 1. Interaction Graph: Exploration and Team Heterogeneity and size.

together, and the summary of results across the different dependent variables presented in Table 6, it is clear that focusing on the aggregate construct of ambidexterity provides potentially misleading insights if we are interested in explaining the antecedents of exploration and exploitation.

4.2. Robustness analysis

To explore the robustness of our findings, we have rerun the models with a number of modifications. Firstly, we have used an alternative, and often used measure of ambidexterity constructed as a sum of exploration and exploitation sub-scales. The results were virtually identical to those outlined above. We have performed an additional analysis using a categorical measure of R&D in our models. The variable was based on the response to the question as to whether or not their firm had a member of staff or a team dedicated to R&D. It was used to focus on the decision to commit to R&D as a proxy of attentional engagement with more radical innovation, while removing the effect of the size of the R&D in its role of the input into the innovation process. Our analysis demonstrates that in case of exploitation, the sign of R&D measure is negative, even though the variable itself is not significant.

We have also introduced more fine-grained controls for industry, creating eight dummy variables, seven of which were included in the robustness check analysis. The eight industrial categories are (i) high tech manufacturing (codes 20, 21, 26–29), (ii) other manufacturing (Section C excluding aforementioned high tech manufacturing industry codes), (iii) construction (Section F), (iv) trading (Sections GHI), (v) information and communication (J), (vi) business services (Sections KLM), (vii) other services (NPQRS) and (viii) our base industrial category "Other" which includes primary industries firms from Sections BDE of the UK SIC 2007. The results are the same as in our original regressions in terms of the signs and significance of the key independent and control variables.

To address the single source of survey data, in addition to checking the agreement between the primary and secondary informants reported previously, we have rerun our regressions substituting responses of the primary informant by those by the secondary informers. The results largely hold, with the exception of the main effect of TMT Heterogeneity, which loses its significance in case of exploration. The hypothesized interaction effect still holds, however.

One of our robustness checks controlled for potential overconfidence and social desirability. We used a measure of relative optimism of entrepreneurs drawn from prior research (Cooper et al., 1988; Ucbasaran et al., 2010). The respondents were first asked to assess "the chances of your business succeeding, followed by the question "what are the chances of any other business like yours succeeding?

Table 4
Regression models for the antecedents of exploitation.

VARIABLES	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
Age	−0.001	−0.015	0.020	−0.006	0.007	0.011
	(0.072)	(0.069)	(0.071)	(0.071)	(0.068)	(0.066)
Size (employees)	0.125	0.074	0.107	0.123	0.051	0.019
	(0.081)	(0.079)	(0.078)	(0.079)	(0.070)	(0.068)
Manufacturing	−0.114	−0.156	−0.084	−0.129	−0.125	−0.125
	(0.116)	(0.114)	(0.107)	(0.115)	(0.097)	(0.093)
Knowledge intensive services	−0.094	−0.206	−0.128	−0.071	−0.149	−0.144
	(0.136)	(0.132)	(0.133)	(0.137)	(0.131)	(0.127)
Environmental Dynamism	−0.050	−0.050	−0.044	−0.046*	−0.052†	−0.040
	(0.032)	(0.031)	(0.034)	(0.027)	(0.026)	(0.023)
Munificence	1.328*	1.307*	1.345**	1.429***	1.591***	1.639***
	(0.538)	(0.546)	(0.504)	(0.524)	(0.442)	(0.434)
Written Vision		0.301***				0.188***
		(0.052)				(0.048)
TMT Heterogeneity			0.293***			0.143***
			(0.052)			(0.047)
TMT size			−0.003			−0.016
			(0.019)			(0.017)
TMT Heterogeneity x TMT size			−0.038*			−0.028†
			(0.018)			(0.017)
R&D Intensity				0.017†		−0.006
				(0.009)		(0.009)
R&D Intensity squared				−0.000*		−0.000
				(0.000)		(0.000)
Continuous Improvement Capability					0.455***	0.389***
					(0.049)	(0.050)
Constant	5.981***	6.005***	5.948***	5.924***	6.320***	6.247***
	(0.451)	(0.452)	(0.444)	(0.462)	(0.367)	(0.384)
Observations	422	422	422	422	422	422
R-squared	0.028	0.101	0.110	0.055	0.231	0.308
Adjusted R-squared	0.0141	0.0862	0.0910	0.0369	0.218	0.286
F test	1.909†	6.331***	5.070***	1.887†	15.24***	13.95***

Robust standard errors in parentheses.
*** p < 0.001, ** p < 0.01, * p < 0.05, † p < 0.1.

Respondents were asked to rank their responses to both questions on zero to ten scales, with zero corresponding to no chance of success, while fully certain chance of success was ranked as 10. The difference between the scores for the two questions provides an indication of the respondent's comparative optimism. Such indirect way of measuring optimism originated in social psychology, and is generally considered more conservative, stable and reliable (Helweg-Larsen and Shepperd, 2001). This measure correlated very weakly with the key constructs used in the study. The significances and signs of the relevant variables hold in the presence of this variable which addresses potential over-optimism and positive affectivity of the respondents in rating their firm.

5. Discussion and conclusion

In this paper, we argue that exploration and exploitation enjoy a paradoxical relationship (Andriopoulos and Lewis, 2010; Raisch and Zimmermann, 2017; Smith and Lewis, 2011) and generate persistent organizational tensions (Lubatkin et al., 2006; March 1991; Smith and Lewis, 2011). These tensions can be addressed by dynamically shifting between exploration and exploitation-focused activities. To do so effectively requires a better understanding of antecedents of exploration and exploitation. We build on previous ambidexterity-as-a-paradox research by exploring the extent to which the antecedents of exploration and exploitation are consistent with or contradict one another.

Our study identifies how blending the right mixture of integration and differentiation can help promote ambidexterity and address the paradoxical tension between exploitation and exploration. Underpinning this is a better understanding of which antecedents constitute integrative and differentiating tactics of managing ambidexterity as a paradox. We find that continuous improvement capability is integrative, while written vision, TMT heterogeneity and size, and R&D intensity are differentiating given the latter three factors' emphasis on one of the sides of the ambidexterity paradox. We posit that an organization can develop a paradox mindset at the organizational level by adopting the right mixture of integration and differentiation mechanisms through dynamically shifting between these mechanisms (see parallels to recent work on paradox mindset at the individual level by Miron-Spektor et al., 2017).

To better understand how the firm could maintain the dynamic balance between exploitation and exploration, we focused on four antecedents of the components of ambidexterity reflecting dimensions of managerial attention: top management team (TMT) composition in terms of heterogeneity and size (Alexiev et al., 2010; Nielsen and Nielsen, 2013; Nielsen, 2010); whether or not the firm has a clear and vision (Pearce and Ensley, 2004); firm's innovation capabilities, particularly its R&D intensity (Rothaermel and Alexandre, 2009); and continuous improvement capabilities. The choice of the variables was driven by our theoretical grounding of the research in the attention based view of the firm. ABV maintains that organizational attention influences its actions when this attention is focused (the choice of support of the innovation activities), situated (the communication of written vision) and distributed across organisation (through TMT composition). In doing so, we respond to the call by Yukl (2009) for more comprehensive models of the impact of leadership on exploration and exploitation, through demonstrating the four key antecedents effect on exploration and exploitation. We now examine these antecedents in turn.

First, TMT composition, both in terms of heterogeneity and size, matters. Our findings add additional insight to the work of Lubatkin et al. (2006) who found that team size had a marginally positive impact on ambidexterity. We suggest that any relationship between TMT composition and ambidexterity (and exploration and exploitation)

Table 5
Regression models for the antecedents of ambidexterity.

VARIABLES	Model 13	Model 14	Model 15	Model 16	Model 17	Model 18
Age	0.068	0.048	0.098	0.041	0.082	0.071
	(0.092)	(0.090)	(0.085)	(0.089)	(0.077)	(0.074)
Size (employees)	0.185	0.112	0.138	0.203†	0.045	0.018
	(0.114)	(0.111)	(0.105)	(0.108)	(0.087)	(0.083)
Manufacturing	0.289†	0.228	0.314*	0.217	0.267*	0.217†
	(0.172)	(0.169)	(0.158)	(0.168)	(0.129)	(0.126)
Knowledge intensive services	0.378*	0.218	0.313†	0.237	0.273†	0.142
	(0.171)	(0.164)	(0.163)	(0.171)	(0.146)	(0.138)
Environmental Dynamism	−0.021	−0.020	−0.029	−0.019	−0.025	−0.029
	(0.039)	(0.039)	(0.039)	(0.038)	(0.025)	(0.026)
Munificence	0.894	0.864	1.035	0.946	1.393*	1.438*
	(0.796)	(0.877)	(0.699)	(0.768)	(0.562)	(0.573)
Written Vision		0.430***				0.194**
		(0.071)				(0.057)
TMT Heterogeneity			0.522***			0.243***
			(0.070)			(0.054)
TMT size			0.042			0.028
			(0.028)			(0.022)
TMT Heterogeneity x TMT size			0.006			0.013
			(0.023)			(0.020)
R&D Intensity				0.077***		0.037***
				(0.012)		(0.010)
R&D Intensity squared				−0.001***		−0.001***
				(0.000)		(0.000)
Continuous Improvement Capability					0.862***	0.712***
					(0.064)	(0.063)
Constant	10.991***	11.025***	11.050***	10.786***	11.634***	11.481***
	(0.646)	(0.645)	(0.597)	(0.643)	(0.479)	(0.469)
Observations	422	422	422	422	422	422
R-squared	0.025	0.102	0.164	0.104	0.402	0.478
Adjusted R-squared	0.0106	0.0867	0.146	0.0870	0.392	0.461
F test	1.591	6.467***	8.751***	7.150***	33.32***	29.37***

Robust standard errors in parentheses.
*** p < 0.001, ** p < 0.01, * p < 0.05, † p < 0.1.

Table 6
Comparative regression results across exploration, exploitation and ambidexterity.

VARIABLES	Exploration	Exploitation	Ambidexterity
Age	+ n.s.	+ n.s.	+ n.s.
Size (employees)	- n.s.	+ n.s.	+ n.s.
Manufacturing	+	- n.s.	+ n.s.
Knowledge intensive services	+	-n.s.	+ n.s.
Environmental Dynamism	+ n.s.	-n.s.	- n.s.
Munificence	- n.s.	+	+
Written Vision	+ n.s.	+	+
TMT Heterogeneity	+	+	+
TMT size	+	-n.s.	+ n.s.
TMT Heterogeneity x TMT size	+	-n.s.	+ n.s.
R&D Intensity	+	-n.s.	+
R&D Intensity squared	−	-n.s.	−
Continuous Improvement Capability	+	+	+
Observations	422	422	422
Adjusted R-squared	0.288	0.286	0.461
F test	17.80***	13.95***	29.37***

needs to account for *both* heterogeneity and size. We hypothesized and found that there is a positive and mutually reinforcing effect on exploration of TMT heterogeneity and size. In other words, larger and more heterogeneous TMTs enhance a firm's capability for exploration. Simply stated, the advantages of TMT heterogeneity for exploration increases with team size in the case of exploration. No such relationship has been shown to exist in case of exploitation. A firm wishing to enhance its capability for ambidexterity, therefore, will face a potential need to rebalance its TMT in line with its focus on either exploration or exploitation.

We hypothesized that the benefits of diversity begin to decline as teams get larger in the context of executing routine tasks where focus on standard operating procedures is required. Most prior studies of group size and heterogeneity have examined either group heterogeneity (Mannix and Neale, 2005; Mueller, 2012) or group size (Haleblian and Finkelstein, 1993; Jackson et al., 1991). A notable exception is the work in the field of productivity of research groups (e.g. (Chompalov et al., 2002; Cummings et al., 2013) which finds that there are diminishing returns to heterogeneity in the context of scientific research collaborations. Drawing on social identity theory (Tajfel and Turner, 1979), the research suggests that as heterogeneity and size combine, conflicts and productivity losses diminish the benefits of heterogeneity (Cummings et al., 2013). However, this research is very context specific, focusing on specialized research collaborations among reputable and accomplished individuals. In addition, it examines the impact of team composition on research productivity rather than on the intermediate capabilities of exploration and exploitation. Our work is based on growth-oriented SMEs which enables us to trace both heterogeneity and size effects in a context that is more generalizable to such firms and tie them to intermediate outcomes which have been linked to growth (He and Wong, 2004).

Second, we found that vision has an important effect on a firm's ability to develop its exploitation skills, through focusing the attention of staff towards executing a developed strategy built on previously communicated vision. We had hypothesised that written vision would be an integration mechanism that would accommodate the dual emphasis on exploitation and exploration. In contrast, vision appears to be unrelated to exploration. We suggest that this finding is consistent with scholarship that attests to the difficulties of managing a creative process (Van de Ven, 1986) and the problems of creating cognitive boundaries (Amabile, 1998; Lock and Kirkpatrick, 1995; Martínez-Costa and Jiménez-Jiménez, 2009). Our findings are consistent with SME

managers communicating their written vision to the existing staff, when they are more likely to emphasize the existing customers and existing products. Given its likely emphasis on exploitation in the context of SMEs, written vision appears to be a differentiating approach to managing ambidexterity.

Third, R&D intensity has a differential effect on exploration and exploitation. The positive effect of R&D intensity on exploration is subject to diminishing marginal returns, suggesting that managers need to think about trying to identify an optimal level of R&D spend. In addition, the insignificant relationship between R&D intensity and exploitation suggests that spending on R&D is not universally beneficial to the firm. Taken together, our findings point to a complex picture whereby too much spending on innovation may actually detract the firm from being focused on the execution of strategy. Similar to Winter's (2003) arguments about the optimal level of investment in dynamic capabilities, our findings suggest that firms may seek to over invest in R&D, which not only is subject to diminishing returns for exploration, but may actually hinder exploitation. As R&D typically relates to exploration activities, it represents a differentiating mechanism for addressing the ambidexterity paradox.

Fourth, counter to expectations, we found that continuous improvement has a positive influence on both exploration and exploitation. The finding suggests that investments in enhancing continuous improvement in a firm will benefit both dimensions of ambidexterity and as such is an integration-based paradox management tool. Guided by ABV and the distributed nature of continuous innovation, we expected that a selective and deliberate focus on continuous improvement would divert the attention away from more radical forms of innovation. Our finding, however, may be more in line with the research that suggests that continuous improvement can create a multiplier effect that can lead to more radical innovation (Bessant and Caffyn, 1997). As SME managers develop the culture of continuous improvement within their firms they are more likely to question existing routines; moreover, continuous improvement-based tools and techniques such as lean manufacturing contribute to innovation implementation by reducing the costs in new product development (Burgess et al., 2005; Perunovic and Christiansen, 2005) or by improving products and processes of innovation (McAdam et al., 2010). It appears that continuous improvement plays a key role in directing managerial efforts to share and leverage improvements across distinct domains of exploration and exploitation and developing the "complex bundle of hard and soft technologies" that constitute innovation (Burgess et al., 2005). Put simply, the result of a continuous improvement initiative may make the company more efficient and eventually able to divert part of the funds to further continuous improvement, creating a virtuous circle.

By identifying the way in which four important antecedents of ambidexterity influence exploration and exploitation we speak directly to the inherent tensions of trying to promote ambidexterity in an organization. Extant research suggests that exploration is promoted by organic structures, improvisation and autonomy (Rosenkopf and Nerkar, 2001); whereas exploitation has been associated with mechanistic structures, path dependence and routinization (Beckman et al., 2004; Benner and Tushman, 2003; March 1991). Our work demonstrates how decisions taken about shaping the antecedents of ambidexterity may simultaneously promote both exploitation and exploration or may enhance one dimension while diminishing the other. Hence, rather than striving for a fixed balance between the two, firms need to be clear about the nature of the balance they wish to achieve.

In connecting our work on ambidexterity and organizational paradoxes with work in the area of strategy and entrepreneurship more generally, there are a number of interesting issues that emerge, which provide interesting avenues for future research. Our findings resonate with the literature about firm growth, in terms of the direction and nature of intended growth, and the rate of growth. For example, Penrose (1959) outlines the inherent problems of growing, even where managers have the talent to spot opportunities, in terms of the adjustment costs of growth, which are exacerbated with increased growth rates, due to the problems of time compression (see Dierickx and Cool, 1989). Penrose delineated between the creative process of identifying new opportunities and the difficulties associated with enacting on them. Furthermore, when exploration activities take the firm away from its core markets (new products/services and/or new markets), then the problems managing any growth processes will be increased. Therefore, there is a need for scholars to examine how firms may seek to balance the components of ambidexterity in different ways contingent on the growth path associated with their strategic intent.

As with all research, our work is not without its limitations, which also present further opportunities for future research. First, our empirical focus has been on SMEs, and so an interesting question relates to the extent to which our findings may translate through to larger companies. Compared to SMEs, outcomes in larger firms may be driven by a wide range of factors, including external governance and capital markets that reduce the autonomy of the CEO and TMT (Lubatkin et al., 2006), as well as the sheer complexity of operations (Lockett et al., 2008). If scholars were to explore our findings in a larger firm context, we suggest that it would be interesting to explore how external governance and capital markets may act as an external antecedent shaping ambidexterity. The neglect of the role of governance in promoting ambidexterity is arguably not surprising given that it is a commonly neglected resource in studies drawing on the resource-based view of the firm (Barney et al., 2001). Furthermore, even though there may be important differences between SMEs and larger firms, we suggest that studying smaller firms may be the best way to explore specific antecedents of ambidexterity. In particular, SMEs are an ideal context in which to study TMT composition and the cognitive orientation of TMT members.

Second, our data is cross-sectional and does not link ambidexterity to performance. Future research could collect subsequent performance data to examine how exploration and exploitation influence growth over time. Also, it will be interesting to relate the dimensions of ambidexterity to the type of growth in relation to whether or not it constitutes market penetration, or is riskier in terms of new products/services and/or markets as detailed above.

We conclude with the managerial implications our work, which attest to the difficulties in trying to develop skills for exploration and exploitation. Our findings suggest that the problem may be more pronounced than Henderson and Clark's "competency trap" (1990), Weick's "key dilemma facing organizations" (1982), and Levinthal and March's "basic unresolved problem" (1993). Rather, the problems may stem from the fact that the antecedents of ambidexterity have differential effects on exploration and exploitation. Although organizations will always face an optimization problem, with respect to their needs to balance the two dimensions in an SME, they can also adopt complementary managerial choices around the recruitment to the TMT and the attention to continuous improvements in the firm. The key takeaway for managers in SMEs is to encourage them to develop integrative factors for organizational ambidexterity including heterogeneity in their TMT and inculcating a culture of continuous improvement in their business. We limit our argumentation to SMEs here, as larger firms may be able to seek structural solutions to the problem. Structural solutions, however, may create additional problems as divorcing exploration from exploitation may lead to an uncoupling of the innovation process.

Appendix A

Construct measurement items:*Ambidexterity* (Lubatkin et al., 2006)
Exploration:

1. My business looks for novel technological ideas by thinking "outside the box"
2. My business bases its success on its ability to explore new technologies
3. My business creates products or services that are innovative to the firm

4. My business looks for creative ways to satisfy its customers' needs (not included)

5. My business aggressively ventures into new market segments

6. My business actively targets new customers groups (not included)

Exploitation:

7. My business commits to improve quality and lower cost

8. My business continuously improves the reliability of its products and services

9. My business increases the levels of efficiency in its operations

10. My business constantly surveys existing customers' satisfaction

11. My business fine-tunes what it offers to keep its current customers satisfied

12. My business penetrates more deeply into its existing customer base*TMT Heterogeneity* (Van Doorn et al., 2013)*, based on* (Campion et al., 1993b)*:*

1. The members of my TMT vary widely in their areas of expertise

2. The members of my TMT have a variety of different backgrounds

3. The members of my TMT have skills and abilities that complement each other

4. The members of my TMT are diverse in terms of their professional experience*Continuous improvement capability* (Peng et al., 2008):

1. We strive to continually improve all aspects of products and processes, rather than taking a static approach

2. We search for continued learning and improvement, after the installation of new equipment or adoption of a new process

3. Continuous improvement makes our performance a moving target, which is difficult for competitors to attack

4. We believe that improvement of a process is never complete; there is always room for more incremental improvement

5. Our organisation is not a static entity, but engages in dynamically changing itself to better serve its customers

References

Aiken, L.S., West, S.G., 1991. Multiple Regression: Testing and Interpreting Interactions. Sage, Newbury Park, CA.

Alexiev, A.S., Jansen, J.J., Van den Bosch, F.A., Volberda, H.W., 2010. Top management team advice seeking and exploratory innovation: the moderating role of TMT heterogeneity. J. Manage. Stud. 47 (7), 1343–1364.

Amabile, T.M., 1998. How to Kill Creativity. Harvard Business School Publishing, Boston MA.

Amason, A.C., Sapienza, H.J., 1997. The effects of top management team size and interaction norms on cognitive and affective conflict. J. Manage. 23 (4), 495–516.

Amason, A.C., 1996. Distinguishing the effects of functional and dysfunctional conflict on strategic decision making: resolving a paradox for top management teams. Acad. Manage. J. 39 (1), 123–148.

Anderson, J.C., Gerbing, D.W., 1988. Structural equation modeling in practice: a review and recommended two-step approach. Psychol. Bull. 103 (3), 411.

Andriopoulos, C., Lewis, M.W., 2009. Exploitation-exploration tensions and organizational ambidexterity: managing paradoxes of innovation. Organ. Sci. 20 (4), 696–717.

Andriopoulos, C., Lewis, M.W., 2010. Managing innovation paradoxes: ambidexterity lessons from leading product design companies. Long Range Plann. 43 (1), 104–122.

Auh, S., Menguc, B., 2005. Balancing exploration and exploitation: the moderating role of competitive intensity. J. Bus. Res. 58 (12), 1652–1661.

Avolio, B.J., Bass, B.M., 1995. Individual consideration viewed at multiple levels of analysis: a multi-level framework for examining the diffusion of transformational leadership. Leadership Q. 6 (2), 199–218.

Avolio, B.J., Zhu, W., Koh, W., Bhatia, P., 2004. Transformational leadership and organizational commitment: mediating role of psychological empowerment and moderating role of structural distance. J. Organ. Behav. 25 (8), 951–968.

Bagozzi, R.P., 1980. Causal Models in Marketing. Wiley, New York.

Barney, J., Wright, M., Ketchen, D.J., 2001. The resource-based view of the firm: ten years after 1991. J. Manage. 27 (6), 625–641.

Barney, J., 1991. Firm resources and sustained competitive advantage. J. Manage. 17 (1), 99–120.

Baum, J.R., Locke, E.A., 2004. The relationship of entrepreneurial traits, skill, and motivation to subsequent venture growth. J. Appl. Psychol. 89 (4), 587–598.

Baum, J.R., Wally, S., 2003. Strategic decision speed and firm performance. Strateg. Manage. J. 24 (11), 1107–1129.

Baum, J.R., Locke, E.A., Kirkpatrick, S.A., 1998. A longitudinal study of the relation of vision and vision communication to venture growth in entrepreneurial firms. J. Appl. Psychol. 83 (1), 43.

Baum, J.A., Li, S.X., Usher, J.M., 2000. Making the next move: how experiential and vicarious learning shape the locations of chains' acquisitions. Adm. Sci. Q. 45 (4), 766–801.

Beckman, C.M., Haunschild, P.R., Phillips, D.J., 2004. Friends or strangers? Firm-specific uncertainty, market uncertainty, and network partner selection. Organ. Sci. 15 (3), 259–275.

Beckman, C.M., 2006. The influence of founding team company affiliations on firm behavior. Acad. Manage. J. 49 (4), 741–758.

Belseley, D., Kuh, E., Welsch, R., 1980. Regression Diagnostics: Identifying Sources of Influential Observations and Collinearity. John Wiley & Sons, New York.

Benner, M.J., Tushman, M.L., 2003. Exploitation, exploration, and process management: the productivity dilemma revisited. Acad. Manage. Rev. 28 (2), 238–256.

Bessant, J., Caffyn, S., 1997. High-involvement innovation through continuous improvement. Int. J. Technol. Manage. 14 (1), 7–28.

Bessant, J., Francis, D., 1999. Developing strategic continuous improvement capability. Int. J. Oper. Prod. Manage. 19 (11), 1106–1119.

Bessant, J., Caffyn, S., Gilbert, J., Harding, R., Webb, S., 1994. Rediscovering continuous improvement. Technovation 14 (1), 17–29.

Bourgeois, L.J., Eisenhardt, K.M., 1988. Strategic decision-processes in high-velocity environments − 4 cases in the microcomputer industry. Manage. Sci. 34 (7), 816–835.

Brown, J.S., Duguid, P., 1991. Organizational learning and communities-of-practice: toward a unified view of working, learning, and innovation. Organ. Sci. 2 (1), 40–57.

Burgess, T.F., Shaw, N.E., de Mattos, C., 2005. Organisational self-assessment and the adoption of managerial innovations. Int. J. Prod. Perform. Manage. 54 (2), 98–112.

Campion, M.A., Medsker, G.J., Higgs, A.C., 1993a. Relations between work group characteristics and effectiveness − implications for designing effective work groups. Personnel Psychol. 46 (4), 823–850.

Campion, M.A., Medsker, G.J., Higgs, A.C., 1993b. relations between work group characteristics and effectiveness: implications for designing effective work groups. Personnel Psychol. 46 (4), 823–850.

Cao, Q., Gedajlovic, E., Zhang, H., 2009. Unpacking organizational ambidexterity: dimensions, contingencies, and synergistic effects. Organ. Sci. 20 (4), 781–796.

Carpenter, M.A., Geletkanycz, M.A., Sanders, W.G., 2004. Upper echelons research revisited: antecedents, elements, and consequences of top management team composition. J. Manage. 30 (6), 749–778.

Castrogiovanni, G.J., 2002. Organization task environments: have they changed fundamentally over time? J. Manage. 28 (2), 129–150.

Chang, Y.-C., Yang, P.Y., Chen, M.-H., 2009. The determinants of academic research commercial performance: towards an organizational ambidexterity perspective. Res. Policy 38 (6), 936–946.

Child, J., 1972. Organizational structure, environment and performance: The role of strategic choice. sociology 6 (1), 1–22.

Cho, T.S., Hambrick, D.C., 2006. Attention as the mediator between top management team characteristics and strategic change: the case of airline deregulation. Organ. Sci. 17 (4), 453–469.

Chompalov, I., Genuth, J., Shrum, W., 2002. The organization of scientific collaborations. Res. Policy 31 (5), 749–767.

Cooper, A.C., Woo, C.Y., Dunkelberg, W.C., 1988. Entrepreneurs' perceived chances for success. J. Bus. Venturing 3 (2), 97–108.

Cua, K.O., McKone, K.E., Schroeder, R.G., 2001. Relationships between implementation of TQM, JIT, and TPM and manufacturing performance. J. Oper. Manage. 19 (6), 675–694.

Cummings, J.N., Kiesler, S., Zadeh, R.B., Balakrishnan, A.D., 2013. Group heterogeneity increases the risks of large group size a longitudinal study of productivity in research groups. Psychol. Sci. 24 (6), 880–890.

Cyert, R.M., March, J.G., 1963. A behavioral theory of the firm. Prentice-Hall, Englewood Cliffs, NI.

De Dreu, C.K., Weingart, L.R., 2003. Task versus relationship conflict, team performance, and team member satisfaction: a meta-analysis. J. Appl. Psychol. 88 (4), 741.

Dess, G.G., Beard, D.W., 1984. Dimensions of organizational task environments. Adm. Sci. Q. 29 (1), 52–73.

Dierickx, I., Cool, K., 1989. Asset stock accumulation and the sustainability of competitive advantge. Manage. Sci. 35, 1504–1511.

Dillman, D., 2007. Mail and Internet Surveys: The Tailored Design Method. 2007 Update with New Internet, Visual, and Mixed-Mode Guide. Whiley.

Duncan, R.B., 1976. The ambidextrous organization: designing dual structures for innovation. Manage. Organ. 1, 167–188.

Elenkov, D.S., Judge, W., Wright, P., 2005. Strategic leadership and executive innovation influence: an international multi-cluster comparative study. Strateg. Manage. J. 26 (7), 665–682.

Ensley, M.D., Pearce, C.L., 2001. Shared cognition in top management teams: implications for new venture performance. J. Organ. Behav. 22 (2), 145–160.

Ensley, M.D., Hmieleski, K.M., Pearce, C.L., 2006. The importance of vertical and shared leadership within new venture top management teams: implications for the performance of startups. Leadersh. Q. 17 (3), 217–231.

Finkelstein, S., Hambrick, D.C., 1996. Strategic leadership: Top executives and their effects on organizations. West Publishing Company, St Paul, Minnesota.

Floyd, S.W., Lane, P.J., 2000. Strategizing throughout the organization: managing role conflict in strategic renewal. Acad. Manage. Rev. 25 (1), 154–177.

Flynn, B.B., Schroeder, R.G., Flynn, E.J., 1999. World class manufacturing: an investigation of Hayes and Wheelwright's foundation. J. Oper. Manage. 17 (3), 249–269.

Fornell, C., Larcker, D.F., 1981. Evaluating structural equation models with unobservable variables and measurement error. J. Marketing Res. 18 (1), 39–50.

Gavetti, G., Levinthal, D., 2000. Looking forward and looking backward: Cognitive and experiential search. Adm. sci. Q. 45 (1), 113–137.

Gerhart, B., Wright, P.M., McMahan, G.C., 2000. Measurement error in research on the

human resources and firm performance relationship: further evidence and analysis. Personnel Psychol. 53 (4), 855–872.
Ghoshal, S., Bartlett, C.A., 1997. The Individualized Corporation. Harper Collins, New York.
Gibson, C.B., Birkinshaw, J., 2004. The antecedents, consequences, and mediating role of organizational ambidexterity. Acad. Manage. J. 47 (2), 209–226.
Glick, W.H., Huber, G.P., Miller, C.C., Doty, D.H., Sutcliffe, K.M., 1990. Studying changes in organizational design and effectiveness: retrospective event histories and periodic assessments. Organ. Sci. 1 (3), 293–312.
Gotsi, M., Andriopoulos, C., Lewis, M.W., Ingram, A.E., 2010. Managing creatives: paradoxical approaches to identity regulation. Hum. Relat. 63 (6), 781–805.
Gupta, V., MacMillan, I.C., Surie, G., 2004. Entrepreneurial leadership: developing and measuring a cross-cultural construct. J. Bus. Venturing 19 (2), 241–260.
Guzzo, R.A., Shea, G.P., 1992. Group performance and intergroup relations in organizations. Handbook of Industrial and Organizational Psychology 3. pp. 269–313.
Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E., Tatham, R.L., 2006. Multivariate Data Analysis. Pearson Prentice Hall, Upper Saddle River NJ.
Haleblian, J., Finkelstein, S., 1993. Top management team size, CEO dominance, and firm performance: the moderating roles of environmental turbulence and discretion. Acad. Manage. J. 36 (4), 844–863.
Hambrick, D.C., Mason, P.A., 1984. Upper echelons − the organization as a reflection of its top managers. Acad. Manage. Rev. 9 (2), 193–206.
Hannan, M.T., Freeman, J., 1984. Structural inertia and organizational change. Am. Sociol. Rev. 49 (2), 149–164.
Hart, S.L., 1992. An integrative framework for strategy-making processes. Acad. Manage. Rev. 17 (2), 327–351.
Hayek, F.A., 1945. The use of knowledge in society. Am. econ. rev. 519–530.
He, Z.-L., Wong, P.-K., 2004. Exploration vs. exploitation: an empirical test of the ambidexterity hypothesis. Organ. Sci. 15 (4), 481–494.
Heavey, C., Simsek, Z., Roche, F., Kelly, A., 2009. Decision comprehensiveness and corporate entrepreneurship: the moderating role of managerial uncertainty preferences and environmental dynamism. J. Manage. Stud. 46 (8), 1289–1314.
Helweg-Larsen, M., Shepperd, J.A., 2001. Do moderators of the optimistic bias affect personal or target risk estimates? A review of the literature. Pers. Soc. Psychol. Rev. 5 (1), 74–95.
Hermalin, B.E., 1998. Toward an economic theory of leadership: leading by example. Am. Econ. Rev. 88 (5), 1188–1206.
Hmieleski, K.M., Baron, R.A., 2008. Regulatory focus and new venture performance: a study of entrepreneurial opportunity exploitation under conditions of risk versus uncertainty. Strateg. Entrepreneur. J. 2 (4), 285–299.
Hmieleski, K.M., Cole, M.S., Baron, R.A., 2012. Shared authentic leadership and new venture performance. J. Manage. 38 (5), 1476–1499.
House, R.J., 1977. A 1976 Theory of Charismatic Leadership. Southern Illinois University Press, Carbondale, IL.
Jackson, S.E., Brett, J.F., Sessa, V.I., Cooper, D.M., Julin, J.A., Peyronnin, K., 1991. Some differences make a difference: individual dissimilarity and group heterogeneity as correlates of recruitment, promotions, and turnover. J. Appl. Psychol. 76 (5), 675.
James, L.R., Demaree, R.G., Wolf, G., 1993. R(wg) – an assessment of within-group interrater agreement. J. Appl. Psychol. 78 (2), 306–309.
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. Manage. Sci. 52 (11), 1661–1674.
Jansen, J.J., George, G., Van den Bosch, F.A., Volberda, H.W., 2008. Senior team attributes and organizational ambidexterity: the moderating role of transformational leadership. J. Manage. Stud. 45 (5), 982–1007.
Jansen, J.J., 2008. Combining competence building and leveraging: managing paradoxes in ambidextrous organizations. Advances in Applied Business Strategy. Emerald Group Publishing Limited, pp. 99–119.
Jehn, K.A., 1995. A multimethod examination of the benefits and detriments of intragroup conflict. Adm. Sci. Q. 256–282.
Jehn, K.A., 1997. A qualitative analysis of conflict types and dimensions in organizational groups. Adm. Sci. Q. 530–557.
Johnson, G., 1988. Rethinking incrementalism. Strateg. Manage. J. 9 (1), 75–91.
Jones, A.P., Johnson, L.A., Butler, M.C., Main, D.S., 1983. Apples and oranges: an empirical comparison of commonly used indices of interrater agreement. Acad. Manage. J. 26 (3), 507–519.
Katila, R., Ahuja, G., 2002. Something old, something new: a longitudinal study of search behavior and new product introduction. Acad. Manage. J. 45 (6), 1183–1194.
Kirzner, I.M., 1997. Entrepreneurial Discovery and the Competitive Market Process: An Austrian Approach. J. Econ. Lit. 35 (1), 60–85.
Knight, D., Pearce, C.L., Smith, K.G., Olian, J.D., Sims, H.P., Smith, K.A., Flood, P., 1999. Top management team diversity, group process, and strategic consensus. Strateg. Manage. J. 20 (5), 445–465.
Koryak, O., Mole, K.F., Lockett, A., Hayton, J.C., Ucbasaran, D., Hodgkinson, G.P., 2015. Entrepreneurial leadership, capabilities and firm growth. Int. Small Bus. J. 33 (1), 89–105.
Kouzes, J.M., Posner, B.Z., 1987. The Leadership Challenge: How to Get Extraordinary Things Done in Organizations, The Jossey-Bass Management Series. Jossey-Bass, San Francisco.
Kozlowski, S.W., Bell, B.S., 2003. Work Groups and Teams in Organizations Handbook of Psychology.
Larwood, L., Falbe, C.M., Kriger, M.P., Miesing, P., 1995. Structure and meaning of organizational vision. Acad. Manage. J. 38 (3), 740–769.
Latane, B., Williams, K., Harkins, S., 1979. Many hands make light the work: the causes and consequences of social loafing. J. Pers. Soc. Psychol. 37 (6), 822.
Levinthal, D.A., March, J.G., 1993. THe myopia of learning. Strateg. Manage. J. 14, 95–112.
Lewis, M.W., 2000. Exploring paradox: toward a more comprehensive guide. Acad. Manage. Rev. 25 (4), 760–776.
Li, J., Hambrick, D.C., 2005. Factional groups: a new vantage on demographic faultlines, conflict, and disintegration in work teams. Acad. Manage. J. 48 (5), 794–813.
Lock, E., Kirkpatrick, S., 1995. Promoting Creativity in Organizations. Creative Action in Organizations: Ivory Tower Visions and Real World Voices. Sage, London.
Locke, E.A., Latham, G.P., 1990. A Theory of Goal Setting and Task Performance. Prentice Hall, Englewood Cliffs, NJ.
Lockett, A., O'Shea, R.P., Wright, M., 2008. The development of the resource-based view: reflections from Birger Wernerfelt 1. Organ. Stud. 29 (8-9), 1125–1141.
Love, J., Roper, S., 2013. SME Innovation Exporting and Growth, White Paper No. 5. Enterprise Research Centre, Aston and Warwick.
Lubatkin, M.H., Lane, P.J., Schulze, W.S., 2005. A strategic management model of agency relationships in firm governance. In: Hitt, M.A., Freeman, J., Harrison, J.S. (Eds.), Handbook of Strategic Management. Blackwell Publishing.
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. J. Manage. 32 (5), 646–672.
Mank, D.A., Nystrom, H.E., 2001. Decreasing returns to shareholders from R&D spending in the computer industry. Eng. Manage. J.-Rolla 13 (3), 3–8.
Mannix, E., Neale, M.A., 2005. What differences make a difference? The promise and reality of diverse teams in organizations. Psychol. Sci. Public Interest 6 (2), 31–55.
March, J.G., 1991. Exploration and exploitation in organizational learning. Organ. Sci. 2 (1), 71–87.
Martínez-Costa, M., Jiménez-Jiménez, D., 2009. The effectiveness of TQM the key role of organizational learning in small businesses. Int. Small Bus. J. 27 (1), 98–125.
McAdam, R., Moffett, S., Hazlett, S.A., Shevlin, M., 2010. Developing a model of innovation implementation for UK SMEs: a path analysis and explanatory case analysis. Int. Small Bus. J. 28 (3), 195–214.
McGrath, R.G., 2001. Exploratory learning, innovative, capacity, and managerial oversight. Acad. Manage. J. 44 (1), 118–131.
Miron-Spektor, E., Ingram, A., Keller, J., Smith, W., Lewis, M., 2017. Microfoundations of organizational paradox: the problem is how we think about the problem. Acad. Manage. J. http://dx.doi.org/10.5465/amj.2016.0594. Epub ahead of print 16 March.
Mueller, J.S., 2012. Why individuals in larger teams perform worse. Organ. Behav. Hum. Decis. Process. 117 (1), 111–124.
Ndofor, H.A., Sirmon, D.G., He, X., 2015. Utilizing the firm's resources: how TMT heterogeneity and resulting faultlines affect TMT tasks. Strateg. Manage. J. 36 (11), 1656–1674.
Nell, P.C., Ambos, B., 2013. Parenting advantage in the MNC: An embeddedness perspective on the value added by headquarters. Strateg. Manage. J. 34 (9), 1086–1103.
Nemanich, L.A., Keller, R.T., 2007. Transformational leadership in an acquisition: a field study of employees. Leadersh. Q. 18 (1), 49–68.
Nielsen, B.B., Nielsen, S., 2013. Top management team nationality diversity and firm performance: a multilevel study. Strateg. Manage. J. 34 (3), 373–382.
Nielsen, S., 2010. Top management team diversity: a review of theories and methodologies. Int. J. Manage. Rev. 12 (3), 301–316.
Nonaka, I., 1988. Creating organizational order out of chaos: self-renewal in Japanese firms. Calif. Manage. Rev. 30 (3), 57–73.
O'Reilly, C.A., Tushman, M.L., 2004. The ambidextrous organization. Harv. Bus. Rev. 82 (4), 74–83.
O'Reilly, C.A., Tushman, M.L., 2008. Ambidexterity as a dynamic capability: resolving the innovator's dilemma. Res. Organ. Behav. 28, 185–206.
O'Reilly, C.A., Tushman, M.L., 2013. Organizational ambidexterity: past, present, and future. Acad. Manage. Perspect. 27 (4), 324–338.
Ocasio, W., Joseph, J., 2005. An attention-based theory of strategy formulation: linking micro-and macroperspectives in strategy processes. Strategy Process. Emerald Group Publishing Limited, pp. 39–61.
Ocasio, W., Joseph, J., 2008. Rise and fall-or transformation?: The evolution of strategic planning at the General Electric Company, 1940–2006. Long Range Plann. 41 (3), 248–272.
Ocasio, W., Wohlgezogen, F., 2010. Attention and Control, Control in Organizations: New Directions for Research. Cambridge University Press, Cambridge.
Ocasio, W., 1997. Towards an attention-Based view of the firm. Strateg. Manage. J. 18, 187–206.
Ocasio, W., 2011. Attention to attention. Organ. Sci. 22 (5), 1286–1296.
Office for National Statistics, 2014. Annual Business Survey, 2012. In U. D. Service (Ed.): http://webarchive.nationalarchives.gov.uk/20150906023149/http://www.ons.gov.uk/ons/publications/re-reference-tables.html?edition=tcm%3A77-330927.
Papachroni, A., Heracleous, L., Paroutis, S., 2014. Organizational ambidexterity through the lens of paradox theory. J. Appl. Behav. Sci. 51 (1), 71–93.
Pearce, C.L., Ensley, M.D., 2004. A reciprocal and longitudinal investigation of the innovation process: the central role of shared vision in product and process innovation teams (PPITs). J. Organ. Behav. 25 (2), 259–278.
Pegels, C.C., Song, Y.I., Yang, B., 2000. Management heterogeneity, competitive interaction groups, and firm performance. Strateg. Manage. J. 21 (9), 911–923.
Pelled, L.H., Eisenhardt, K.M., Xin, K.R., 1999. Exploring the black box: an analysis of work group diversity, conflict, and performance. Adm. Sci. Q. 44 (1), 1–28.
Peng, D.X., Schroeder, R.G., Shah, R., 2008. Linking routines to operations capabilities: a new perspective. J. Oper. Manage. 26 (6), 730–748.
Penrose, E., 1959. The Theory of the Growth of the Firm, 3rd edition. Oxford University Press, New York, NY.
Perunovic, Z., Christiansen, T.B., 2005. Exploring Danish innovative manufacturing performance. Technovation 25 (9), 1051–1058.

Pieterse, A.N., Van Knippenberg, D., Schippers, M., Stam, D., 2010. Transformational and transactional leadership and innovative behavior: the moderating role of psychological empowerment. J. Organ. Behav. 31 (4), 609–623.
Pitcher, P., Smith, A.D., 2001. Top management team heterogeneity: personality, power, and proxies. Organ. Sci. 12 (1), 1–18.
Podsakoff, P.M., MacKenzie, S.B., Lee, J.Y., Podsakoff, N.P., 2003. Common method bias in behavioral research: a critical review of literature and recommended remedies. J. Appl. Psychol. 88 (5), 879–903.
Porter, M.E., 1985. Competitive Advantage: Creating and Sustaining Superior Performance. FreePress, New York.
Priem, R.L., Rasheed, A.M., Kotulic, A.G., 1995. Rationality in strategic decision processes, environmental dynamism and firm performance. J. Manage. 21 (5), 913–929.
Puranam, P., Singh, H., Zollo, M., 2006. Organizing for innovation: managing the coordination-autonomy dilemma in technology acquisitions. Acad. Manage. J. 49 (2), 263–280.
Raisch, S., Birkinshaw, J., 2008. Organizational ambidexterity: antecedents, outcomes, and moderators. J. Manage. 34 (3), 375–409.
Raisch, S., Zimmermann, A., 2017. A process perspective on the Exploration–Exploitation paradox. The Oxford Handbook of Organizational Paradox. pp. 315.
Raisch, S., Birkinshaw, J., Probst, G., Tushman, M.L., 2009. Organizational ambidexterity: balancing exploitation and exploration for sustained performance. Organ. Sci. 20 (4), 685–695.
Randolph, W.A., Dess, G.G., 1984. The congruence perspective of organization design: A conceptual model and multivariate research approach. Acad. Manage. Rev. 9 (1), 114–127.
Reed, M., 1996. Expert power and control in late modernity: an empirical review and theoretical synthesis. Organ. Stud. 17 (4), 573–597.
Rosenkopf, L., Nerkar, A., 2001. Beyond local search: boundary-spanning, exploration, and impact in the optical disk industry. Strateg. Manage. J. 22 (4), 287–306.
Rothaermel, F.T., Alexandre, M.T., 2009. Ambidexterity in technology sourcing: the moderating role of absorptive capacity. Organ. Sci. 20 (4), 759–780.
Ruvio, A., Rosenblatt, Z., Hertz-Lazarowitz, R., 2010. Entrepreneurial leadership vision in nonprofit vs. for-profit organizations. Leadersh. Q. 21 (1), 144–158.
Schippers, M.C., Den Hartog, D.N., Koopman, P.L., Wienk, J.A., 2003. Diversity and team outcomes: the moderating effects of outcome interdependence and group longevity and the mediating effect of reflexivity. J. Organ. Behav. 24 (6), 779–802.
Schippers, M.C., Edmondson, A.C., West, M.A., 2014. Team reflexivity as an antidote to team information-Processing failures. Small Group Res. 45 (6), 731–769.
Schumpeter, J., 1942. Creative destruction. Capitalism, Socialism and Democracy. pp. 825.
Sharfman, M.P., Dean Jr., J.W., 1991. Conceptualizing and measuring the organizational environment: a multidimensional approach. J. Manage. 17 (4), 681.
Shane, S., Venkataraman, S., 2000. The promise of entrepreneurship as a field of research. Acad. Manage. Rev. 25 (1), 217–226.
Siggelkow, N., Levinthal, D.A., 2003. Temporarily divide to conquer: centralized, decentralized, and reintegrated organizational approaches to exploration and adaptation. Organ. Sci. 14 (6), 650–669.
Simsek, Z., Veiga, J.F., Lubatkin, M.H., Dino, R.N., 2005. Modeling the multilevel determinants of top management team behavioral integration. Acad. Manage. J. 48 (1), 69–84.
Smith, W.K., Lewis, M.W., 2011. Toward a theory of paradox: a dynamic equilibrium model of organizing. Acad. Manage. Rev. 36 (2), 381–403.
Smith, W.K., Tushman, M.L., 2005. Managing strategic contradictions: a top management model for managing innovation streams. Organ. Sci. 16 (5), 522–536.
Smith, K.G., Smith, K.A., Olian, J.D., Sims Jr., H.P., O'Bannon, D.P., Scully, J.A., 1994. Top management team demography and process: the role of social integration and communication. Adm. Sci. Q. 412–438.
Smith, W.K., 2015. Dynamic decision making: a model of senior leaders managing strategic paradoxes. Acad. Manage. J. 1015 (1), 58–89.
Souitaris, V., Maestro, B.M.M., 2010. Polychronicity in top management teams: the impact on strategic decision processes and performance of new technology ventures. Strateg. Manage. J. 31 (6), 652–678.
Starbuck, W.H., 1976. Organisations and their environments. In: Dunette, M.D. (Ed.), Handbook of Industrial and Organisational Psychology. Rand McNally Publishers, Chicago, pp. 1069–1124.
Tajfel, H., Turner, J.C., 1979. An integrative theory of intergroup conflict. In: Austin, W.G., Worchel, S. (Eds.), The Social Psychology of Intergroup Relations. Brooks/Cole, Monterey, CA, pp. 33–47.
Talke, K., Salomo, S., Rost, K., 2010. How top management team diversity affects innovativeness and performance via the strategic choice to focus on innovation fields. Res. Policy 39 (7), 907–918.
Thompson, J.D., 1967. Organization in Action: Social Science Bases of Administrative Theory. McGraw-Hill, New York.
Tushman, M.L., O'Reilly III, C.A., 1996. Ambidextrous organizations: managing evolutionary and revolutionary change. Calif. Manage. Rev. 38 (4), 8–30.
Tushman, M.L., Romanelli, E., 1995. Organizational evolution: a metamorphosis model of convergence and reorientation. In: In: Cummings, J.L., Staw, B.M. (Eds.), Research in Organizational Behavior 7. JAI, Greenwich, CT, pp. 171–222.
Tushman, M., Smith, W.K., Wood, R.C., Westerman, G., O'Reilly, C., 2010. Organizational designs and innovation streams. Ind. Corporate Change 19 (5), 1331–1366.
Ucbasaran, D., Westhead, P., Wright, M., Flores, M., 2010. The nature of entrepreneurial experience, business failure and comparative optimism. J. Bus. Venturing 25 (6), 541–555.
Van Doorn, S., Jansen, J.J.P., Van den Bosch, F.A.J., Volberda, H.W., 2013. Entrepreneurial orientation and firm performance: drawing attention to the senior team. Jo. Prod. Innovation Manage. 30 (5), 821–836.
Van Knippenberg, D., Schippers, M.C., 2007. Work group diversity. Annu. Rev. Psychol. 58, 515–541.
Van Knippenberg, D., De Dreu, C.K., Homan, A.C., 2004. Work group diversity and group performance: an integrative model and research agenda. J. Appl. Psychol. 89 (6), 1008.
Van de Ven, A.H., 1986. Central problems in the management of innovation. Manage. Sci. 32 (5), 590–607.
Vera, D., Crossan, M., 2004. Strategic leadership and organizational learning. Acad. Manage. Rev. 29 (2), 222–240.
Vermeulen, F., Barkema, H., 2001. Learning through acquisitions. Acad. Manage. J. 44 (3), 457–476.
Vissa, B., Chacar, A.S., 2009. Leveraging ties: the contingent value of entrepreneurial teams' external advice networks on Indian software venture performance. Strateg. Manage. J. 30 (11), 1179–1191.
Vyakarnam, S., Handelberg, J., 2005. Four themes of the impact of management teams on organizational performance implications for future research of entrepreneurial teams. Int. Small Bus. J. 23 (3), 236–256.
Yukl, G., 2009. Leading organizational learning: reflections on theory and research. Leadersh. Q. 20 (1), 49–53.
Zenger, T.R., 1994. Explaining organizational diseconomies of scale in R&D: Agency problems and the allocation of engineering talent, ideas, and effort by firm size. Manage. Sci. 40 (6), 708–729.
Zhang, Y., Li, H., 2010. Innovation search of new ventures in a technology cluster: the role of ties with service intermediaries. Strateg. Manage. J. 31 (1), 88–109.