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AMBIDEXTERITY AND PERFORMANCE IN MULTIUNIT CONTEXTS: CROSS-LEVEL MODERATING EFFECTS OF STRUCTURAL AND RESOURCE ATTRIBUTES

JUSTIN J.P. JANSEN,[1]* ZEKI SIMSEK,[2] and QING CAO[2]
[1] *Rotterdam School of Management, Erasmus University, Rotterdam, the Netherlands*
[2] *School of Business, University of Connecticut, Storrs, Connecticut, U.S.A.*

Research suggests that unit-level ambidexterity positively impacts subsequent unit performance but theory and testing on this impact remain impoverished. We develop a cross-level model suggesting that structural and resource attributes of the organizational context significantly shape the relationship between unit ambidexterity and performance. Using multisource and lagged data from 285 organizational units located within 88 autonomous branches, results from hierarchical linear modeling show that this relationship is boosted when the organization is decentralized, more resource munificent, or less resource interdependent. We also find that structural differentiation of the organization does not condition the unit ambidexterity-performance relationship. Through this cross-level theory and testing, we develop a richer explanation of the effectiveness of ambidextrous units operating in multiunit contexts. Copyright © 2012 John Wiley & Sons, Ltd.

INTRODUCTION

With multiunit firms becoming more pervasive in the contemporary business landscape (Usher, 1999), scholars and practitioners are increasingly interested in those that exhibit dynamic capabilities through the achievement of ambidexterity at the unit level (Gibson and Birkinshaw, 2004; Gupta, Smith, and Shalley, 2006; O'Reilly and Tushman, 2007; Simsek *et al*., 2009). Unit ambidexterity refers to an organizational unit's ability to exploit value from existing markets, competencies, and resources, while it simultaneously explores new markets, products, and opportunities (Gibson and Birkinshaw, 2004). Consistent with the general ambidexterity hypothesis (He and Wong, 2004) or premise (Raisch and Birkinshaw, 2008), Gibson and Birkinshaw (2004) were the first to provide empirical evidence showing that ambidexterity increases a unit's performance by enabling the unit to be innovative and flexible without losing the benefits of accumulated experience and efficiency.

While this initial evidence of the ambidexterity hypothesis at the unit level is informative, recent reviews contend that in a multiunit context, theory on how and under what conditions ambidexterity enhances units' subsequent performance remains impoverished (Raisch and Birkinshaw, 2008; Simsek, 2009). Put simply, prior research on unit ambidexterity fails to consider the interunit variations in performance within the same organization. And yet, one of the more pervasive and enduring principles of organizational design is that the optimal conditions for business unit performance are contingent on the attributes of the organizational context in which units operate (Brown and Eisenhardt, 1997; Gupta, 1987; Lawrence and

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*Correspondence to: Justin J.P. Jansen, Rotterdam School of Management, Erasmus University, Burgemeester Oudlaan 50, 3062 PA Rotterdam, the Netherlands. E-mail: jjansen@rsm.nl

Lorsch, 1967). Units generally need to interact systematically with other parts in the organization, including coordinating or synchronizing work flow with other units, acquiring resources, and obtaining support from upper and vertical-level executives and managers (Dutton and Ashford, 1993). Should their attention, discretion, and strategic flexibility be constrained by such processes, units may encounter thorny challenges in effectively leveraging and appropriating value from their joint pursuit of exploratory and exploitative activities. Ambidexterity research has yet to build theory that incorporates these cross-level effects to explain how the specific attributes of the organizational context can shape the relationship between unit ambidexterity and subsequent unit performance. Our central argument is that the unit ambidexterity-performance relationship is not invariant across structural and resource conditions of the organizational context. Thus, while we join others in adopting the perspective that unit ambidexterity may generally be beneficial to improving unit performance, we propose a richer understanding, arguing that the ultimate magnitude of this relationship is contingent upon structural (differentiation and centralization) and resource (munificence and interdependency) attributes at the organizational level.

We first draw on insights from research on organization design to identify two structural contingencies commensurate with the complexity of a multiunit setting: differentiation and centralization. Structural differentiation captures the subdivision of organizational tasks and domains across units (Hall, 1977; Jansen *et al*., 2008; Lawrence and Lorsch 1967), while centralization concerns the role of formal authority and hierarchical mechanisms in the organization's decision-making process (Ghoshal and Nohria, 1993). An ambidextrous unit can create and capture additional value by combining insights, information, and input from other units, but opportunities for such a productive exchange likely decrease as differentiation goes up. Not only does differentiation complicate interunit exchanges by giving rise to differences in structures, systems, and processes across units but it also heightens the salience of parochial goals and interest—all of which can detract from ambidextrous units' ability to realize synergies between exploratory and exploitative activities for more performance gains. Conversely, a decentralized organization should help boost performance by allowing ambidextrous units to freely adapt to contradictory demands with only limited constraints imposed from upper hierarchy (Galunic and Eisenhardt, 2001; Siggelkow and Levinthal, 2003). Then, because ambidexterity's continued implementation and successful leveraging require diverse and timely resource inputs, we argue that the availability and interdependency of organizational resources also exert shaping influence on the relationship between unit ambidexterity and performance (Aiken and Hage, 1968; Tushman and Nadler, 1978). A munificent context may considerably ease resource constraints imposed on ambidextrous units so that these units can obtain more performance gains by more effectively implementing and leveraging ambidexterity. By contrast, the difficulty in utilizing interdependent resources across units may represent a powerful countervailing force, mitigating units' flexibility to continually execute ambidexterity to their advantage (Burgelman, 1983; Cao, Gedajlovic, and Zhang, 2009).

We test these cross-level influences using multisource data with a lagged design from 285 organizational units located within 88 autonomous branches of a global financial services firm. The firm has more than $350 billion in assets and ranks among the top 30 on the Fortune Global 500 in terms of total revenue in the banking industry. Using hierarchical linear modeling, and after controlling for environmental-, organizational-, and unit-level factors, we find that ambidextrous units are more likely to increase their performance when the organization is less centralized, more resource munificent, and less resource interdependent. Interestingly, and contrary to our expectation, we find that structural differentiation of the organization does not condition the relationship between a unit's ambidexterity and its subsequent performance. Overall, our cross-level theory and testing enrich research as well as practice by providing insights into the effectiveness of ambidextrous units operating under different organizational-level conditions.

THEORY AND HYPOTHESES

There are several compelling reasons to expect a positive relationship between a unit's ambidexterity and its subsequent performance. The synergistic fusion of exploration and exploitation within units unleashes the unused potential of both, such that the achievement of ambidexterity at units increases

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subsequent performance (Cao *et al*., 2009). Organizational units that regularly change and implement adaptations to existing products while also developing new products will benefit from both the penetration of existing markets (and higher market share) and the creation of entirely new revenue sources (resulting in market leadership). And since increasing market share in both existing and new markets typically leads to higher growth rates (He and Wong, 2004), unit performance is enhanced due to ambidexterity. While the joint pursuit of exploitation and exploration is inherently challenging, ambidextrous units that fail to maintain a combined emphasis are susceptible to certain maladaptive predilections that can threaten their performance (Bierly and Daly, 2007).

The commercial banking industry, which is the setting for the present study, has particularly witnessed fundamental changes and greater instability that heightened the successful attainment of ambidexterity as an important orientation for units to increase their performance. In particular, deregulation has intensified competition in this market. Thus, on the one hand, the bank units are expected to constantly improve existing products as well as reduce costs in serving current customers and existing markets, and the advances in information and communication technologies have enabled units to introduce process technologies to gain internal efficiency and increase productivity. On the other hand, these units are also expected to introduce new products and establish new advantages, which is necessary to compete with new entrants that enter areas once exclusively reserved for commercial banks. Facing these challenges, bank units located in branches need to emphasize both exploiting routine-based transaction activities and exploring nonroutine, innovative activities (De Jong, De Ruyter, and Lemmink, 2004), which not only provides opportunities for additional sources of revenue but also can yield economies of scope and cost savings that arise from efficient resource utilization (Gibson and Birkinshaw, 2004). By conjointly pursuing exploratory and exploitative activities, bank units can eschew the risk of sustaining exploratory initiatives and investments without getting adequate returns while also obtaining additional revenues from existing and new markets.

Having said that, and going beyond this basic ambidexterity premise, we envision that the relationship between unit ambidexterity and performance is not a given and is subject to shaping influences cascading from the organizational context in which the unit operates. A constraining organizational context may severely hamper units' ability to obtain performance benefits from pursuing ambidexterity. Conversely, an enabling context with limited constraints imposed by other units or the wider organization can help boost unit performance by allowing ambidextrous units to align their exploratory and exploitative activities with internal and external opportunities in a timely fashion and by so doing, increase performance (Galunic and Eisenhardt, 2001; Siggelkow and Levinthal, 2003).

Specifically, because ambidextrous units generally do not have at their command the kind of structural and resource solutions that would enable them to aptly address process, resource, and implementation challenges, performance effects can be expected to be conditioned by organizational-level characteristics. Indeed, structural attributes such as differentiation and centralization of decision making (Lawrence and Lorsch, 1967) have been shown to impact information-processing capabilities of units (Brown and Eisenhardt, 1997; Tushman and Nadler, 1978) and responsiveness in product markets (Birkinshaw and Lingblad, 2005). Studies have suggested that more differentiated and decentralized structures help organizational units rapidly adapt to altered business conditions by pursuing distinct strategic activities (Benner and Tushman, 2003; Galunic and Eisenhardt, 2001; Tushman and O'Reilly, 1996). Research has also shown that corporate-level structural attributes and control systems contribute differentially to the effectiveness of business units pursuing distinct strategies such as differentiation or low cost (Govindarajan, 1988).

Beyond structural elements, scholars have suggested that unit effectiveness is complicated by the availability and interdependency of resources within the organization (Aiken and Hage, 1968; Gilbert, 2005; Tushman and Nadler, 1978). Access to resources may come about either because resources are available within the organization or because ambidextrous units have established linkages with other units that own or control complementary resources (Gupta *et al*., 2006). Research shows that the availability of slack financial resources within organizations may support units to invest in specific assets and take advantage of specific market opportunities (Bourgeois, 1981;

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Nohria and Gulati, 1996; Sirmon, Hitt, and Ireland, 2007). Furthermore, studies recognize that organizational units depend on other units for resource inputs (Thompson, 1967). Such resource interdependency increases the need for mutual adjustment between units and may lead to conflict-creating interdependencies that add to the complexity and uncertainty that units face (Tushman and Nadler, 1978). Accordingly, resource attributes may increase the complexity facing ambidextrous units and require additional coordination efforts across units to accomplish individual tasks. Hence, they may have important implications for the effectiveness of ambidextrous units to alter their portfolio of activities to increase performance.

While units may overcome internal challenges associated with managing contradictory agendas of exploration and exploitation (Gibson and Birkinshaw, 2004), the effectiveness of this ambidextrous attainment in enhancing performance may be boosted or dampened by the salient attributes of the wider organizational-level context blanketing units. We specifically focus on the shaping influences cascading from structural (differentiation and centralization) and resource (munificence and interdependence) attributes.

Cross-level effects of organizational structure: differentiation and centralization

Structural differentiation

While structural differentiation can be conceptualized in several ways, the number of units serving distinct product-market segments provides a parsimonious and objective index to capture the extent of structural differentiation in a multiunit organization (Dewar and Hage, 1978). As such, structural differentiation captures the subdivision of organizational tasks and domains across units, possibly to enable each unit to develop a more focused set of competencies and expertise (Hall, 1977; Lawrence and Lorsch 1967).

As differentiation increases, the performance of ambidextrous units is likely to be stifled due to a potential constraint of requisite variety—that is, mismatch between the complex requirements of simultaneous pursuit of exploratory and exploitative activities and the specialized set of skills and functional experiences among units (Bowers, Pharmer, and Salas, 2000). In a highly differentiated organizational context, units are less able to facilitate within-unit discussion across a variety of perspectives and approaches, which are critical for fusing exploratory and exploitative activities into a purposeful, sustainable orientation that increases subsequent unit performance.

Structural differentiation can also result in different goal orientations across units, which may hamper constructive interunit exchanges and constrain units from accessing and utilizing distributed expertise. With greater subdivision of organizational tasks and domains across units, it is likely that units' respective self-interests lead them to take no action or share no information that could benefit other units. And yet, given the contradictory requirements of implementing ambidexterity, such exchanges can be critical to interlacing exploratory and exploitative activities in new ways to obtain unrealized synergies and improve performance (Dean and Sharfman, 1996; Garud and Nayyar 1994; Postrel 2002; Smith and Tushman, 2005). Moreover, differentiation may give rise to interunit conflicts due to competition for the parent company's attention and resources to further parochial interest and goals. This could further contribute to the isolation of units from one another, and as a result, units may miss opportunities to learn from one another to develop and implement beneficial solutions to enhance their performance. Consequently, in a structurally differentiated multiunit context, the array of preferences, competencies, and goals may become a series of constraints on ambidextrous units' ability to more fully mobilize, coordinate, and leverage exploitation and exploration activities for performance gains.

Conversely, ambidextrous units situated in a less differentiated context possess and can potentially access a wider variety of information and perspectives, such that they are more capable of integrating intra- and interunit skills and functional experiences (Menon and Pfeffer, 2003; Beckman and Haunschild, 2002) in extracting more value from the pursuit of ambidexterity. As such, we expect:

> *Hypothesis 1: Organizational-level structural differentiation moderates the relationship between a unit's ambidexterity and its subsequent performance in such a way that this positive effect is reduced as structural differentiation increases.*

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Centralization

Centralization reflects the extent to which decision making is concentrated at higher levels of an organization (Aiken and Hage, 1968), and thus concerns the role of formal authority and hierarchical mechanisms in the company's decision-making process (Ghoshal and Nohria, 1993). Because information travels through a longer filtering process before it reaches final decision makers, a centralized organizational context reduces the extent to which corporate managers consider substantial information from unit managers (Atuahene-Gima, 2003; Sheremata, 2000). Given the challenging nature of the problems encountered at ambidextrous units (Gibson and Birkinshaw, 2004), we expect that this reduced amount and quality of information obtained by upper-level decision makers can lead to incomplete and inaccurate assessments of the feasibility and risks involved in matching units' ambidextrous behaviors to valuable local market opportunities (Govindarajan, 1988; Ruekert and Walker, 1987). By placing decision-making authority in the hands of corporate managers, a centralized organizational structure reduces the effectiveness of ambidextrous units in capturing market opportunities and, in turn, optimizing benefits with the leverage of exploratory and exploitative activities.

Another critical factor for ambidextrous units to achieve greater performance is the speed of response, or time taken to tune their exploratory and exploitative activities to valuable market opportunities. A centralized organizational-level context provides less discretion for unit managers to quickly respond to unique opportunities or threats in their local environments (Birkinshaw and Lingblad, 2005; Tsai, 2002). This restricts the timely adaptiveness of units to the distinct market opportunities and limits the degree to which units benefit from ambidextrous behaviors. Consistently, White (1986) reported that business units with more complex strategies obtained a much higher sales growth in a more decentralized organizational context than in a centralized one. A decentralized context provides ambidextrous units with more freedom of initiative to be more expansive and rigorous in utilizing their unique portfolio of exploratory and exploitative activities to capture valuable market opportunities in a timely manner for enhanced performance (Atuahene-Gima and Li, 2002). Accordingly, we expect that:

Hypothesis 2: Organizational-level centralization of decision making moderates the relationship between a unit's ambidexterity and its subsequent performance in such a way that this positive effect is reduced as centralization increases.

Cross-level effects of organizational resources: munificence and interdependency

Resource munificence

Although the scarcity of unit resources may severely limit ambidextrous units' ability to effectively and synergistically leverage exploratory and exploitative activities (Levinthal and March, 1993; March, 1991), they may acquire additional financial resources from their organization to realize gains from pursuing exploratory and exploitative activities simultaneously (Simsek *et al*., 2009). By accessing and utilizing resources from within the wider organization, ambidextrous units may considerably ease constraints imposed by scarce unit resources (Gupta *et al*., 2006), and harmonize their portfolio of exploratory and exploitative activities with promising opportunities in both existing and emerging markets. Conversely, in a resource-constrained organizational environment, ambidextrous units may be subject to the liability of being 'stuck-in-the-middle' (Porter, 1980: 41) and to diminishing returns.

Uncommitted financial resources within organizations, including cash reserves, are highly flexible and provide opportunities for ambidextrous units to redeploy and reallocate activities whenever needed (George, 2005; Voss, Sirdeshmukh, and Voss, 2008). Importantly, the utilization of slack financial resources from the organization may enhance the performance of ambidextrous units, as additional resources may be allocated in a timely manner to more effectively leverage exploratory and exploitative activities in response to the dynamic market needs (Sirmon *et al*., 2007). Likewise, ambidextrous units may also deploy excess financial resources to mitigate potential adverse consequences on their financial performance as they encounter difficulties responding to paradoxical demands (Cao *et al*., 2009). With less financial resources available from the organizational context, ambidextrous units are likely susceptible to potential downside risks in simultaneously engaging in exploratory and exploitative

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activities and experience declining financial performance (Ebben and Johnson, 2005; Lin, Yang, and Demirkan, 2007). The availability of slack resources within the organization may thus help unit managers to increase the perceived controllability of uncertain and complex behaviors (Sharma, 2000). It might, for example, encourage ambidextrous units to frame environmental issues in terms of opportunities for action and facilitate experimental behavior (Lounamaa and March, 1987). Finally, when organizational slack exists, there is less incentive for organizational units to aggressively compete with one another over resource control. Thus, we expect that:

Hypothesis 3: Organizational-level resource munificence moderates the relationship between a unit's ambidexterity and its subsequent performance in such a way that this positive effect is increased as munificence increases.

Resource interdependency

While munificence captures availability of resources, resource interdependency refers to the extent to which units are dependent on other units' resources for their own functioning (Thompson, 1967; Tushman and Nadler, 1978). The more substantial the interdependency of organizational-level resources, the more ambidextrous units require high levels of interaction and close coordination with other units' actions in timing and sequence (Wageman, 1995). As such, resource interdependency at the organizational level may be inconsistent with high levels of autonomy and flexibility needed for individuals within ambidextrous units to appropriate returns from the simultaneous pursuit of exploratory and exploitative activities (Gibson and Birkinshaw, 2004).

For ambidextrous units to achieve superior performance, it is important that they be able to distribute appropriate resources between exploration and exploitation in a fluid and timely manner. This would enable the ambidextrous units to better capitalize on the synergistic fusion between such activities (Yang and Atuahene-Gima, 2007). Conversely, being resource interdependent with other units, the focal unit may fail to command the right resources when needed, and thus fail to make in-time switching or adjustment between the exploratory and exploitative activities. Furthermore, resource interdependency may require the sacrifice of autonomy and interest of units in pursuing ambidexterity, and the conflicting goals and incentives of other units may hurt the performance of the focal unit (Orton and Weick, 1990). In addition, to improve the effectiveness of their operations, resource interdependency requires ambidextrous units to make multiple changes in concurrence with other units (Rivkin, 2000). It may stifle the ability of ambidextrous units to flexibly address potential limitations of their own processes and to improve the financial benefits obtained from achieving ambidexterity. Hence, ambidextrous units cannot optimize their activities one at a time for maximal gains; changes in one activity might require concomitant changes in other units. Performance benefits of ambidexterity at the unit level are more likely boosted when unit members work in a context of resource independence. This allows individual unit members to take advantage of their own unique systems and processes and to appropriate benefits by effectively aligning exploratory and exploitative activities with environmental opportunities as well as synergistically interlacing these activities (Gibson and Birkinshaw, 2004; Latham, Winters, and Locke, 1994). Thus:

Hypothesis 4: Organizational-level resource interdependency moderates the relationship between a unit's ambidexterity and its subsequent performance in such a way that this positive effect is reduced as resource interdependency increases.

METHODS

Setting and data collection

To test our cross-level hypotheses, we used company records and survey data collected in a field study of a large European financial services firm. We studied organizational units located in the firm's Dutch branches because these branches are geographically distinct entities, each with its own board of directors, and have autonomy with respect to types of products and services offered. In the study sample described below, the average branch consisted of 5.35 organizational units (range 2 to 10), each of which deliver consumer and business services but are targeted at different product-market domains, such as mortgages,

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asset management, loans and savings, insurance, leasing, equity participation, corporate banking, and investment banking. Within each unit, front-office and back-office employees are responsible for both routine, transaction-intensive, and nonroutine, knowledge-intensive tasks to provide service excellence. Hence, both exploitative and exploratory activities are important to the ultimate performance of each unit operating within the branches. After soliciting participation through presentations and explanation of research goals, 88 (42%) out of 211 branches agreed to participate in our study. To deal with potential problems associated with single-informant bias and common method bias, we lagged our measures by collecting data on our independent and moderating variables in 2004 and on our dependent variable in 2005 for the period 2004–2005, respectively. Moreover, we collected quantitative data from three independent sources given the multilevel and lagged nature of our testing. First, an organizational-level survey was designed for the executive director and additional senior team members of the branches that included items on branch centralization and resource interdependency. Second, an organizational unit-level survey was designed for the unit manager and additional senior unit employees and included items on a unit's exploratory and exploitative innovation (to measure unit ambidexterity). Third, we relied on corporate records for measuring structural differentiation and resource munificence at the organizational level as well as unit-level financial performance.

All executive directors responded to the organizational-level survey (n = 88) and a 61 percent unit manager response was recorded across the organizational units (n = 285). Hence, our data collection effort resulted in responses from 285 units in 88 branches. The average tenure of the executive directors and unit managers were 7.82 years (standard deviation [s.d.] = 7.23) and 7.56 years (s.d. = 8.10), respectively. The mean sizes of the branches and organizational units were 129.95 (s.d. = 68.29) and 24.29 (s.d. = 19.18) full-time employees, respectively. To test for nonresponse bias, we examined differences between respondents and nonrespondents for our final sample. These tests showed no significant differences based on a branch's and a unit's number of full-time employees and prior performance. We also compared early and late respondents (before and after six weeks) on tested and control variables. These comparisons did not reveal any significant differences ($p>0.05$), indicating that nonresponse bias was not a problem in this study.

Measurements

Unit performance

The financial performance of each unit was measured by the unit's average profitability for two consecutive years (Han, Kim, and Srivastava 1998). Following Tsai (2001), we used a unit's profitability-achieved rate, namely a unit's actual profitability divided by its target profitability. We collected data on a unit's actual profitability as well as target profitability (targets for units are set by branch management) through internal corporate records and averaged the profitability-achieved rate for 2004 and 2005 (up to one year after the measurement of ambidexterity) to help guard against random fluctuations in the data. To validate the empirical results, we also measured unit performance through the average net income growth for the period 2004–2005 (collected through internal corporate records) as well as a five-item self-reported measure on business performance following Li and Atuahene-Gima (2001) ($\alpha = 0.81$) that asked unit managers to assess the overall business performance of their units for 2005. As these additional measures for unit performance (objective and subjective measures of net growth and overall business performance, respectively) produced similar results, we only report results for the performance measure as profitability-achieved rate.

Unit ambidexterity

Following prior studies, we used a two-step approach to develop a measure for a unit's ambidexterity (Gibson and Birkinshaw 2004; He and Wong, 2004). First, each unit manager provided information concerning his or her unit's level of exploratory and exploitative innovation. The six-item scale for *exploratory innovation* was adapted from Jansen, Van den Bosch, and Volberda (2006) and captured the extent to which units depart from existing knowledge and pursue radical innovations for emerging customers or markets ($\alpha = 0.89$). Sample items are 'we experiment with new products and services in our local market' and 'we frequently utilize new opportunities in new markets.'

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A six-item scale ($\alpha = 0.84$) measured unit-level *exploitative innovation* (adapted from Jansen *et al.* 2006) and captured the extent to which units build upon existing knowledge and pursue incremental innovations that meet the needs of existing customers (Abernathy and Clark, 1985; Benner and Tushman, 2003). Sample items are 'we regularly implement small adaptations to existing products and services' and 'we increase economies of scale in existing markets.' To provide evidence of convergent and discriminant validity for exploratory and exploitative innovation, we performed confirmatory factor analysis. The analysis clearly replicated the underlying two-factor structure with acceptable goodness of fit indices ($\chi^2/df = 2.83$, $p < 0.001$; comparative fit index (CFI) = 0.96; goodness of fit index (GFI) = 0.92; root mean square error of approximation (RMSEA) = 0.08). Second, to develop a measure for unit ambidexterity, we build on prior studies and conceptualize it as a multidimensional construct comprising the non-substitutable combination of exploratory and exploitative innovation (Gibson and Birkinshaw, 2004). High levels of exploratory and exploitative innovation complement and augment the performance-enhancing effect of each other (Cao *et al.*, 2009), such that we measure unit ambidexterity as the multiplicative interaction of exploratory and exploitative innovation (Cao *et al.*, 2009; Gibson and Birkinshaw, 2004; He and Wong, 2004).

We used additional responses of up to two senior employees in each unit to assess the reliability of data received from unit managers. Of the 285 organizational units in our final sample, we received 81 responses from senior employees located in 59 units, or 20.7 percent of the units within our final sample that were comparable in size, age, and prior performance to the full sample. We calculated an interrater agreement score (r_{wg}) between the scores of the unit manager and additional senior employees for exploratory innovation and exploitative innovation (James, Demaree, and Wolf, 1993). The median (average) interrater agreements were 0.75 (0.73) and 0.79 (0.80) for both constructs, suggesting adequate agreement.

Organizational-level moderators

Following Dewar and Hage (1978), *structural differentiation* was based on the division in the organizational chart and was captured by the number of units in each branch (mean = 5.35; s.d. = 1.37), where these units serve distinct product-market segments. To measure *centralization* ($\alpha = 0.78$), we used the sub-construct of hierarchy of authority of Hage and Aiken (1967). The five-item scale reflected the extent to which decision making is concentrated in a branch. *Resource munificence* captures the availability of nonabsorbed, financial resources within each branch that are available for immediate deployment (Singh, 1986). We used accounting-based measures for resource munificence and measured the average branch's level of cash reserves divided by total expenses in 2003 and 2004 (Voss *et al.*, 2008). The cash reserves as well as total expenses for each branch were ascertained through internal corporate records. Finally, *resource interdependency* ($\alpha = 0.82$) at the organizational level refers to the extent to which units must exchange information and resources or work together to complete their tasks and activities (Brass, 1985; Thompson, 1967). We adapted a five-item measure for resource interdependency from Van der Vegt and Janssen (2003). To examine reliability issues associated with the executive-director data, we collected responses from a second senior team member in each responding branch. Of the 88 branches that participated, we received 39 responses from second senior team members located in branches that were comparable in size, age, and prior performance to our full sample. We calculated interrater agreement scores (r_{wg}) between the executive director and the second senior team member for branch-level centralization and resource interdependence (James *et al.* 1993). The median (average) interrater agreements were 0.78 (0.79) and 0.87 (0.88) for each construct respectively, suggesting adequate agreement.

Control variables

We controlled for possible alternative explanations by including pertinent control variables at both the unit-level and organizational-level of analysis. At the unit level, as larger units may have more opportunities to leverage their ambidexterity, we included the natural logarithm of the number of full-time employees within units to account for *unit size*. A *unit's age,* measured by the number of years from its founding, was included since age may influence rigidness and the ability

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of units to adapt successfully (Autio, Sapienza, and Almeida, 2000). Units with a strong history of high performance are likely to accumulate slack financial resources. Hence, we included a *unit's prior financial performance* measurements from corporate records. Following Tsai (2001), we used a unit's average profitability-achieved rate, a unit's profitability divided by its target profitability in 2002–2004. Environmental aspects such as dynamism can trigger units to develop new products and services. Hence, we included a four-item scale ($\alpha = 0.85$) adapted from Jansen *et al*. (2006) that captures *environmental dynamism* rated by unit managers. Regarding organizational-level controls, we included *branch size* by using the natural logarithm of the number of full-time employees within a branch. Additionally, branch age was included as older branches may have developed routines of how to handle paradoxical situations. A *branch's age* was measured by the natural logarithm of the number of years from its founding. Finally, to account for environmental dynamics like market concentration and competitiveness (Dietz, Pugh, and Wiley, 2004), we included a dummy variable, *branch location* (0/1 = rural/urban location). The rural/urban classification was collected through internal corporate records.

RESULTS

Analytic strategy

Table 1 presents the descriptives and correlations of all variables at the unit and organizational level. To test our cross-level predictions, we used hierarchical linear modeling (HLM) (Bryk and Raudenbush, 1992), which allows for the simultaneous analysis of both unit- and organizational-level variance in unit outcomes. The use of HLM improves the precision of estimates relative to traditional approaches because it recognizes that actors at a lower level within a higher level system (e.g., units operating within branches) may not be independent of each other (Hofmann, Griffin, and Gavin, 2000). This accurately reflects our theoretical logic that the effectiveness of unit ambidexterity to its subsequent performance interacts in important ways with organizational-level attributes. More specifically, a two-level HLM model was used to test the effectiveness of unit ambidexterity (level 1) nested within branches (level 2). Thus, we could test for cross-level relationships among study variables while accounting for their different sources of variance across the different levels (Hofmann *et al*., 2000). Model testing followed sequential steps and standard HLM practices (Bryk and Raudenbush, 1992). Table 2 summarizes HLM

Table 1. Means, standard deviations, and correlations[a]

Level 1 variables	n	Mean	St. dev	(1)	(2)	(3)	(4)	(5)	(6)
(1) Unit financial performance	285	103.50	19.35	–					
(2) Unit ambidexterity	285	24.14	7.76	0.31	–				
(3) Unit size[b]	285	1.39	0.26	−0.06	0.06	–			
(4) Unit age	285	2.86	2.66	0.08	0.05	−0.06	–		
(5) Unit prior financial performance	285	104.07	22.87	0.22	0.02	0.05	−0.01	–	
(6) Environmental dynamism	285	4.32	1.21	0.21	0.35	−0.07	−0.09	0.06	(0.85)

Level 2 variables		Mean	St. dev	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) Structural differentiation	88	5.35	1.37	–						
(2) Centralization	88	3.26	1.17	0.01	(0.78)					
(3) Resource munificence	88	11.63	3.15	0.12	−0.20	–				
(4) Resource interdependency	88	3.54	1.08	−0.01	0.19	−0.01	(0.82)			
(5) Branch size[b]	88	2.08	0.20	0.31	−0.11	−0.19	−0.16	–		
(6) Branch age[c]	88	1.98	0.08	0.11	0.17	0.18	0.16	−0.00	–	
(7) Branch location	88	0.55	0.50	0.02	−0.11	−0.13	−0.08	0.37	−0.11	–

[a] n = 285 for unit-level data and n = 88 for branch-level data. Correlations above |0.11| are significant for the unit-level data and at $p < 0.05$; above |0.20| are significant at $p < 0.05$ for the branch-level data. Numbers in parentheses are Cronbach's alpha.
[b] log number of full-time employees.
[c] log number of years from its founding.

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Table 2. Results of HLM analysis on unit financial performance[a]

Variable	Unit financial performance[b]				
	Coefficient	s.e.	t-value	R^2	Total R^2
Null model					
Intercept	103.25**	1.31	78.96		
Unit-level (level 1) predictors					
Intercept	103.65**	1.26	81.96	0.35	0.31
Unit size	−3.03	1.76	1.72		
Unit age	0.48	0.39	1.25		
Unit prior financial performance	0.17**	0.05	3.64		
Environmental dynamism	2.28*	0.95	2.38		
Unit ambidexterity	0.62**	0.19	3.24		
Organizational-level (level 2) predictors					
Branch size	1.52	6.30	0.24	0.17	0.33
Branch age	19.58*	9.50	2.06		
Branch location	−1.52	2.67	0.57		
Structural differentiation	1.29	1.07	1.20		
Centralization	0.46	0.79	0.58		
Resource munificence	0.59	0.38	1.54		
Resource interdependency	2.05*	0.88	2.33		
Individual cross-level interaction effects					
Unit ambidexterity × Structural differentiation	0.27	0.18	1.49	0.21	0.34
Unit ambidexterity × Centralization	−0.25*	0.12	2.05	0.27	0.34
Unit ambidexterity × Resource munificence	0.15**	0.05	2.87	0.31	0.35
Unit ambidexterity × Resource interdependency	−0.28*	0.14	2.00	0.25	0.34
All cross-level interaction effects					
Unit ambidexterity × Structural differentiation	0.26	0.17	1.56	0.34	0.37
Unit ambidexterity × Centralization	−0.28*	0.11	2.52		
Unit ambidexterity × Resource munificence	0.12**	0.04	2.82		
Unit ambidexterity × Resource interdependency	−0.39**	0.14	2.63		

[a] *$p < 0.05$, **$p < 0.01$.
[b] R^2 indicates the proportion of variance explained at each level, that is, level 1 within-unit variance, level 2 between-unit variance and cross-level interactions. Total R^2 is the total variance explained in unit financial performance ($R^2_{\text{within unit}} \times (1\text{-ICC1}) + R^2_{\text{between unit}} \times \text{ICC1}$).

results. First, we tested a null model in which no predictors were entered. Next, we introduced unit-level variables (level 1) and the organizational-level variables (level 2) into the multilevel model. In the final step, to test our hypotheses that organizational-level structural and resource attributes would moderate the relationship between unit ambidexterity and unit financial performance, we entered the appropriate cross-level interaction effects into the final model. We grand-mean-centered all unit-level variables (level 1) to facilitate interpretation. The null model allowed us to test the significance of the between-unit variance in unit financial performance by examining the level 2 residual variance of the intercept (τ_{00}) and intraclass correlations (ICC)1. ICC1 represents the proportion of variance in the outcome variable that resided between units. The analyses revealed that 12.2 percent ($\tau_{00} = 45.70$, $p < 0.01$, ICC1 $= 0.122$) of the variance resided between units. Additionally, a precondition for testing cross-level interactions is that the slope of the relationship between ambidexterity and financial performance varies across units. Results revealed significant variance in the level 1 slope (U_1 variance $= 1.16$, $\chi^2(87) = 148.13$, $p < 0.001$).

Unit- and organizational-level effects

The top section of Table 2 shows that among the unit-level control variables, prior financial performance ($\gamma = 0.17$, $p < 0.01$) and environmental dynamism were significantly related to unit financial performance. Corresponding to prior literatures asserting a positive relationship between ambidexterity and performance (i.e., Gibson and

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Birkinshaw, 2004; He and Wong, 2004), we found a significant main effect between unit ambidexterity and its subsequent financial performance ($\gamma = 0.62,\ p < 0.01$). Regarding organizational-level control variables, our results show that branch age was significantly related to unit financial performance ($\gamma = 19.58,\ p < 0.05$). Moreover, resource interdependency also appeared to directly impact unit financial performance ($\gamma = 2.05,\ p < 0.05$). Although not hypothesized, this direct cross-level effect may reveal that organizational-level resource interdependency increases the causal ambiguity underlying an organizational unit's outcomes, and hence, its sustainability of performance over time.

Cross-level interaction effects

We estimated slopes-as-outcomes models in HLM to assess the moderating effect of organizational-level attributes on the relationship between unit ambidexterity and financial performance. The results are presented in the bottom section of Table 2, which explained 37 percent of the total variance in financial performance. The final model containing the cross-level interaction effects explained an additional four percent of the variance in unit financial performance ($\Delta R^2 = 0.04$) than the model with only linear effects of unit-level (level 1) and organizational-level (level 2) predictors. Hypothesis 1 states that organizational-level structural differentiation negatively moderates the relationship between unit ambidexterity and financial performance. When structural differentiation is high, unit ambidexterity was expected to be less strongly related to unit performance than when structural differentiation is low. As shown in Table 2, the cross-level interaction between branch structural differentiation and unit ambidexterity was nonsignificant ($\gamma = 0.26,\ p > 0.10$). Thus Hypothesis 1 was not supported. Hypothesis 2 predicts that organizational-level centralization positively moderates the relationship between unit ambidexterity and unit financial performance. The results confirm this hypothesis and indicate that the cross-level interaction effect was negative and significant ($\gamma = -0.28,\ p < 0.05$). As shown in Figure 1, the relationship between unit ambidexterity and unit financial performance is much stronger when centralization was low (i.e., one s.d. below the mean), supporting Hypothesis 2. Hypothesis 3 predicts that organizational-level resource munificence would moderate the relationship between unit ambidexterity and unit financial performance. When branches are characterized by higher levels of resource munificence, our results indicate that the effectiveness of unit ambidexterity to realize higher levels of financial performance increases substantially ($\gamma = 0.12,\ p < 0.01$). As shown in Figure 2, ambidextrous units are able to increase their performance considerably in resource munificent contexts compared to resource scarce contexts. Hypothesis 3 is supported. Finally, Hypothesis 4 predicting that organizational-level resource interdependency dampens the relationship between unit ambidexterity and unit financial performance was also supported ($\gamma = -0.39,\ p < 0.01$). Figure 3 depicts the interaction.

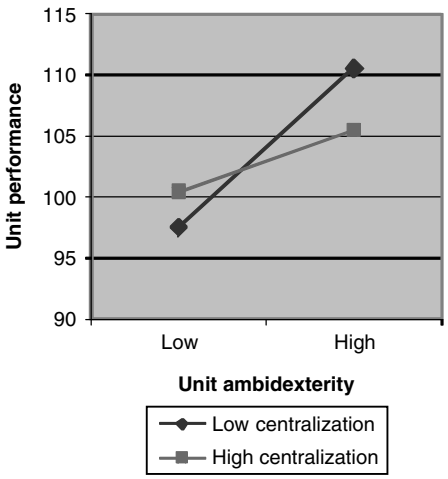

Figure 1. The cross-level moderating effect of centralization

Supplementary analysis

We conducted a series of *post hoc* analyses to further verify the research findings. First, following Gibson and Birkinshaw (2004) we performed a K-means cluster analysis resulting in four groups ('explorers,' 'exploiters,' 'moderately ambidextrous,' and 'highly ambidextrous') that provided the best fit with the data. An analysis of variance (ANOVA) F-test ($F = 6.23$, $p < 0.001$) indicated that we needed to reject the null hypothesis that all four groups have equal performance levels. Group 4, the 'highly ambidextrous' units, were the best performing (mean performance = 109.47), followed by group 3 'moderately ambidextrous' units (mean performance = 102.76),

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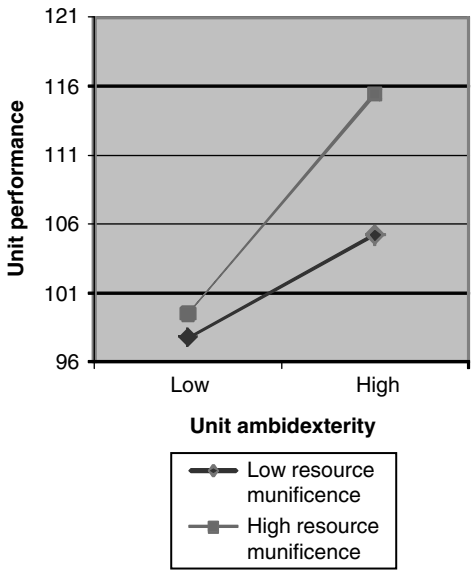

Figure 2. The cross-level moderating effect of resource munificence

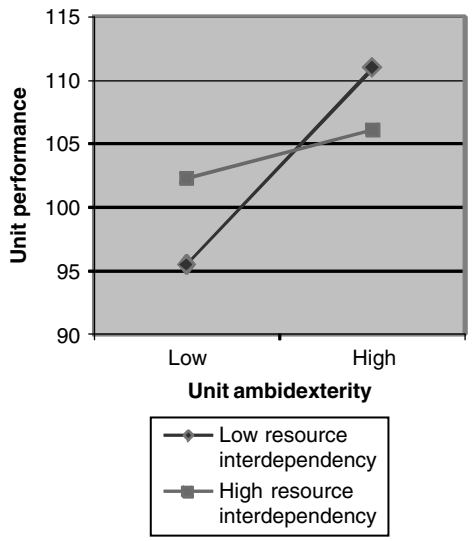

Figure 3. The cross-level moderating effect of resource interdependency

group 1 'exploratory' units (mean performance = 99.23), and group 2 'exploitative' units (mean performance = 95.33). We also repeated tests of the baseline relationship between unit ambidexterity and performance using progressively more stringent cut-off criteria for defining unit ambidexterity (*cf.* He and Wong, 2004). A unit was considered ambidextrous when it scored in the upper half or upper quarter for both exploratory and exploitative innovation, and we found similar results for the relationship between unit ambidexterity and its subsequent performance using this criteria (upper half: $\gamma = 8.13$, $p < 0.01$; upper quarter: $\gamma = 9.81$, $p < 0.05$). Hence, confirming the earlier HLM results, the *post hoc* analysis revealed that ambidextrous units have a higher level of performance relative to units adopting other orientations.

Second, we conducted additional HLM analyses with the additive of exploratory and exploitative innovation as an alternative measure of ambidexterity (Jansen *et al.*, 2009; Lubatkin *et al.*, 2006). We repeated the tests of the hypotheses using this alternative measurement and found similar results. The findings regarding the cross-level moderating role of organizational-level structural and resource attributes replicated our earlier findings with the multiplicative interaction as measurement for ambidexterity—Hypothesis 1 (structural differentiation) was not supported; Hypothesis 2 (centralization of decision making) was supported, Hypothesis 3 (resource munificence) was supported, and Hypothesis 4 (resource interdependency) was supported. Overall, our *post hoc* analysis indicates that the previously reported findings are robust.

Finally, it can be argued that organizational-level attributes may not only affect the extent to which ambidextrous units are able to obtain performance benefits but also the likelihood or magnitude that units engage in ambidextrous behaviors. To assess such potential self-selection bias in our findings, we ran separate HLM models using unit ambidexterity as the dependent variable with both unit-level and organizational-level predictors included. The results show that neither structural nor resource attributes of the organization significantly predicted unit ambidexterity. To provide additional descriptive statistics on how unit ambidextrous behaviors are spread across low, medium, and high levels of differentiation, centralization, resource munificence, and resource interdependency within branches, we also compared the mean of unit ambidexterity in each group (low, medium, and high). ANOVA F-tests revealed no significant differences at the p-level of 0.05 for the average level of unit ambidexterity across each cluster of branches. Taken together, these supplementary analyses help to alleviate a potential concern over the biasing influence of self-selection on the reported findings.

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DISCUSSION AND CONCLUSION

We built and tested a cross-level model suggesting that structural and resource attributes of the multiunit context significantly condition the relationship between unit ambidexterity and performance. Supporting our argument, we find that unit ambidexterity is more likely to contribute to unit performance in less centralized, more resource munificent, or less resource interdependent organizations. Contrary to our expectation, structural differentiation does not appear to condition this relationship. Our cross-level theory and testing enrich research as well as practice by providing insights into the effectiveness of ambidextrous units operating under different organizational-level conditions.

Implications for theory, research, and practice

Although prior studies have examined the ambidexterity premise at lower hierarchical levels within organizations (Gibson and Birkinshaw, 2004), our multisource and lagged design allowed us to more clearly demonstrate that ambidextrous units increase their subsequent performance, even when controlling for unit-level traits, organizational-level traits, and previous unit performance. Answering calls to study the role of context to understand performance implications of ambidexterity (Gibson and Birkinshaw, 2004; Raisch *et al*., 2009), our study additionally demonstrates that the underlying features of the organizational setting serve as an important boundary condition for this impact. Taking a multilevel approach that explicitly considers the role of organizational contingencies helps more fully capture the inherent complexity associated with sustaining unit performance. Despite some initial evidence of the importance of these interactions across multiple hierarchical levels (i.e., Andriopoulos and Lewis, 2009), our study demonstrates that a full understanding of the effectiveness of unit ambidexterity can only be gained through a careful consideration of key organizational-level contingencies. Overall, our model highlights that structural and resource attributes of the organizational context condition the unit ambidexterity-performance relationship by shaping units' ability to continuously implement and leverage ambidexterity for greater performance gains.

With that, our study has important implications for understanding the nested nature of dynamic capabilities and the ability to create new value-creating strategies (Eisenhardt and Martin, 2000). Our study shows that the locus of ambidexterity may lie within a complex orchestration of skills and capabilities at units (Gibson and Birkinshaw, 2004), yet its contribution to obtaining above normal performance is contingent upon the organizational-level context. One speculative deduction from our supplementary analyses, which show that organizational-level structural and resource attributes do not directly impact the emergence of ambidexterity at units, is that unit ambidexterity is a path-dependent process (Jansen *et al*., 2009; O'Reilly and Tushman, 2007) shaped by units' own context and capabilities (Gibson and Birkinshaw, 2004). Coupled with our main findings, this result leads us to suggest that the complex interactions between firm-level contextual attributes and unit-level capabilities have the potential to result into valuable, rare, inimitable, and non-substitutable combinations that can form the basis of a unit-level, and ultimately, firm-level competitive advantage (Barney, 1991).

We are intrigued that structural differentiation of the organizational context did not condition the relationship between unit ambidexterity and performance. Although previous studies suggest that structural differentiation may decrease the variety of functional experiences within units (Garud and Nayyar, 1994), the subdivision of tasks across units apparently does not detract from an ambidextrous unit's ability to increase its performance. A possible explanation for this null finding could be that successful ambidextrous units are neither fully differentiated nor fully integrated. Rather, organizations may use rhythmic, time-paced transition processes to allow employees within ambidextrous units to engage in parallel and simultaneous adaptations to localized demands while exploiting complementarities over time (Brown and Eisenhardt, 1997; Lavie and Rosenkopf, 2006). In other words, to preserve diversity as well as to permit the transfer of best performing ideas throughout the organization, units may be temporarily differentiated and subsequently reintegrated (Siggelkow and Levinthal, 2003) using a dynamic hybrid between them, and future research is warranted to examine this conjecture.

Our study shows that decentralization of decision making within organizations enables

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ambidextrous units to increase their performance. Decentralized organizational structures facilitate ambidextrous units to act in a timely fashion and encourage them to improve their performance by targeting specific valuable product-market domains. This finding is consistent with previous insights suggesting that decision-making discretion or 'latitude of action' increases the performance of units pursuing complex orientations and outcomes such as ambidexterity (Birkinshaw and Lingblad, 2005; Gupta, 1987). Our cross-level findings, however, go beyond previous insights into the role of autonomy as a crucial structural feature, not only at the unit level through providing support and stretch for individuals *within* ambidextrous units (i.e., Gibson and Birkinshaw, 2004), but also at the organizational level through delegating authority and providing discretion to managers at ambidextrous units in carrying out tasks. In this sense, our study suggests that individuals within ambidextrous units can work autonomously and make their own judgment in addressing conflicting demands of exploitation and exploration, but that the ultimate effectiveness in improving their unit's performance is constrained by centralized decision-making processes.

Regarding the cross-level moderating role of organizational-level resources, we consider the implications of resource munificence and interdependency as adding to the basic stipulations of the resource-based view of the firm. Although resource munificent organizations may provide ambidextrous units more flexibility to reconcile conflicting demands in a timelier and effective manner, resource interdependency decreases the effectiveness of ambidextrous units. As widely acknowledged, the ability of organizational units to achieve ambidexterity and to improve their performance is constrained by the availability of resources (March, 1991). Whereas prior literatures focused on the importance of slack resources to the pursuit of either exploratory or exploitative activities (Mishina, Pollock, and Porac, 2004; Nohria and Gulati, 1996; Voss *et al*., 2008), our study reveals that ambidextrous units may deploy excess financial resources located in the wider organization to increase the likelihood of profiting from emerging opportunities and to generate above normal returns. Hence, ambidextrous units in resource munificent organizations are able to increase their performance by reconciling conflicting demands in a timelier manner and responding to a wider variety of environmental opportunities across customer markets or industries (Cao *et al*., 2009; Sirmon *et al*., 2007).

Resource interdependency at the organizational level requires mutual interaction among units to decide upon the particular course of transforming inputs into outputs. It necessitates ambidextrous units to coordinate work by anticipating the actions and needs of other units and adjusting their actions accordingly (Rico *et al*., 2008). Such coordination leads to a greater need for exchanging knowledge, skills, or other resources and has been identified as an important moderator impacting the effectiveness of unit behavior (Jehn, Northcraft, and Neale, 1999; Langfred, 2000). Interestingly, our findings imply that the interdependency of resources at the organizational level may act as a double-edged sword: it negatively moderates the impact of a unit's ambidexterity on its performance; however, it also increases a unit's performance directly. Firm-level contingencies that arise from interdependencies at the organizational level can make unit behavior difficult to imitate because it involves routines and capabilities that are specific, socially complex, and path dependent (Defillipi and Reed, 1990). The double-edged nature of interdependency suggests that it is not easy for organizations to establish sources of competitive advantage for their units without avoiding potential difficulties of leveraging portfolios of exploratory and exploitative activities at ambidextrous units. Thus, while the traditional resource-based view focuses on the capacity and the quality of the resources as drivers of competitive advantage (Barney, 1991; Penrose, 1959), our findings suggests that how resources are distributed within the firm and retrieved across hierarchical as well as lateral boundaries also matter, especially so in multiunit firms.

Limitations and future research directions

We designed our study in a way to avoid various threats to validity, but it is not without limitations. First, although the collection of performance data through internal corporate records and the temporary separation of the independent and dependent measures provide valuable methodological contributions, the issues of key informant bias cannot be totally ruled out. However, a strong interrater agreement and interrater reliability reduced our concern that this bias artificially inflated or

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disguised our findings. Nevertheless, future research may consider a longitudinal panel design to better assess how a unit's pursuit of ambidexterity affects its subsequent performance over time. Second, our findings may need to be tempered because we utilized a sample of units at branches of a large financial services firm. While this helped control for corporate-, industry-, and country-specific differences that might have otherwise confounded the results, without comparative data from other firms and industries, we cannot rule out this limiting factor to generalizing our results. In less regulated and more dynamic industry settings, for instance, effects of unit ambidexterity on performance may be more pronounced—however, the financial services sector has also been witnessing an increasing extent of turbulence due to increased competition. Thus, while it may be useful for future researchers to gather data from other types of units and multiunit firms, we believe the findings would be, at most, a matter of degree and not significantly different in direction.

Several other substantive research directions follow from our study and findings. First, additional studies further unpacking organizational-level attributes that may impact the unit ambidexterity-performance relationship are warranted. For instance, rather than examining formal organizational-level characteristics, it may be useful to incorporate informal attributes as well. Second, although our study replicates previous findings that the achievement of ambidexterity leads to higher levels of performance (Gibson and Birkinshaw, 2004), it would be useful to consider the link, if any, from the emergence of ambidexterity at units to organizational-level performance. The achievement and maintenance of ambidexterity at various units is difficult and complex and, therefore, brings about substantial costs of implementing complex systems and processes within the wider organization. Although studies have assumed that the benefits of achieving ambidexterity outweigh the associated costs (Gibson and Birkinshaw, 2004; He and Wong, 2004), estimating implications for organizational-level performance represents a novel future approach to measuring the additional costs associated with achieving ambidexterity at lower levels within the organization. Furthermore, future studies may examine unit-level contingencies. For example, as ambidextrous units may target specific customer markets with unique demands, environmental aspects such as dynamism, complexity, and munificence might impact their effectiveness. Finally, scholars have argued that units that are strategically and operationally distinct are likely to spin off from the organization (Seward and Walsh, 1996; Woo, Willard, and Daellenbach, 1992). Our study suggests that units that benefit the most from ambidextrous behaviors include those with a high degree of discretion, autonomy, and resource flexibility. Thus, it would be interesting for future studies to investigate the effectiveness of spinning off ambidextrous units and, uncover implications for the structure and strategy of the parent organization.

In conclusion, while our study builds on the general ambidexterity premise, we believe that our cross-level model represents a much needed fulcrum from which additional insights can be leveraged to examine this premise at the unit level. It contributes to research and managerial understanding of how organizations may facilitate ambidextrous units to improve their performance, while providing novel insights into the multilevel nature of organizational attributes impacting the effectiveness of unit ambidexterity. In the end, we hope that we have begun to pave the way for a more complete understanding of the relationship between unit ambidexterity and subsequent unit performance.

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