

**Justin J.P. Jansen/Frans A.J. Van den Bosch/Henk W. Volberda\***

## **EXPLORATORY INNOVATION, EXPLOITATIVE INNOVATION, AND AMBIDEXTERITY: THE IMPACT OF ENVIRONMENTAL AND ORGANIZATIONAL ANTECEDENTS\*\***

---

### **ABSTRACT**

Organizational ambidexterity (i.e., the ability to pursue exploratory and exploitative innovation simultaneously) is crucial to firm survival. In this study we explore how multiunit firms might develop ambidextrous organizational units in response to environmental demands. We examine how environmental and organizational antecedents affect a unit's level of organizational ambidexterity. Our study reveals that multiunit firms develop ambidextrous organizational units to compete in dynamically competitive environments. Moreover, we show that organizational units with decentralized and densely connected social relations are able to act ambidextrously and pursue exploratory and exploitative innovations simultaneously. Our study provides new insights how multiunit firms can cope with contradictorily pressures for exploratory and exploitative innovations.

JEL-Classifications: M13, O31, O32.

Keywords: Ambidexterity; Exploration/Exploitation; Organizational and Environmental Antecedents.

---

### **1 INTRODUCTION**

As competition intensifies and the pace of change accelerates, firms are increasingly confronted with a tension between exploiting existing competencies and exploring new ones (Floyd/Lane (2000); Levinthal/March (1993); March (1991)). Firms seek to adapt to environmental changes, explore new ideas or processes, and develop new products and services for emerging markets. At the same time, they need stability to leverage current competences and exploit existing products and services (Benner/Tushman (2003)). Hence, previous studies

\* Dr. Justin J.P. Jansen, RSM Erasmus University, Strategy Department, P.O. Box 1738, 3000 DR Rotterdam, The Netherlands, Tel: +31 10 4082210, e-mail: jjansen@rsm.nl; Prof. Dr. Frans A.J. Van den Bosch, RSM Erasmus University, Strategy Department, P.O. Box 1738, 3000 DR Rotterdam, The Netherlands, Tel: +31 10 4082005, e-mail: fbosch@rsm.nl; Prof. Dr. Henk W. Volberda, Strategy Department, RSM Erasmus University, P.O. Box 1738, 3000 DR Rotterdam, The Netherlands, Tel: +31 10 4082210, e-mail: hvolberda@rsm.nl.

\*\* The Erasmus Research Institute of Management (ERIM) has supported this research. We would like to thank Dania Dialdin, Arie Lewin, and Raymond van Wijk for helpful comments on earlier drafts of this paper.

argue that successful firms are *ambidextrous* (Gibson/Birkinshaw (2004); He/Wong (2004); Tushman/O'Reilly (1996)), that is, they generate rents through both revolutionary and evolutionary change (Tushman/O'Reilly (1996)), creating and sustaining advantages (Grant (1996a)), change and preservation (Volberda (1996)), or exploratory and exploitative innovations (Benner/Tushman (2003); Levinthal/March (1993); March (1991)).

Although various studies argue that multiunit firms must simultaneously strive for exploratory and exploitative innovations, there is little empirical research on how multiunit firms manage both types of innovations in organizational units. The lack of research on antecedents is surprising, especially since various studies note the difficulty that ambidextrous organizations have in reconciling contradictory organizational structures in organizational units (e.g., Adler/Borys (1996); Sheremata (2000)). On the one hand, local environmental aspects such as dynamism and competitiveness can have contradictory pressures for exploratory innovations and exploitative innovations (Levinthal/March (1993); Lewin/Long/Carroll (1999)). Dynamically competitive environments may even require units to become ambidextrous and pursue both types of innovations simultaneously (Benner/Tushman (2003)). On the other hand, combinations of contradictory organizational characteristics such as decentralization, formalization, and connectedness may be needed to develop exploratory and exploitative innovations simultaneously (Gibson/Birkinshaw (2004); Jansen/Van den Bosch/Volberda (2005)). Such ambidextrous units combine mechanistic as well as organic features (Adler/Borys (1996)) or establish centrifugal as well as centripetal forces (Sheremata (2000)). Surprisingly, there is almost no empirical research that examines how combinations of organizational antecedents affect a unit's ambidexterity.

Our objective in this study is to address these issues and to examine antecedents of a unit's ambidexterity (i.e., units characterized by high levels of exploratory and exploitative innovations). We hypothesize that the extent to which units pursue both types of innovations simultaneously is shaped by local environmental conditions and organizational characteristics.

By empirically examining these relationships, our study contributes to current research in several ways. First, empirical research has only begun to explore the ambidexterity hypothesis by including alignment and adaptability (Gibson/Birkinshaw (2004)) and exploration and exploitation innovation strategies (He/Wong (2004)). This study adds to these studies by including complementary measures for a firm's ambidexterity – pursuing exploratory and exploitative innovations concurrently – and thereby providing additional insights into pursuing contradictory forces simultaneously. Second, our research examines how combinations of environmental aspects lead to units that pursue exploratory and exploitative innovations simultaneously. Third, we examine how organizational units are able to become ambidextrous and develop contradictory organizational characteristics (Adler/Borys (1996); Sheremata (2000)). Empirical support for our hypotheses could advance the theoretical perspective (Gibson/Birkinshaw (2004)) that organizational units are indeed able to act ambidextrously and simultaneously pursue exploratory and exploitative innovations when responding to their external environments.

In the next section, we present the theoretical review that underpins our hypotheses. We examine environmental and organizational antecedents and explain their relation to a unit's ambidexterity. In Section 3 we describe our research method and in Section 4 present our empirical findings. In Section 5 we conclude with a discussion of the results, implications, and issues for further research.

## 2 LITERATURE REVIEW AND HYPOTHESES

### 2.1 ENVIRONMENTAL ANTECEDENTS OF A UNIT'S AMBIDEXTERITY

Environmental aspects have been the focal point of research in various studies. In the context of multinational corporations, Ghoshal/Nohria (1989) examined both environmental conditions to specify local environments of subsidiaries. Regarding exploration and exploitation, Levinthal/March (1993) and Lewin et al. (1999) suggested that environmental dynamism and competitiveness may have differential effects on a unit's exploratory and exploitative innovations.

Dess/Beard (1984) define *environmental dynamism* as the rate of change and the degree of instability of the environment. Rapid change, short product life cycles, and processes of creative destruction are typical characteristics of dynamic environments. Dynamic environments make current products and services obsolete and require new competences to be developed. *Environmental competitiveness* refers to the degree of competition reflected in the number of competitors and the number of areas in which there is competition (Miller (1987)). In competitive environments, outcomes of successful exploration tend to rapidly become diffused over the population of competitors (Levinthal/March (1993)). Therefore, in local environments that are characterized by high levels of dynamism and competitiveness, units generate rents through creating and sustaining advantages (Grant (1996)), simultaneous responsiveness and efficiency (Hanssen-Bauer/Snow (1996)) or change and preservation (Volberda (1996)). Units focus not only on enhancing the scope and flexibility of knowledge integration, but also on improving efficiency of knowledge integration within units (Grant (1996); Van den Bosch et al. (1999)). Exploratory innovations help units to encounter rapid obsolescence of products and services (Ahuja/Lampert (2002)). However, without rapid exploitation of the results from exploration, competitors are able to imitate a unit's exploration efforts and introduce an improved version more efficiently and at lower cost. In this way, units waste time and resources to exploratory innovation without enhancing efficiency and generating income through exploitative innovation. Accordingly, units need to synchronize and balance concurrent exploration of new opportunities and exploitation of existing capabilities (Volberda/Lewin (2003)).

We hypothesize that organizational units that operate in dynamically competitive environments simultaneously pursue both types of innovations. They become ambidextrous and concurrently develop both exploratory and exploitative innovations to respond to contradictory demands from environmental dynamism and competitiveness.

Hypothesis 1: *The higher the local environmental dynamism and competitiveness, the higher a unit's level of ambidexterity (i.e., the level of exploratory and exploitative innovations).*

## 2.2 ORGANIZATIONAL ANTECEDENTS OF A UNIT'S AMBIDEXTERITY

To accomplish diverse strategic objectives in terms of exploratory and exploitative innovations, organizational units use different coordination mechanisms (Tushman/O'Reilly (1996); Van de Ven et al. (1976)). To address this fundamental issue for managers in organizational units, we examine the influence of various coordination mechanisms on a unit's ambidexterity. As have previous studies, we distinguish between three generic types of coordination mechanisms: (1) decentralization, i.e., the extent to which authority is delegated to lower levels of an organizational hierarchy; (2) formalization, i.e., the degree to which rules, procedures, instructions, and communications are formalized or written down (Khandwalla (1977)); and (3) connectedness, i.e., the density of social relations that serves as a governance mechanism and facilitates the exchange of knowledge (Jaworski/Kohli (1993); Nahapiet/Ghoshal (1998)).

Combining the required organizational characteristics for pursuing both exploratory and exploitative innovations is a challenging task that has received increasing attention. Recent papers argue that units may become ambidextrous and pursue exploration and exploitation simultaneously (Gibson/Birkinshaw (2004)). These units combine organic and mechanistic features (Adler/Borys (1996)), centrifugal and centripetal forces (Sheremata (2000)), or develop a collective organizational context (Gibson/Birkinshaw (2004)). For example, decentralization allows for the interplay between a variety of perspectives and leads to a rich internal network of diverse knowledge resources (Hage/Aiken (1967, 510)). Decentralization facilitates ad hoc problem solving that increases the range of possible responses to problems and supports exploratory learning (McGrath (2001)). Decentralization of decision-making supports a unit's exploratory innovations, but without formal and densely connected structures these new opportunities may not be exploited successfully.

Formalization is generally established to respond to environmental phenomena in a known way (Daft/Lengel (1986)). Formalization is aimed at reducing variance through incremental improvements in processes and outputs (Benner/Tushman (2003)). Through formalization, units codify best practices so as to make them more efficient to exploit, easier to apply, and accelerate its diffusion (Lin/Germain (2003); Zander/Kogut (1995)). Thus, formalization enhances exploitative innovations through improvement of current products, services, and processes. It motivates individuals to share explicit as well as tacit knowledge, and it reduces the costs associated with knowledge sharing (Dyer/Nobeoka (2000)).

Densely connected networks permit individuals to develop deep knowledge structures and to refine existing businesses, products, and processes (Rowley et al. (2000)). In this sense, exploratory and exploitative innovations "are supported by their enabling-organic features while their efficiency and control requirements are supported by the collaborative, shared control afforded by their enabling-bureaucratic features" (Adler/Borys (1996, 79)). Therefore, organizational units that pursue exploratory and exploitative innovations simultaneously must develop combinations of organizational characteristics that act complementarily and reinforce each other (Sheremata (2000)). Such an organizational context supports individuals to engage in both exploration-oriented actions and exploitation-oriented actions (Gibson/Birkinshaw (2004)). Accordingly, we propose that ambidextrous

units are characterized by an interaction of decentralization, formalization, and connectedness. Ambidextrous units combine these contradictorily coordination mechanisms and increase both exploratory and exploitative innovations simultaneously.

Hypothesis 2: *The more a unit is characterized by an interaction of decentralization, formalization, and connectedness, the higher its level of ambidexterity (i.e., the level of exploratory and exploitative innovations).*

### 3 METHOD

#### 3.1 SETTING AND DATA COLLECTION

We conducted our empirical research at a large European multiunit financial services firm. The firm has total assets of more than US \$350 billion and ranks among the top 30 on the Fortune Global 500 in terms of total revenue in the banking industry. It is a broad-based financial service provider with branches that are geographically distinct entities that have their own clientele. The products and services of these branches cover asset management, insurance, leasing, equity participation, corporate banking, and investment banking. We developed and administered a survey to unit managers of 769 organizational units within 220 branches. A total of 363 questionnaires were completed and returned, corresponding with a response rate of 47.2 percent. The average size of the organizational units was 32.79 (s.d. = 21.09) full-time employees.

#### 3.2 MEASUREMENT AND VALIDATION OF CONSTRUCTS

This study mainly uses existing scales from literature. However, appropriate scales for exploratory and exploitative innovations were not available. We took the following steps to develop new measures for these constructs. First of all, we reviewed relevant literature and generated a pool of items to tap the domain of each construct. From the pool of items, we selected unique items for inclusion in the initial scales. Next, to enhance the construct validity of the survey measures, we conducted a pretest involving in-depth pilot interviews with 15 managers with various tenures at different branches. We asked these managers to complete the questionnaire and indicate any ambiguity regarding the phrasing of the items. During follow-up interviews, we invited managers to provide suggestions for improvement of the questionnaire. After this pretest, the phrasing of items was further enhanced by the authors and peers and resulted in a final version of the questionnaire.

*Firm-level ambidexterity.* Following previous research (Gibson/Birkinshaw (2004); He/Wong (2004)), we use a two-step approach to develop a measure for unit-level ambidexterity. First, unit managers provide information concerning the level of their unit's exploratory and exploitative innovations. A six-item scale measures exploratory innovation. The measure for exploratory innovation ( $\alpha = 0.85$ ) captures the extent to which units depart from existing knowledge and skills or existing customers, markets, and products (Benner/Tushman (2003)). Sample items are 'We experiment with new products and services in our local market' and 'We commercialize products and services that are completely new to our unit'.

A second six-item scale ( $\alpha = 0.76$ ) measures unit-level exploitative innovation and captures the extent to which units build on existing knowledge and skills or existing customers, markets, and products (Benner/Tushman (2003)). Sample items are 'We frequently refine the provision of existing products and services' and 'We regularly implement small adaptations to existing products and services'.

To provide evidence of convergent and discriminant validity of unit-level exploratory and exploitative innovations, we perform exploratory factor analysis with varimax rotation and examine the factor structure of the two measures. Exploratory innovation cleanly loads on one factor and exploitative innovation cleanly loads on a second factor.

To capture a unit's ambidexterity, our second step for the construction of the measurement is to compute the multiplicative interaction between unit-level exploratory and exploitative innovations. Computing the multiplicative interaction between exploratory and exploitative innovation reflects arguments that both are nonsubstitutable and interdependent (Gibson/Birkinshaw (2004)).

*Environmental and organizational antecedents.* Based on previous research, we include a five-item measure that captures environmental dynamism (Dill (1958); Volberda/Van Bruggen (1997)). The scale for environmental dynamism ( $\alpha = 0.86$ ) taps into the extent to which units encounter changes within their environment. We measure environmental competitiveness by using a four-item scale (Birkinshaw/Hood/Jonsson (1998); Jaworski/Kohli (1993)). The scale for competitiveness is unidimensional and reliable ( $\alpha = 0.85$ ).

To measure decentralization, we use the sub-construct of participation in decision-making (Hage/Aiken (1967)) ( $\alpha = 0.81$ ). As Dewar/Whetten/Boje (1980) indicate, we find this the scale to be both reliable and valid. We reversed the score for participation in decision-making to measure centralization in units.

To measure formalization, we use a four-item formalization scale ( $\alpha = 0.74$ ) from Desphandé/Zaltman (1982), and measure connectedness with a five-item scale adapted from Jaworski/Kohli (1993). These authors developed a scale for connectedness that measures the extent to which individuals in a subunit are networked to various levels of the hierarchy in other subunits. The resulting scale is reliable ( $\alpha = 0.71$ ).

We assess the construct validity of all items pertaining to our constructs through confirmatory factor analysis. Each item loads clearly on their intended factor (all factor loadings are above 0.57 with cross-loadings below 0.4) and all factors had eigenvalues greater than one. These findings support the 7-factor solution. An integrated CFA on the items of all scales (with each item constrained to load only on the factor for which it is the proposed indicator) yields an acceptable fit to the data ( $\chi^2/df = 2.2$ , incremental fit index [IFI] = 0.9, comparative fit index [CFI] = 0.89, root-mean-square error of approximation [RMSEA] = 0.056). Item loadings are as proposed and are significant ( $p < 0.001$ ).

*Control variables.* In our empirical study, we control for possible confounding effects by including various relevant variables. Larger units might devote more resources to innovation, but they may lack the flexibility to pursue exploratory

innovations. Therefore, we include the natural logarithm of the number of full-time employees within units to account for both *unit size* and *branch size*. We calculate branch size by the natural logarithm of the number of full-time employees within a branch. We include a *unit's age*, since age may influence knowledge exploration and exploitation (Autio/Sapienza/Almeida (2000)). We measure a unit's age by the number of years from the business unit's founding. To control for the effect that units may specialize in different markets with different ranges of products and services, we add a control variable for *unit client focus*. We use a dummy variable to indicate whether the unit provides products and services for private clients (coded as zero) or business clients (coded as one). Organizational units with a strong history of high performance are likely to invest in innovation. Hence, we use a *unit's past performance* measures. Because business units may have different strategic priorities, we adjust performance data to evaluate each unit. Following Tsai (2001), we use a unit's profitability-achieved rate, a unit's profitability divided by its target profitability. We also control for a *branch's past performance* and include a branch's profitability-achieved rate, a branch's return on investment divided by its target return. We use internal corporate records to collect the performance measures and the achieved rates for the units and branches in this study for the period 2000-2002.

**4 ANALYSIS AND RESULTS**

Table 1 presents descriptive statistics and correlations for the study variables.

Table 1: Means, Standard Deviations, and Correlations<sup>a</sup>

|                              | Mean   | St. dev | (1)  | (2)   | (3)   | (4)   | (5)   | (6)   | (7)   | (8)  | (9)  | (10) | (11) | (12) |
|------------------------------|--------|---------|------|-------|-------|-------|-------|-------|-------|------|------|------|------|------|
| (1) Unit ambidexterity       | 19.94  | 6.69    | --   |       |       |       |       |       |       |      |      |      |      |      |
| (2) Dynamism                 | 5.36   | 1.49    | .34  | (.86) |       |       |       |       |       |      |      |      |      |      |
| (3) Competitiveness          | 4.60   | 1.28    | .28  | .51   | (.85) |       |       |       |       |      |      |      |      |      |
| (4) Decentralization         | 3.76   | 1.20    | .23  | -.03  | .03   | (.81) |       |       |       |      |      |      |      |      |
| (5) Formalization            | 5.46   | 0.86    | .05  | -0.00 | .08   | .01   | (.74) |       |       |      |      |      |      |      |
| (6) Connectedness            | 5.50   | 0.78    | .24  | .10   | .11   | .17   | .09   | (.71) |       |      |      |      |      |      |
| (7) Unit size <sup>b</sup>   | 3.22   | 0.59    | .08  | -.05  | .08   | -.02  | .09   | -.02  | --    |      |      |      |      |      |
| (8) Branch size <sup>b</sup> | 4.82   | 0.42    | .21  | .27   | .22   | .05   | -.02  | .04   | .31   | --   |      |      |      |      |
| (9) Unit age                 | 3.03   | 2.91    | -.03 | -.09  | -.09  | .06   | .04   | .01   | -.07  | -.15 | --   |      |      |      |
| (10) Unit client focus       | 0.39   | 0.49    | -.01 | -.14  | -.30  | .02   | -.06  | .02   | -.11  | .02  | .10  | --   |      |      |
| (11) Past performance unit   | 102.28 | 28.42   | .08  | .09   | -.04  | .08   | -.11  | .07   | -.30  | .01  | -.00 | .23  | --   |      |
| (12) Past performance branch | 103.54 | 28.27   | .04  | -0.00 | -.08  | -.08  | -.01  | .06   | -0.00 | -.10 | -.01 | -.01 | .09  | --   |

<sup>a</sup> n = 363. Numbers in parentheses on the diagonal are Cronbach's alphas of the composite scales. All correlations above |0.11| are significant at p < 0.05.

<sup>b</sup> log number of full-time employees.

*Table 2: Results of Hierarchical Regression Analyses: Effects of Antecedents on a Unit's Ambidexterity<sup>a</sup>*

|                                              | Unit Ambidexterity |         |         |
|----------------------------------------------|--------------------|---------|---------|
|                                              | Model 1            | Model 2 | Model 3 |
| <i>Environmental Antecedents</i>             |                    |         |         |
| Dynamism                                     |                    | 0.26*** | 0.26*** |
| Competitiveness                              |                    | 0.13*   | 0.16**  |
| <i>Organizational Antecedents</i>            |                    |         |         |
| Decentralization                             |                    | 0.21*** | 0.20*** |
| Formalization                                |                    | 0.02    | 0.02    |
| Connectedness                                |                    | 0.15**  | 0.13**  |
| <i>Interaction Effects</i>                   |                    |         |         |
| Dynamism*Competitiveness                     |                    |         | 0.11*   |
| Decentralization*Formalization               |                    |         | -0.01   |
| Decentralization*Connectedness               |                    |         | 0.16**  |
| Formalization*Connectedness                  |                    |         | 0.01    |
| Decentralization*Formalization*Connectedness |                    |         | 0.05    |
| <i>Control variables</i>                     |                    |         |         |
| Unit size                                    | 0.05               | 0.08    | 0.09    |
| Branch size                                  | 0.20***            | 0.08    | 0.07    |
| Unit age                                     | 0.01               | 0.00    | -0.01   |
| Unit client focus                            | -0.05              | 0.05    | 0.05    |
| Unit past performance                        | 0.10               | 0.05    | 0.05    |
| Branch past performance                      | 0.06               | 0.06    | 0.08    |
| Adjusted R <sup>2</sup>                      | 0.04**             | 0.21*** | 0.24*** |
| Δ adjusted R <sup>2</sup>                    |                    | 0.17*** | 0.03**  |

<sup>a</sup> Reports standardized regression coefficients

\*  $p < 0.05$

\*\*  $p < 0.01$

\*\*\*  $p < 0.001$

Table 2 presents the results of the hierarchical regression analyses for environmental and organizational antecedents and a unit's ambidexterity. The baseline Model 1 contains control variables. Model 2 introduces environmental and organizational antecedents and Model 3 includes the interaction effects on a unit's ambidexterity.

For a unit's ambidexterity, Model 3 shows that the interaction between environmental dynamism and environmental competitiveness is positive and significant ( $\beta = 0.11, p < 0.05$ ). This result supports Hypothesis 1. The coefficient for the interaction between decentralization, formalization, and connectedness is positive but not significant ( $\beta = 0.05, ns$ ). As proposed by Hypothesis 2, the interaction between the three dimensions of coordination within units does not increase a unit's ability to pursue exploratory and exploitative innovations simultaneously. We note that, as shown in Model 3, the interaction effect between decentralization and connectedness is positive and significant ( $\beta = 0.16, p < 0.01$ ). Thus, decentralized and densely connected units are able to increase their ambidexterity and increase both levels of exploratory and exploitative innovations.



## 5 DISCUSSION AND CONCLUSION

Our objective in this study has been to explore the importance of environmental and organizational antecedents on a unit's ambidexterity (i.e., high levels of exploratory and exploitative innovations). Although research suggests that these aspects influence a unit's innovation stream, studies have only just begun to explore how units can become ambidextrous and pursue both exploratory and exploitative innovations simultaneously.

Our study contributes to our understanding of how multiunit firms cope with contradictory pressures from local environments. It provides empirical support for previous suggestions that environmental aspects have contradictory pressures for exploratory and exploitative innovation (Lewin et al. (1999)). Our findings indicate that within dynamically competitive local environments, multiunit firms develop ambidextrous units that pursue exploratory and exploitative innovations simultaneously. Although Lewin et al. (1999) argue that organizations may opt for exploitation of niche markets, exploration of new lines of business, or balancing exploration and exploitation, our study shows that units operating in dynamically competitive environments pursue both types of innovations simultaneously. Thus, multiunit firms do not respond to local dynamically competitive environments by developing units that focus on either exploratory innovations or exploitative innovation, but by developing ambidextrous units that pursue both types of innovations concurrently.

Our findings also show that the interaction between decentralization and connectedness positively influences a unit's ability to pursue exploratory and exploitative innovations simultaneously. These findings contribute to recent research proposing that units may become ambidextrous by combining contradictory elements (Adler/Borys (1996); Gibson/Birkinshaw (2004); Sheremata (2000)). Our study contributes to these recent insights and provides empirical evidence that a combination of formal and informal coordination mechanisms (i.e., decentralization and connectedness) enhances a unit's ambidexterity and its ability to pursue exploratory and exploitative innovations concurrently.

We note that our results indicate that the hypothesized interaction between decentralization, formalization, and connectedness is not significantly related to a unit's ambidexterity. A primary reason for this result could be that densely connected social relations establish strong norms and beliefs that diminish the likelihood of conflict over goals and implementation (Rindfleisch/Moorman (2001)) and encourage compliance with rules. Therefore, connectedness reduces the need for formal controls (Adler/Kwon (2002)) and decreases the usefulness of formalization. Gibson/Birkinshaw (2004), for instance, discuss the fact that systems used by ambidextrous units are quite simple and often informal, rather than formalized. Our study confirms their findings and shows that units that pursue both exploratory and exploitative innovations simultaneously rely on decentralized and densely connected structures. Additional qualitative studies may further clarify the roles of connectedness and formalization in establishing norms of behavior, and in contributing to exploratory and exploitative innovations.

We contribute to new insights on managing contradictory pressures associated with pursuing exploration and exploitation simultaneously. Because explora-

tion and exploitation require contradictory organizational mechanisms, previous research argues that multiunit firms need to separate exploration from exploitation in organizational units (Benner/Tushman (2003); Tushman/O'Reilly (1986)). In contrast to creating exploratory and exploitative units (Benner/Tushman (2003)), organizational units could become ambidextrous (Gibson/Birkinshaw (2004)) and pursue exploration and exploitation simultaneously. Our study provides empirical support for the argument that units are able to increase both levels of exploratory and exploitative innovations. In this way, our findings build on and extend recent studies that discuss the possibility of organizational units in overcoming contradictory pressures for exploration and exploitation by managing combinations of contradictory structures.

### *5.1 LIMITATIONS*

Several limitations of this study deserve further discussion. First, our data are mainly derived from self-reported assessments of unit managers. Although we took several steps both in the design and testing phases to limit concerns regarding single-informant data, the issues of key informant bias and common method bias cannot be totally ruled out. However, the confidentiality that was assured for respondents reduced our concerns that respondents artificially inflated or disguised their responses (Podsakoff/MacKenzie/Lee/Podsakoff (2003)).

In addition, although our results confirm the majority of the hypotheses, our study is to some degree exploratory. For instance, we developed new scales for exploratory and exploitative innovations. Although we conducted additional analyses to assess the validity of these measures, it would be useful to measure both types of innovations using objective measures and relate these to our measures.

Moreover, our survey research was conducted at multiple units within the branches of a large financial services firm. Our focus helped to control for corporate-, industry-, and country-specific differences that might have otherwise masked significant effects. Empirical studies in a wider variety of organizations within non-service industries are necessary to generalize the findings further.

### *5.2 FUTURE RESEARCH DIRECTIONS AND CONCLUSION*

The present study provides several issues for future research. Future research may examine performance implications of different levels of exploratory and exploitative innovations. Although our study shows that environmental aspects influence a unit's ambidexterity, we do not examine whether a 'fit' between environmental aspects and a unit's levels of exploratory and exploitative innovations leads to above-average performance. Future studies may examine whether ambidextrous units generate the highest performance in dynamically competitive environments, or that units focusing on exploratory or exploitative innovations (i.e., act in a structurally ambidextrous manner) are able to achieve the highest performance. Furthermore, our study shows that branches of the large financial services firm cope with differential effects from local environments by differentiating units in terms of exploratory and exploitative innovations. In this way, certain branches may consist of multiple integrated units that are inconsistent with each other

(Tushman/O'Reilly (1996)). Future research may examine how these branches integrate these inconsistent organizational units with different levels of exploratory and exploitative innovations. For example, branches may support horizontal coordination of these inconsistent organizational units by creating a common vision or by supportive leaders (Benner/Tushman (2003); Tushman/O'Reilly (1996)).

## REFERENCES

- Adler, Paul and Bryan Borys (1996), Two Types of Bureaucracy: Enabling and Coercive, *Administrative Science Quarterly* 41, 61-89.
- Adler, Paul and Seok-Woo Kwon (2002), Social Capital: Prospects for a New Concept, *Academy of Management Review* 27, 17-40.
- Ahuja, Gautum and Curba Lampert (2001), Entrepreneurship in the Large Corporation: A Longitudinal Study of how Established Firms create Breakthrough Inventions, *Strategic Management Journal* 22, 521- 543.
- Autio, Errko, Harry Sapienza, and James Almeida (2000), Effects of Age at Entry, Knowledge Intensity, and Imitability on International Growth, *Academy of Management Journal* 43, 909-924.
- Benner, Mary and Michael Tushman (2003), Exploitation, Exploration, and Process Management: The Productivity Dilemma Revisited, *Academy of Management Review* 28, 238-256.
- Birkinshaw, Julian, Niel Hood, and Stefan Jonsson (1998), Building Firm-specific Advantages in Multinational Corporations: The Role of Subsidiary Initiative, *Strategic Management Journal* 19, 221-241.
- Cardinal, Laura (2001), Technological Innovation in the Pharmaceutical Industry: The Use of Organizational Control in Managing Research and Development, *Organization Science* 12, 19-36.
- Daft, Richard and Robert Lengel (1986), Organizational Information Requirements, Media Richness and Structural Design, *Management Science* 32, 554-571.
- Desphande, Rohit and Gerald Zaltman (1982), Factors affecting the use of Market Research Information, A Path Analysis, *Journal of Marketing Research*, 19, 14-31.
- Dess, Gregory and Donald Beard (1984), Dimensions of Organizational Task Environments, *Administrative Science Quarterly* 29, 52-73.
- Dewar, Robert, David Whetten, and David Boje (1980), An Examination of the Reliability and Validity of the Aiken and Hage Scales of Centralization, Formalization, and Task Routiness, *Administrative Science Quarterly* 25, 120-128.
- Dill, William (1958), Environments as an Influence on Managerial Autonomy, *Administrative Science Quarterly* 2, 409-443.
- Dyer, Jeffrey and Kenichi Nobeoka (2000), Creating and managing a high-performance knowledge-sharing network: The Toyota case, *Strategic Management Journal* 21, 345-367.
- Floyd, Steve and Peter Lane (2000), Strategizing Throughout the Organization: Managing Role Conflict in Strategic Renewal, *Academy of Management Review* 25, 154-177.
- Ghoshal, Sumantra and Nithin Nohria (1989), Internal Differentiation within Multinational Corporations, *Strategic Management Journal* 10, 323-337.
- Gibson, Cristina. B. and Julian Birkinshaw (2004), The Antecedents, Consequences, and Mediating Role of Organizational Ambidexterity, *Academy of Management Journal* 47, 209-226.
- Grant, Robert (1996), Prospering in Dynamically-competitive Environments: Organizational Capability as Knowledge Integration, *Organization Science* 7, 375-387.
- Hage, Jerald and Michael Aiken (1967), Program Change and Organizational Properties: A Comparative Analysis, *American Journal of Sociology* 72, 503-519.
- Hansen, Morten.T. (1999), The Search-Transfer Problem: The Role of Weak Ties in Sharing Knowledge across Organization Subunits, *Administrative Science Quarterly* 44, 82-111.
- Hanssen-Bauer, Jon and Charles Snow (1996), Responding to Hypercompetition: The Structure and Processes of a Regional Learning Network Organization, *Organization Science* 7, 413-427.

- James, Lawrence, Robert Demaree, and Wolf Gerrit (1993),  $R_{wg}$ : An Assessment of Within-Group Interrater Agreement, *Journal of Applied Psychology* 78, 306-309.
- Jaworski, Bernard and Ajay Kohli (1993), Market Orientation: Antecedents and Consequences, *Journal of Marketing* 57, 53-70.
- Jansen, Justin, Frans Van den Bosch, and Henk Volberda (2005), Managing Potential and Realized Absorptive Capacity: How do Organizational Antecedents Matter?, *Academy of Management Journal* 48, in press.
- Khandwalla, Pradib (1977), *Design of Organizations*. New York: Harcourt Brace Jovanovich.
- Levinthal, Daniel and James March (1993), The Myopia of Learning, *Strategic Management Journal* 14 (Winter Special Issue), 95-112.
- Lewin, Arie Y., Chris Long, and Timothy Caroll (1999), The Coevolution of New Organizational Forms, *Organization Science* 10, 535-550.
- March, James (1991), Exploration and Exploitation in Organizational Learning, *Organization Science* 2, 71-87.
- Miller, Danny (1987), The Structural and Environmental Correlates of Business Strategy, *Strategic Management Journal* 8, 55-76.
- Miller, Danny and Cornelia Droge (1986), Psychological and Traditional Dimensions of Structure, *Administrative Science Quarterly* 31, 539-560.
- Nahapiet, Janine and Sumantra Ghoshal (1998), Social Capital, Intellectual Capital, and the Organizational Advantage, *Academy of Management Review* 23, 242-266.
- Nobel, Robert and Julian Birkinshaw (1998), Innovation in Multinational Corporations: Control and Communication Patterns in International R&D Operations, *Strategic Management Journal* 19, 479-496.
- Pierce, Jon and Andre Delbecq (1977), Organization Structure, Individual Attitudes and Innovation, *Academy of Management Review* 2, 27-37.
- Podsakoff, Philip, Scott MacKenzie, Johnston Lee, and Nathan Podsakoff (2003), Common Method Biases in Behavioral Research: A Critical Review of the Literature and Recommended Remedies, *Journal of Applied Psychology* 88, 879-903.
- Rowley, Timothy, David Behrens, and Dean Krackhardt (2000), Redundant Governance Structures: An Analysis of Structural and Relational Embeddedness in the Steel and Semiconductor Industries, *Strategic Management Journal* 21, 369-386.
- Sheremata, Willow (2000), Centrifugal and Centripetal Forces in Radical New Product Development under Time Pressure, *Academy of Management Review* 25, 389-408.
- Sidhu, Jatinder, Henk Volberda, and Harry Commandeur (2004), Exploring Exploration Orientation and its Determinants: Some Empirical Evidence, *Journal of Management Studies* 41, 913-932.
- Tsai, Wenpin (2001), Knowledge Transfer in Intra-organizational Networks: Effects of Network Position and Absorptive Capacity on Business Unit Innovation and Performance, *Academy of Management Journal* 44, 996-1004.
- Tsai, Wenpin (2002), Social Structure of 'Coopetition' Within a Multiunit Organization: Coordination, Competition, and Intraorganizational Knowledge Sharing, *Organization Science* 13, 179-190.
- Tushman, Michael and Charles O'Reilly (1996), Evolution and Revolution: Mastering the Dynamics of Innovation and Change, *California Management Review* 38, 8-30.
- Van de Ven, Andrew (1976), A Framework for Organizational Assessment, *Academy of Management Review* 1, 64-78.
- Van den Bosch, Frans, Henk Volberda, and Michiel De Boer (1999), Coevolution of Firm Absorptive Capacity and Knowledge Environment: Organizational Forms and Combinative Capabilities, *Organization Science* 10, 551-568.
- Volberda, Henk (1996), Toward the Flexible Form: How to Remain Vital in Hypercompetitive Environments, *Organization Science* 7, 359-374.
- Volberda, Henk and Arie Lewin (2003). Guest Editor's Introduction: Co-evolutionary Dynamics Within and Between Firms: From Evolution to Coevolution, *Journal of Management Studies* 40, 2111-2136.

- Volberda, Henk and Gerrit Van Bruggen (1997), Environmental Turbulence: A Look into its Dimensionality, *NOBO Onderzoeksdag 1997*, Enschede.
- Walker, Gordon, Bruce Kogut, and Weian Shan (1997), Social Capital, Structural Holes, and the Formation of an Industry Network, *Organization Science* 8, 109-125.
- Zaltman, Gerald, Robert Duncan, and Jon Holbek (1973), *Innovations and Organizations*, New York: Wiley.
- Zander, Udo and Bruce Kogut (1995), Knowledge and the Speed of the Transfer and Imitation of Organizational Capabilities: An Empirical Test, *Organization Science* 6, 76-92.
- Zollo, Maurizio and Sydney G. Winter (2002), Deliberate Learning and the Evolution of Dynamic Capabilities, *Organization Science* 13, 339-351.

# Order form – Order now!

Verlagsgruppe Handelsblatt GmbH  
Abo-Service Ausland  
Postfach 10 27 53  
40018 Düsseldorf  
Germany

Fon: 0049 211 887 1730  
Fax: 0049 211 887 1738  
e-mail: [abo-service@vhb.de](mailto:abo-service@vhb.de)  
Internet: [www.sbr-online.com](http://www.sbr-online.com)



simply the best research.

## Use this form to order your free sample copy and to subscribe to sbr!

### Free sample copy

Please send me a free sample copy of **sbr**  
PB-ZFSBRPH1

### Subscription

Open ended subscription\*

One-Year subscription

PB-ZFSBRO15

\* In case of open-ended subscription an invoice will be issued at the end of each subscription year to cover the next year. Cancellation within a period of at least 21 days before the new subscription year begins.

### Subscription rates\*\*

Schmalenbach Business Review (**sbr**),  
ISSN: 1439-2917, Quaterly

Institutions:  \$ 95.00  £ 60.00  € 91.00

Individuals:  \$ 48.00  £ 30.00  € 45.00

Students\*:  \$ 24.00  £ 50.00  € 21.00

\* Student rate only accepted with copy of validated ID.

\*\* Postage rates are – depending on the currency you want to be charged in – \$ 14, £ 8, € 12.

### Payment

Payment is due within 14 days on receipt of invoice. You will receive the invoice directly from Verlagsgruppe Handelsblatt GmbH in Düsseldorf.

### Address

\_\_\_\_\_  
Institute/Company

\_\_\_\_\_  
Position/Department

\_\_\_\_\_  
First and Surname

\_\_\_\_\_  
Street and Number

\_\_\_\_\_  
Zip Code City

\_\_\_\_\_  
State Country

\_\_\_\_\_  
Fon

\_\_\_\_\_  
Fax

\_\_\_\_\_  
e-mail

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date