

RESEARCH NOTES AND COMMENTARIES

KNOWLEDGE-BASED RESOURCES, ENTREPRENEURIAL ORIENTATION, AND THE PERFORMANCE OF SMALL AND MEDIUM-SIZED BUSINESSES

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While theory suggests that management has discretion in manipulating resources in order to build competitive advantage, resource-based research has focused on the characteristics of resources, paying less attention to the relationship between those resources and the way firms are organized. In explaining performance, entrepreneurship scholars have focused on a firm's entrepreneurial strategic orientation (EO), leaving its interrelationship with internal characteristics aside. We argue that EO captures an important aspect of the way a firm is organized. Our findings suggest that knowledge-based resources (applicable to discovery and exploitation of opportunities) are positively related to firm performance and that EO enhances this relationship. Copyright © 2003 John Wiley & Sons, Ltd.

INTRODUCTION

Resource-based theories of strategy (RBV) argue that firms with valuable, rare, and inimitable resources (including nonsubstitutability) have the potential of achieving superior performance (e.g., Barney, 1991, 1995). Resources are inputs into a firm's production process (Barney, 1991) and can be separated into those that are knowledge-based and those that are property-based (Miller and Shamsie, 1996). Property-based resources typically refer to tangible input resources, whereas knowledge-based resources are the ways in which

firms combine and transform these tangible input resources (Galunic and Rodan, 1998). Knowledge-based resources may be particularly important for providing sustainable competitive advantage, because they are inherently difficult to imitate, thus facilitating sustainable differentiation (McEvily and Chakravarthy, 2002), play an essential role in the firm's ability to be entrepreneurial (Galunic and Eisenhardt, 1994), and improve performance (McGrath *et al.*, 1996).

Developing the so-called VRIO framework, Barney (1991) notes that a firm's resources should not only be valuable, rare, and inimitable to facilitate superior performance, but the firm must also have an appropriate organization in place to take advantage of these resources. Eisenhardt and Martin (2000), drawing on the concept of dynamic capabilities, argue that in addition to the resources

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themselves, the organizational and strategic processes of firms are important because they facilitate the manipulation of resources into value-creating strategies. Empirical studies have mainly focused on the direct link between individual strands or configurations of resources and performance, while less attention has been devoted to how management can utilize these resources more effectively (Helfat, 2000). That is, using the VRIO terminology, there has been little consideration of the interrelationship between a firm's organization ('O') and its resources ('VRI') in explaining performance.¹ The limited evidence that exists, however, suggests that this interrelationship is important—management can respond to new opportunities and environmental changes by taking actions that affect the firm's resource base and how those resources are utilized (Cockburn, Henderson, and Stern, 2000).

Entrepreneurship scholars have attempted to explain performance by investigating a firm's entrepreneurial orientation (EO). EO refers to a firm's strategic orientation, capturing specific entrepreneurial aspects of decision-making styles, methods, and practices (Lumpkin and Dess, 1996). Given the importance of entrepreneurship to firm performance (McGrath *et al.*, 1996), EO could be an important measure of the way a firm is organized—one that enhances the performance benefit of a firm's knowledge-based resources by focusing attention on the utilization of these resources to discover and exploit opportunities.² Thereby, EO can explain, in part, the managerial processes that allow some firms to be ahead of the competition because EO facilitates firm action based upon early signals from its internal and external environments (Lumpkin and Dess, 1996).

EO scholars have empirically explored the independent effect of EO on performance (e.g., Zahra and Covin, 1995) and its contingent relationship with the external environment (e.g., Covin and Slevin, 1989) but have largely ignored Lumpkin and Dess's (1996) call for research that also investigates how characteristics internal to the firm moderate and mediate the EO–performance relationship. It appears, therefore, that EO scholars have focused on how the firm is organized ('O')

to undertake entrepreneurial endeavors, ignoring resources internal to the firm (i.e., 'VRI').

The above leads us to the following research questions. From the RBV perspective: Does a bundle of knowledge-based resources applicable to the discovery and exploitation of opportunities improve firm performance? Does a firm's EO enhance the positive performance benefits of knowledge-based resources? The same question in terms relevant to EO scholars asks: Is there a contingent relationship between EO and knowledge-based resources (an internal characteristic of the firm) in explaining firm performance?

THEORY AND HYPOTHESES

Knowledge-based resources and performance

Organizational knowledge is an important bundle of intangible resources that can be the source of a sustainable competitive advantage (Hitt, Ireland, and Hoskisson, 1999). In fact, it has been argued that knowledge has the greatest ability of all resources to serve as a source of sustainable differentiation, because of immobility (McEvily and Chakravarthy, 2002) and general applicability (Miller and Shamsie, 1996). Knowledge permits the firm to predict more accurately the nature and commercial potential of changes in the environment and the appropriateness of strategic and tactical actions (Cohen and Levinthal, 1990). Without such knowledge, an organization is less capable of discovering and exploiting new opportunities. Following Gupta and Govindarajan (2000), we focus on procedural knowledge as opposed to declarative knowledge (Lesgold, 1988). Procedural knowledge refers to knowing the procedures for how to do things and arises from experience with similar situations (Lesgold, 1988). It is difficult to formalize, articulate, and transfer between organizational contexts (Nonaka and Takeuchi, 1995), therefore meeting resource-based theory's requirements of being rare and inimitable. If it is also valuable and organized, it can provide a sustainable competitive advantage. Knowledge about markets and technology represent two strands of procedural knowledge that potentially have strong performance implications, because, we argue, they increase the ability to discover and exploit opportunities.

Market knowledge can increase a firm's ability to discover and exploit opportunities because: (1) awareness of customer problems may have

¹ Possible exceptions also include the work on complementary resources (e.g., Christmann, 2000).

² Entrepreneurship refers to the discovery and exploitation of opportunities to bring into existence future goods and services (Shane and Venkataraman, 2000).

great generality and thus constitute real market opportunities; (2) it is easier to determine the market value of new scientific discoveries, technological change etc.; (3) the locus of innovation often lies with users of new technologies who cannot easily articulate their needs for not-yet-developed solutions to problems, and therefore the organization must share some of the same tacit knowledge as its users (Cohen and Levinthal, 1990; Shane, 2000; von Hippel, 1994). In support of this, Shane (2000) found that prior knowledge of customer problems and ways to serve the market influenced the discovery of solutions to customer problems. Those who lack customer familiarity (Shane, 2000; Von Hippel, 1988) and knowledge of ways to serve the market (Shane, 2000) will find it difficult to recognize solutions to customer needs and to formulate an effective marketing strategy to introduce and sell the new product/service.

Technological knowledge can also enhance the discovery and exploitation of opportunities. Sometimes knowledge can lead to a technological breakthrough that represents an opportunity despite its market applicability not being readily apparent (cf. Abernathy and Utterback, 1978). Technological knowledge can also enhance a firm's ability to effectively exploit an opportunity by, for example, determining the product's optimal design to optimize functionality, cost, and reliability (Rosenberg, 1994) and ultimately the economic impact of exploiting the opportunity (McEvily and Chakravathy, 2002). Therefore, technological knowledge provides a firm with the ability to rapidly exploit opportunities, or to be able to respond quickly when competitors make advancements (Cohen and Levinthal, 1990). From the above we argue that market and technological knowledge, taken together, represent important knowledge-based resources applicable to a firm's ability to discover and exploit opportunities. Thus:

Hypothesis 1: A bundle of knowledge-based resources applicable to the discovery and exploitation of opportunities is positively related to firm performance.

Entrepreneurial orientation and performance

Researchers have agreed that EO is a combination of three dimensions: innovativeness, proactiveness, and risk-taking (e.g., Wiklund, 1999). Innovativeness reflects a tendency to support new ideas,

novelty, experimentation, and creative processes, thereby departing from established practices and technologies (Lumpkin and Dess, 1996). Proactiveness refers to a posture of anticipating and acting on future wants and needs in the marketplace, thereby creating a first-mover advantage *vis-à-vis* competitors (Lumpkin and Dess, 1996). With such a forward-looking perspective, proactive firms capitalize on emerging opportunities. Risk-taking is associated with a willingness to commit large amounts of resources to projects where the cost of failure may be high (Miller and Friesen, 1978). It also implies committing resources to projects where the outcomes are unknown. It largely reflects the organization's willingness to break away from the tried-and-true and venture into the unknown. The above suggests that organizations that have an EO are more prone to focus attention and effort towards opportunities.

EO likely has positive performance implications for the firm. The shortening of product and business model lifecycles makes future profit streams from existing operations uncertain and businesses need to constantly seek out new opportunities (Hamel, 2000). An EO can assist companies in such a process. Innovative companies, creating and introducing new products and technologies, can generate extraordinary economic performance and have even been described as the engines of economic growth (Brown and Eisenhardt, 1995). Proactive companies can create first-mover advantages, target premium market segments, and 'skim' the market ahead of competitors (Zahra and Covin, 1995). They can control the market by dominating distribution channels and establish brand recognition. While tried-and-true strategies may lead to high mean performance, risky strategies leading to performance variation may be more profitable in the long run (McGrath, 2001). Previous empirical results provide support for a positive relationship between EO and performance (Wiklund, 1999). Thus:

Hypothesis 2: EO is positively related to firm performance.

Knowledge-based resources, EO, and performance

As discussed above, EO refers to a firm's strategic orientation, capturing specific entrepreneurial aspects of decision-making styles, methods, and practices. As such, it reflects how a firm operates

rather than what it does (Lumpkin and Dess, 1996). Applied to the VRIO framework, EO represents how a firm is organized in order to discover and exploit opportunities. From resource-based theory, the way that a firm is organized, when combined with firm resources, can enhance the positive relationship between resources and firm performance (Barney, 1995). We argue that EO captures a firm's organization toward entrepreneurship and can enhance other firm resources.

Previously, we proposed a positive relationship between knowledge-based resources applicable to the discovery and exploitation of opportunities and firm performance. We propose that a firm well endowed with these resources will perform *even better* if it has an EO, i.e., the methods, practices, and managers with a decision-making style that promote a willingness to capitalize on its knowledge-based resources by engaging in entrepreneurial activities. Firms with considerable knowledge-based resources know where to look for opportunities, can more accurately assess the value of potential opportunities, and have the ability to extract value from these opportunities (Cohen and Levinthal, 1990), but unless the firm is willing to grasp and enthusiastically pursue these opportunities, then the knowledge-based resources are likely to be underutilized.³ Thus:

Hypothesis 3: EO moderates the relationship between a bundle of knowledge-based resources and firm performance. EO enhances the positive relationship that a bundle of knowledge-based resources has with firm performance.

RESEARCH METHOD

Sample

A firm's EO is typically operationalized from the perspective of its CEO. This is an accepted approach (cf. Covin and Slevin, 1989). However, in large firms CEOs might be separated from 'how a firm operates' by layers of middle managers. This is less likely a problem for small and medium-sized businesses. Therefore, to test the hypotheses, we use a sample of Swedish small and medium-sized businesses. Although this might limit the generalizability of our findings,

these firms represent a major part of most modern economies (Storey, 1994). The sample was stratified using the following criteria: (a) industrial sector based on ISIC codes (manufacturing, wholesale/retail, and services); (b) employment size class (10–49, 50–249, following the European Union's cut-off for small and medium-sized enterprises, respectively); and (c) corporate governance (independent firms, members of company groups with fewer than 250 employees, and members of company groups with 250 employees or more). The sampling population consisted of 2455 firms whose names and addresses were obtained from Statistics Sweden (the Bureau of Census). The target respondent was the CEO.

In 1997, data for the study's independent and control variables were collected. Three years later (2000), data for the dependent variables were collected, which reduced the problem of reverse causality encountered in many cross-sectional studies. A time lag between independent and dependent variables was also important because the performance effects of knowledge-based resources and EO might take time to materialize. To collect these data, the firms were contacted by telephone in 1997 (2034 responses) and, shortly thereafter all firms interviewed were sent a mail survey (1278 responses). In 2000, firms that responded to the 1997 telephone interview were contacted again for another telephone interview and a mail questionnaire. By then, 240 businesses had ceased to exist. Of those 1794 still in business, 1647 responded to the telephone interview and 827 also completed the mail questionnaire. In order to make relevant predictions it is important to ensure that the independent and dependent variables in fact refer to the same firm. Therefore, several questions were included to tap whether the firm could still be considered 'the same' as in 1997. Owing to mergers and acquisitions and other ownership changes, we disqualified 218 firms. Furthermore, 225 individuals who responded to the mail questionnaire in 2000 did not respond to the 1997 mail questionnaire and therefore their responses were incomplete and could not be used, leaving a sample size of 384.

Variables and measures

Dependent variable

We ascribe to the view that *performance* is multidimensional (Cameron, 1978) and that performance

³ Furthermore, the idea that the pursuit of opportunities is universally beneficial may be overly simplistic (see Miller, 1990).

comparisons with competitors reveal important information (Birley and Westhead, 1990). Therefore, respondents were asked to compare the development of their own firm over the past 3 years relative to their two most important competitors for 10 different dimensions of performance: sales growth, revenue growth, growth in the number of employees, net profit margin, product/service innovation, process innovation, adoption of new technology, product/service quality, product/service variety, and customer satisfaction ($\alpha = 0.82$). We used 5-point scales ranging from 'much lower' to 'much higher.' Our reliance on self-report data from single informants introduces the potential of common method variance. Therefore, we correlated this performance index from the mail survey with another performance measure collected during the telephone interview (see Robinson, Shaver, and Wrightsman, 1991). The items used in the telephone interview were identical to those for measuring past performance (see below for details) and the Cronbach's alpha value was 0.82. The correlation between the two indices—performance measured by the mail survey and a different measure of performance from the telephone interview—was 0.53 ($p < 0.01$), suggesting that the correlation between the two underlying theoretical constructs, corrected for measurement error, is 0.65 (Cohen and Cohen, 1983), indicating that common method bias is not a major problem.

Independent variables

Following Gupta and Govindarajan (2000), CEOs evaluated the firm's *knowledge* position on 7-point scales in order to measure procedural knowledge. The scales measure the firm's knowledge position *vis-à-vis* competitors. We had 11 items pertaining to market and technological knowledge—'Compared to other companies in your industry, does your company have a weak or strong position in terms of': staff with a positive commitment to the company's development, technical expertise, expertise regarding development of products or services, highly productive staff, expertise in marketing, special expertise regarding customer service, special expertise regarding management, innovative markets, staff educated in giving superior customer service, staff who like to contribute with ideas for new products/services, and staff capable of marketing your products/services well ($\alpha = 0.84$). *EO*: We used Covin and

Slevin's (1989) version of the instrument, consisting of nine items ($\alpha = 0.75$).

Control variables

The environment may affect a firm's performance regardless of its strategic orientation (Lumpkin and Dess, 1996) or its knowledge-based resources. We therefore control for environmental munificence and heterogeneity. The scale for measuring *munificence* was adapted from Dess and Beard (1984) and consisted of four items ($\alpha = 0.85$). The scale for measuring *heterogeneity* was taken from Miller and Friesen (1982) and consisted of three items (one of their original items was dropped due to space limitations; $\alpha = 0.85$). *Past performance* was measured by an index consisting of four items, comparing the respondent's company to its competitors. The items were net profit, sales growth, cash flow, and growth of net worth. The items had 5-point scales ranging from 'much worse than competitors' to 'much better than competitors' ($\alpha = 0.76$). We also controlled for *firm age* and *firm size* (previous year's sales). *Industry* effects were captured by dummy variables for the firm's main line of business (manufacturing, retail or service).

RESULTS

Table 1 provides means, standard deviations and correlations for all continuous variables. Skewness and kurtosis statistics of the dependent variable fall well within the boundaries for normality (Shapiro and Wilk, 1965), allowing parametric tests of significance. The hypotheses were tested using hierarchical regression analysis because an interaction effect only exists if the interaction term gives a significant contribution over and above the direct effects of the independent variables.

The results are displayed in Table 2. The base model (control variables only) explains a statistically significant share of the variance in firm performance ($R^2 = 0.09$, $p < 0.001$). The main effects model makes a significant contribution over and above the base model ($\Delta R^2 = 0.12$, $p < 0.001$). The positive and significant effects of knowledge-based resources and EO support Hypotheses 1 and 2 respectively. The interaction term makes a significant contribution over and above the main effects ($\Delta R^2 = 0.02$, $p < 0.01$). We plotted the effect of

Table 1. Means, standard deviations and correlations for quantitative variables

Variables	Mean	S.D.	1	2	3	4	5	6	7
1. Performance	3.43	0.44	1						
2. EO	-0.03	0.61	0.34**	1					
3. Knowledge	4.62	0.65	0.40**	0.39**	1				
4. Heterogeneity	13.17	3.89	0.08	0.17**	0.13**	1			
5. Munificence	-0.09	2.81	0.17**	0.30**	0.22**	0.20**	1		
6. Firm Age	32.32	28.00	-0.02	-0.12**	-0.06	0.06	-0.22**	1	
7. Firm Size	112.00	372.94	0.06	0.11**	0.11**	0.07	0.14**	0.09**	1
8. Past Perform.	3.58	0.63	0.28**	0.28**	0.30**	0.11**	0.15**	-0.04	0.13**

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$ ($n = 384$)

Table 2. Independent and contingency models of knowledge, EO, and performance

	Base model		Independent model		Contingency model	
	Coefficient	<i>t</i> -statistic	Coefficient	<i>t</i> -statistic	Coefficient	<i>t</i> -statistic
<i>Control variables</i>						
Heterogeneity	0.03	0.55				
Munificence	0.13*	2.44				
Firm Age	0.01	0.25				
Firm Size	0.04	-1.55				
Past Performance	0.22***	4.36				
Manufacturing	-0.10	-1.55				
Service	-0.11	-1.61				
<i>Main effect variables</i>						
EO			0.20***	3.72		
Knowledge			0.28***	5.45		
<i>Interaction</i>						
Knowledge \times EO					0.94**	3.33
<i>Model</i>						
R^2	0.09		0.21		0.23	
Adj. R^2	0.07***		0.19***		0.21***	
F -statistic		5.11		11.04		11.31
Change in R^2			0.12***		0.02**	
Change in F				29.10		11.08

Standardized regression coefficients are displayed in the table.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$ ($n = 384$)

the bundle of knowledge-based resources on performance for values of EO set at the mean and at one standard deviation above and below the mean, as suggested by Cohen and Cohen (1983). The plot indicated that EO enhances the positive impact that the bundle of knowledge-based resources had on firm performance, supporting Hypothesis 3.

DISCUSSION AND CONCLUSIONS

The primary contribution of this article is that EO moderates the relationship between a bundle of

knowledge based-resources (applicable to opportunity discovery and exploitation) and firm performance. That is, the willingness to be innovative, proactive, and take risks enhances the positive impact that a firm's bundle of knowledge-based resources has on performance. For strategy scholars utilizing resource-based theory, our finding that EO enhances the positive relationship between knowledge-based resources and performance is consistent with EO capturing a firm's organization and enhancing the relationship between a firm's resources and performance. Thus, our empirical results are consistent with hitherto largely untested

arguments that, over and above a firm's stock of resources, it is how management utilizes those resources that is important in explaining firm performance. Our results complement Cockburn *et al.* (2000) and suggest that EO can help explain the managerial processes that provide some firms the ability to utilize their resources to identify and respond to environmental cues earlier than competitors. Similarly, our findings provide empirical support for the VRIO framework in that a firm's resources (VRI) and organization (O) considered conjointly provide a more complete explanation of firm performance than these variables considered independently.

An implication of our finding for resource-based strategy scholars is that investigations of the relationship between firms' resources and performance should also consider its organization. We argue that the considerable body of research on a firm's strategic orientation (its EO) provides a construct and operationalization that allows for greater exploration of the way that a firm is organized for the discovery and exploitation of opportunities and, when combined with the body of empirical work on firm resources, provides considerable scope for future research.

For EO scholars, our findings suggest that there is a contingent relationship between EO and characteristics internal to the firm. This finding provides support for Lumpkin and Dess's (1996) assertion that the relationship between EO and performance is likely more complex than a simple main-effect-only, and scholars benefit from considering the moderating effects of characteristics internal to the firm. Our finding of a contingent relationship between EO and knowledge-based resources complements those studies that have found a contingent relationship between EO and the external environment (e.g., Covin and Slevin, 1989; Zahra and Covin, 1995). Thus, an important implication for scholars of EO is the need to consider the contingent role of resources internal to the firm, specifically knowledge-based resources.

Our finding of a positive main-effect-only relationship between a firm's knowledge-based resources and performance is not necessarily surprising. However, our focus on, and operationalization of, knowledge-based resources applicable to the discovery and exploitation of opportunities is a contribution to the entrepreneurship literature. Despite the importance of knowledge to

the entrepreneurial process (Shane and Venkataraman, 2000) and the acknowledgement of firm-level entrepreneurship (Brown, Davidsson, and Wiklund, 2001), few studies have operationalized a firm's knowledge applicable to the discovery and exploitation of opportunities. We used a measure of knowledge-based resources that captured aspects of the type of knowledge previously found to enhance an individual's ability to produce entrepreneurial outcomes (cf. Shane, 2000).

We used a single construct of knowledge-based resources because our research question focused on the interrelationship between a bundle of resources and an organization's orientation (we also found from a factor analysis that the items loaded on one common factor). However, given that measuring knowledge is of central importance to entrepreneurship research, there is a need for more scholarly attention to the development of valid measures of different types of knowledge-based resources applicable to entrepreneurship, such as separate measures of knowledge applicable to the discovery and to the exploitation of opportunities. We expect such work to draw heavily on entrepreneurship research at the individual level (e.g., Shane, 2000) and the organizational knowledge and learning literatures.

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