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EMPIRICAL RESEARCH ON THE RESOURCE-BASED VIEW OF THE FIRM: AN ASSESSMENT AND SUGGESTIONS FOR FUTURE RESEARCH

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The resource-based view (RBV) is one of the most widely accepted theories of strategic management. However, to date no systematic assessment of the RBV's level of empirical support has been conducted. In response, a sample of RBV-grounded empirical articles was analyzed from which it was found that the RBV has received only modest support overall and that this support varies considerably with the independent variable and theoretical approach employed. It is therefore suggested that scholars avoid the tendency to test models reflecting early incarnations of the RBV and instead test those that incorporate its more contemporary theoretical extensions.

The resource-based view of the firm (RBV) is one of the most widely accepted theoretical perspectives in the strategic management field (Powell, 2001; Priem and Butler, 2001; Rouse and Daellenbach, 2002). As such, the RBV has become a dominant theory upon which arguments in academic journals and textbooks alike have been grounded. Thus, much of what we as strategy scholars study, write about, and teach has been greatly influenced by the fundamental arguments of the RBV.

Given that all theories must survive repeated attempts at empirical falsification before they can be accepted as 'true' (Godfrey and Hill, 1995), one might assume that the RBV owes its influence to well-documented assessments of the empirical support for its central tenets. Surprisingly, such is not the case. In fact, while there have certainly been many individual tests of the RBV's fundamental hypotheses in the empirical literature, there has been only one scholarly review of the results of this research. In 2001, Barney and Arikan published an assessment of 166 empirical articles that test the RBV in one form or another. The authors conclude from this study that of these 166 studies, only four (2%) present results that are at least partially inconsistent with RBV logic. Although at face value Barney and Arikan's (2001) findings would seem to validate the RBV as a 'true' (in the words of Godfrey and Hill, 1995) theory, such a conclusion may be premature for at least two reasons.

First, unlike the present study, Barney and Arikan (2001) seek to simply identify articles that have reported some empirical results in support of the RBV. More specifically, Barney and Arikan conclude that an article is consistent with the RBV so long as none of the findings it reports are inconsistent with resource-based logic. Though this may sound obvious by definition (what is not inconsistent must be consistent), it is important to note that Barney and Arikan do not treat non-findings (such as insignificant regression coefficients) as indicating inconsistency. Instead, they only treat findings

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that are counter to (such as significant regression coefficients with a sign opposite what the RBV would predict) as indicating inconsistency. Given that many empirical articles fail to find support for *all* hypotheses tested, Barney and Arikan's study cannot be used (nor was it intended to be used) to assess the actual level of support for the RBV.

Second, though extremely comprehensive in nature, Barney and Arikan's (2001) sample is not immune from selection bias. Because they identified their sample based entirely on their knowledge of the empirical literature, it is possible that they may have inadvertently omitted articles, such as those published in journals representing academic disciplines with which they were less familiar, that may have nonetheless tested the RBV. This is not to disparage the authors' collective expertise in the field; to be sure, the articles these well-accomplished scholars selected for review are certainly relevant to an assessment of the RBV. At the same time, however, it is important to note that this type of subjective sampling may result in the selection of articles based on the researcher's unconscious predispositions, the consequence of which is a potentially biased sample that does not accurately represent the population from which it was drawn (Kerlinger and Lee, 2000: Ch. 8).

Given the nature of Barney and Arikan's (2001) framing and sampling technique, and because no other assessment of the RBV literature has yet been conducted, the actual level of empirical support for the RBV remains uncertain. Such uncertainty may be worrisome to the RBV's supporters in that without systematic evidence of its validity it is possible that the RBV's fundamental hypotheses are incomplete and/or require further theoretical development, a consequence that may subject any research relying on the theoretical arguments from the RBV to propose propositions, develop and test hypotheses, prescribe practitioner advice, and/or otherwise extend our understanding of business strategy to unwelcome scrutiny.

In response to this possibility, this paper seeks to advance our understanding of the RBV by conducting a systematic review and analysis of the empirical literature. Following closely the methodology employed by David and Han (2004) in their assessment of the empirical support for transaction cost economics (TCE), this paper seeks to assess the manner in which the RBV has been empirically tested as well as the actual level of support it has received. Based on the subsequent findings, this paper will then discuss which streams of the RBV appear most promising and outline an agenda that may facilitate the further testing of the RBV in the future.

THE RESOURCE-BASED VIEW OF THE FIRM

Edith Penrose was one of the first scholars to recognize the importance of resources to a firm's competitive position. In 1959, she argued that a firm's growth, both internally and then externally through merger, acquisition, and diversification, is due to the manner in which its resources are employed. She began by arguing that a firm consists of 'a collection of productive resources' (Penrose, 1959: 24) and continued by suggesting that these resources may only contribute to a firm's competitive position to the extent that they are exploited in such a manner that their potentially valuable services are made available to the firm.

Aside from Penrose (1959), Rubin (1973) is argued to be one of the few scholars to conceptualize firms as resource bundles prior to the formal origins of the RBV (Wernerfelt, 1984). Like Penrose, Rubin recognized that resources were not of much use by themselves. Instead of merely possessing resources, Rubin (1973: 937) argued that 'firms must process raw resources to make them useful.'

Building on the inroads made by Penrose and Rubin, Wernerfelt, in the first attempt at formalizing the RBV, argued that '[f]or the firm, resources and products are two sides of the same coin' (Wernerfelt, 1984: 171). In other words, while a firm's performance is driven directly by its products, it is indirectly (and ultimately) driven by the resources that go into their production, a point that was further clarified by Barney (1986) 2 years later.[1] Given this line of reasoning, Wernerfelt (1984) proposed that firms may earn above normal returns by identifying and acquiring resources that are critical to the development of demanded products.

Because of the rather abstract nature of Wernerfelt's (1984) seminal work, acceptance of this theoretical perspective did not immediately gain support from academic audiences. Indeed, Wernerfelt

[1] The author thanks an anonymous reviewer for helping clarify this point.

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(1995) himself acknowledges that his 1984 article was 'terse and abstract ... [e]ven I did not cite it' (Wernerfelt, 1995: 171). As such, widespread appreciation for the RBV did not begin to accumulate until several years later with the publication of two papers.

The first was Prahalad and Hamel's 1990 paper, 'The core competence of the corporation,' published in *Harvard Business Review*. In this paper, Prahalad and Hamel (1990) argued that the critical task of management was to create radical new products, which was enabled by the exploitative nature of the firm's core competences. Much like Penrose (1959) and Rubin (1973), these authors focused not only on static resources but also the firm's inimitable skills, technologies, knowledge, etc., with which they are deployed. Despite the merits of Prahalad and Hamel's (1990) paper, perhaps because it was positioned as a paper for practitioners (Wernerfelt, 1995) and contained no testable propositions, its focus on resource exploitation was largely ignored at the time by empirical scholars.

The second influential paper was Jay Barney's article, 'Firm resources and sustained competitive advantage,' published in the *Journal of Management* in 1991. This paper is widely regarded as the first formalization of the then-fragmented resource-based literature into a comprehensive (and thus empirically testable) theoretical framework. Drawing on arguments by Penrose (1959), Rumelt, (1984), Wernerfelt (1984), and others, Barney (1991) based his articulation of the RBV on two fundamental assumptions: that resources (and capabilities) are heterogeneously distributed among firms and that they are imperfectly mobile. These assumptions conjointly allow for differences in firm resource endowments to both exist and persist over time, thereby allowing for a resource-based competitive advantage. Barney (1991) argued that firms that possessed resources that were valuable and rare would attain a competitive advantage and enjoy improved performance in the short term. Barney (1991) also contended, drawing heavily on Dierickx and Cool (1989), that in order for a firm to sustain these advantages over time its resources must also be inimitable and non-substitutable. Barney's (1991) conceptual model is interpreted parsimoniously in Figure 1.

One of the primary critiques of Barney's (1991) expression of the RBV over time has been its rather static nature. Most notably, Priem and Butler argue that in '[a]lthough the RBV began as a dynamic approach ... much of the subsequent literature has been static in concept' (Priem and Butler, 2001: 33). They continue by noting that in Barney's interpretation of the RBV, 'the processes through which particular resources provide competitive advantage remain in a black box' (Barney, 2001: 33). Indeed, years later Barney admits adopting the assumption in 1991 that 'once a firm understands how to use its resources ... implementation follows, almost automatically' as if the '[a]ctions the firm should take to exploit these resources will be self-evident' (Barney, 2001: 53).

In response to this missing link between resource possession and resource exploitation, Mahoney and Pandain reminded scholars that '[a] firm may achieve rents not because it has better resources, but rather the firm's distinctive competence involves making better use of its resources' (Mahoney and Pandain, 1992: 365). They continued by suggesting that firms that make the best use of their resources are those that allocate them in such a way that their productivity and/or financial yield are maximized. Similar arguments were put forth by Peteraf and by Henderson and Cockburn, who argued that to confer a competitive advantage to a given firm its valuable resources must be properly

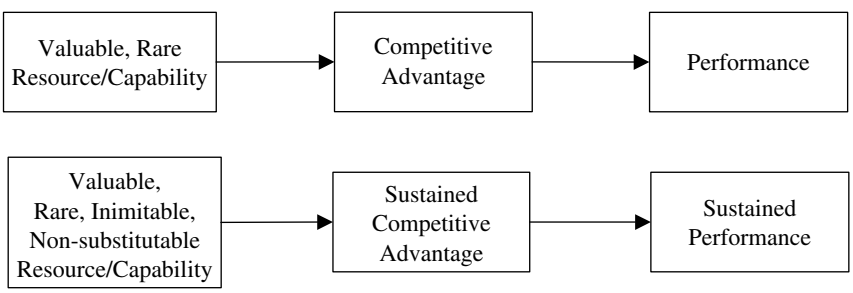

Figure 1. Barney's (1991) conceptual model

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leveraged (Peteraf, 1993) or managed (Henderson and Cockburn, 1994). Subsequently, a great deal of theoretical work began to emerge regarding the types of processes to which resources must be subjected in order to exploit their latent value, such as core capabilities (Leonard-Barton, 1992), competences (Fiol, 1991; Reed and DeFillippi, 1990), combinative capabilities (Kogut and Zander, 1992), transformation-based competencies (Lado, Boyd, and Wright, 1992), organizational capabilities (Russo and Fouts, 1997), and capabilities (Amit and Schoemaker, 1993).

This rediscovered attention to process led to the emergence of two theoretical approaches within the RBV. The first was Barney's VRIO framework. Building in part off of Mahoney and Pandain (1992), Barney argued that in addition to simply possessing valuable, rare, inimitable (which by then included non-substitutable) resources, a firm also needed to be organized in such a manner that it could exploit the full potential of those resources if it was to attain a competitive advantage (Barney, 1997: 160; Barney and Wright, 1998). He added that the implementation skills that could ensure proper resource exploitation included such organizational components as structure, control systems, and compensation policies (Barney, 1997; Barney and Mackey, 2005). In short, the organization of a firm was considered to be a firm-level orientation, strategy, or context that encouraged a general and unified approach to the utilization of its resources.

Concurrent with the publication of Barney's VRIO framework was a second and radically new theoretical approach that more specifically defined the types of processes by which firms could exploit resources. In their influential paper, Teece, Pisano, and Shuen proposed the dynamic capabilities framework 'to explain how combinations of competences and resources can be developed, deployed, and protected' (Teece, Pisano, and Shuen, 1997: 510). To do so, they defined a dynamic capability as 'the firm's ability to integrate, build and reconfigure internal and external competences to address rapidly changing environments' (Teece *et al*., 1997: 516).

This line of reasoning echoed much of Winter's early work on organizational routines (Nelson and Winter, 1982; Winter, 1995) in which he argued that while resources are no doubt important to a firm's competitive advantage, they are by themselves insufficient. To earn above normal rents, Winter (1995) suggested that firms needed to also possess and be able to replicate 'routines,' or webs of relationships by which resources can be coordinated and/or deployed.

Building on the work of both sets of scholars, Eisenhardt and Martin later averred that dynamic capabilities 'are the organizational and strategic routines by which firms achieve new resource configurations as markets emerge, collide, split, evolve, and die' (Eisenhardt and Martin, 2000: 1107). These authors contended that resources are of no real value to the firm in isolation. Instead, they reaffirmed that their latent value could only be made available to the firm via its idiosyncratic dynamic capabilities.

As is obvious from the above discussion, the RBV has come a long way over the past decade and a half. Originally formalized in 1991 as a rather static list of the ingredients for competitive advantage, it has evolved into a dynamic recipe explaining the process by which these ingredients must be utilized to attain this end. While it is now understood that it is no doubt necessary for a firm to possess valuable, rare, inimitable, non-substitutable resources and capabilities, it is also understood that such a condition is nonetheless insufficient. In addition to possessing these ingredients, firms seeking a competitive advantage must also demonstrate the ability to alter them in such a way that their full potential is realized.

METHODOLOGY

In order to assess the RBV's support in the empirical literature, a sample of articles testing hypotheses grounded in the RBV was identified using an adapted version of the approach developed by David and Han (2004). This approach was chosen as it represents a more objective approach than that used by Barney and Arikan (2001), thereby mitigating some of the bias noted above that may result when samples are selected via purely subjective criteria. Specifically, in their assessment of the TCE empirical literature, David and Han 'identify a representative sample of studies that empirically tested the core tenets of Williamson's TCE' (David and Han, 2004: 43), via the following set of criteria:[2]

[2] Refer to David and Han (2004) for a fuller description of the methodology by which articles were selected.

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1. Search for published journal articles only.
2. Search the ABI/Inform and EconLit databases.
3. Ensure substantive relevance by requiring that selected articles contain at least one primary keyword in their title or abstract.
4. Eliminate substantively irrelevant articles by requiring that selected articles also contain at least one of 12 additional keywords in their title or abstract.
5. Ensure empirical content by requiring that selected articles also contain at least one of the following seven 'methodological' keywords in their title or abstract: data, empirical, test, statistical, finding*, result* or evidence.[3]
6. Eliminate substantively irrelevant articles by only selecting articles that appear in journals in which multiple articles appear.[4]
7. Ensure substantive and empirical relevance by reading all remaining abstracts for substantive context (i.e., discussion of the core tenets of the theory) and empirical content (i.e., mention of statistical analysis).[5]
8. Further ensure substantive and empirical relevance by reading all remaining articles in their entirety for substantive context (i.e., article tests the core tenets of the theory) and adequate empirical content (i.e., article presents results of statistical tests).[6]
9. Consolidate results from ABI/Inform and EconLit and eliminate duplicate articles.

In compiling the present sample, the above criteria were adhered to with the following five adaptations. First, this study restricts the search by including articles published in 'scholarly' journals only (criterion 1). Referring to work by Light and Pillemer (1984: 35), David and Han (2004) argue that by restricting their search to journal articles (as opposed to book chapters or unpublished works, for example), they enhanced quality control. Given this logic, it was felt that by further restricting the present search to journal articles published in 'scholarly' journals, the quality of the articles returned would be further increased due to the rigorous peer review process to which articles published in such journals are subjected prior to publication.

Second, the substantive keywords used to identify articles via criterion 3 were necessarily adapted to make the search relevant to the RBV as opposed to the TCE literature. Whereas David and Han (2004) initially select articles that contain either transaction* or cost* in their abstract or title, the present study initially selects articles that contain either 'resource-based' or RBV in their abstract or title.

Third, David and Han (2004) identify 12 additional keywords that articles must have in their title or abstract in order to be considered relevant to TCE (criterion 4). Based on the discussion of the RBV presented above, the following 17 additional keywords were used to further identify articles that were substantively relevant to the RBV in step 4: competitive advantage, perform*, valu*, capabilit*, intangib*, heterogen*, rare*, imitab*, inimitab*, immob*, non-substitutab*, substitutab*, tangib*, Barney, competenc*, organized, or organizing. It is important to note that these keywords were chosen in order to identify articles seeking to explain performance (as well as its antecedent, competitive advantage). Although the RBV has been used to explain a variety of alternative dependent variables, such as diversification,

[3] As David and Han (2004) explain, the asterisk at the end of a search word allows for different suffixes. For example, the search word 'finding*' will return articles with 'finding' and 'findings'.

[4] David and Han (2004: 43) opt to eliminate 'single journal' articles (1) given that they are more likely to be removed from the core tenets of the theory being assessed and (2) even if such articles did include appropriate tests of the theory, there is no reason to believe that the level of support provided by them would vary from that of the articles that were retained. A review of the articles eliminated as a result of this selection criterion seems to uphold David and Han's (2004) arguments. Specifically, this step of the selection process resulted in the elimination of articles from various medical journals, such as *American Medical News* and *Hospital and Health Services Administration*, which would have been eliminated anyway in step 7, as well as articles from more mainstream journals, such as *Human Resource Management*, that sought to explain the types of alternative dependent variables that are argued below to be of less interest to strategic management scholars than competitive advantage and performance.

[5] It should be noted that while case studies and qualitative analyses are rigorous forms of empirical inquiry, they were excluded because, as David and Han (2004) point out, there is no systematic way to code the results of such studies in a way that is comparable to the results of statistical tests.

[6] The result of a statistical test was coded as 'significant' only if the respective p-value did not exceed 0.05. This cut-off was chosen not only in an attempt to adhere to the procedure used by David and Han (2004), but also because it represents the largest p-value used across the entire sample. Indeed, many authors did not report significance at the $p < 0.10$ level, though all articles reported significance at the $p < 0.05$ level. Thus, to report significance at the $p < 0.10$ level for some articles and not for others would be inconsistent. As a result, a uniform p-value of 0.05 (the largest p-value reported in all studies) was used in order to ensure that the significance of all test results in the sample were evaluated via the same metric.

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growth, entry, etc., because contemporary strategic management theory is primarily concerned with explaining performance differentials among firms (Barney and Hesterly, 1999; Teece *et al*., 1997; Winter, 1995), only those tests that seek to explain this and related dependent variables (sustained performance, competitive advantage, and sustained competitive advantage) are assessed in the present study.[7]

Fourth, the methodological keyword, test, was replaced with test* in step 5. This was done in order to account for variations in this root word, such as tests, tested, or testing.[8]

Fifth, in further determining substantive relevance via criteria (7) and (8), articles were retained only if they presented the results of multivariable statistical tests[9] and if they tested relationships between resource-related constructs[10] and either competitive advantage or performance. Articles that did not meet these conditions were deleted from the dataset. For example, although Sharma and Vredenburg's (1998) and Linnehan and de Carolis' (2005) articles met each of the first seven criteria, each was eliminated upon reading the full article as the former employed simple regression analysis (the regression models included only one independent variable and no control variables) and the latter did not seek to explain performance or competitive advantage (the authors operationalized the dependent variable as the decision to participate in school-to-work activities).

RESULTS

Table 1 shows the number of articles returned from this methodology at each step from steps 3 through 8, with a final sample size of 55.[11] It should be noted that this sample is similar in size to David and Han's (2004) sample of 63 and is larger than the samples used in several other reviews of strategic management theory (Stankovic and Luthans, 1997; Ketchen *et al*., 1997; Dalton *et al*., 1998; Campbell-Hunt, 2000). By further comparing the present sample to that used by Barney and Arikan (2001), it is important to note that while their sample is much larger, it is not necessarily more representative of the full population of empirical articles testing the RBV. In fact, of the 15 articles in the present sample that were published during 2000 and earlier (the time frame corresponding to Barney and Arikan's, 2001, study),

[7] It should be noted that because many scholars use the terms 'competitive advantage' and 'performance' interchangeably (see, for example, Porter, 1985: 11), studies operationalizing the dependent variable as either construct will be assessed in the present study.

[8] The author thanks an anonymous reviewer for suggesting this adaptation.

[9] Articles that only presented the results of bivariate statistical tests (such as simple regression, paired *t*-tests, or correlations) were eliminated as the results of such tests are generally considered to lack rigor.

[10] Note that 'resource-related constructs' includes individual resources, capabilities, core competencies, organizing contexts, and resource attributes.

[11] Per David and Han (2004), all articles in the dataset are listed in the reference list and are preceded by an asterisk.

Table 1. Summary of selection criteria[a]

Filter type	Description	ABI result	EconLit result	Total
Substantive	All articles with 'resource-based' or 'RBV' in title or abstract	994	158	1152
Substantive	At least one of 17 additional keywords must also appear in title or abstract	642	83	716
Methodological	At least one of seven keywords indicating empirical data or analysis must also appear in title or abstract	330	43	369
Substantive	Article must appear in a journal that has returned more than one item from the filters above	221	13	231
Substantive and methodological	Remaining abstracts read for both substantive relevance and statistical analysis	114	8	122
Substantive and methodological	Remaining full articles read for both substantive relevance and statistical analysis	54	3	57
Duplicates	Deletion of duplicate articles found in both databases			55

[a] The selection filters used herein are based on and/or adapted from those developed and used by David and Han (2004) in their review of the TCE literature.

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Table 2. Independent and dependent variables

Variable	# Articles[a]	% Total articles	# Tests	% Total tests	# Supported	% Supported
Independent variable						
Specific resource	33	60%	232	42%	85	37%
Specific capability	19	35%	161	29%	114	71%
Specific core competence	3	5%	24	4%	16	67%
Capability × Organization	3	5%	72	13%	40	56%
Inimitability	5	9%	20	4%	14	70%
Competitive advantage	5	9%	13	2%	6	46%
Resource × Capability	3	5%	13	2%	5	38%
Resource × Organizing context	4	7%	6	1%	4	67%
Value	1	2%	3	1%	3	100%
Rareness	1	2%	3	1%	3	100%
Organizing context	1	2%	2	<1%	2	100%
Total	55	—	549	—	292	53%
Dependent variable						
Performance	51	93%	363	66%	173	48%
Competitive advantage	9	16%	154	28%	91	59%
Sustained performance	1	2%	24	4%	24	100%
Sustained competitive advantage	1	2%	8	1%	4	50%
Total	55	—	549	—	292	53%

[a] Because several articles use a variety of independent and dependent variables, the totals reported for this column do not equal their sums.

only eight (53%) were included in Barney and Arikan's (2001) sample. Of these eight articles, seven (88%) were published in mainstream management journals. However, of the seven articles not included in Barney and Arikan's (2001) sample, only four (57%) were published in mainstream management journals. Though by no means conclusive, these statistics suggest that Barney and Arikan's (2001) sample may under-represent relevant research from non-mainstream management journals, thereby underscoring the value of David and Han's (2004) more objective, methodologically driven sampling procedure.

Table 2 shows that the 55 articles in the sample contain 549 individual tests of the RBV as discussed above, 292 (53%) of which were supported.[12] What is most notable from this table is that the level of empirical support varies considerably with the independent variable. For example, in the 232 tests where the independent variable is operationalized as a specific resource, empirical support is found for only 85 (37%), whereas in the three tests where the independent variable is operationalized as value, empirical support is found in all (100%).

Given that little more than half of the total tests conducted were supported by empirical evidence, each test was categorized first according to its independent-dependent variable pair and then by its theoretical approach in an effort to determine if the level of support for the RBV differed based on the approach utilized.[13] Scholars employing a *resource heterogeneity approach* argue on theoretical grounds that a given resource, capability, or core competence is valuable, rare, inimitable, and/or non-substitutable, quantify the amount of it possessed by a firm, and correlate this amount to some measure of competitive advantage or performance. For example, drawing on Barney (1991), Deephouse (2000) argues that a firm's media favorableness (a resource) is a valuable, rare, inimitable, non-substitutable resource and then tests the relationship between the amount (or favorableness) of this resource and the firm's return on assets.

[12] It must be noted that these 55 articles contain more than 549 total tests. Because some of the tests contained in these articles do not fall within the scope of the RBV, only those tests in which the relationships discussed above are included in the present analysis.

[13] The following notation, reflecting which of the following theoretical approaches was/were tested in each article in the dataset, is included in the reference list: R = resource heterogeneity approach; O = organizing approach; C = conceptual-level approach; D = dynamic capability approach.

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Scholars employing an *organizing approach* seek to identify those firm-level conditions that enable the effective exploitation of the resources and capabilities under examination. For example, citing Barney's VRIO framework, Wiklund and Shepherd argue that in addition to possessing valuable, rare, inimitable resources, firms must also 'have an appropriate organization in place to take advantage of those resources' (Wiklund and Shepherd, 2003: 1307). They then test the effect of the interaction between a firm's knowledge (a resource) and its entrepreneurial orientation (an organizing context) on its financial and non-financial performance.

Instead of identifying the actual resources and capabilities that confer an advantage to a firm, scholars employing a *conceptual-level approach* seek to test whether the attributes prescribed by Barney (1991) as essential for a resource to effectively contribute to a firm's advantage are indeed significant predictors to this end. For example, King and Zeithaml begin by acknowledging Barney's (1991) work that suggests that 'firm performance is a function of how well managers build their organizations around resources that are valuable, rare, inimitable, and lack substitutes' (King and Zeithaml, 2001: 75) and then proceed to test the effect of the causal ambiguity (one dimension of inimitability) of a firm's competencies on its performance.

Lastly, scholars employing a *dynamic capabilities approach* test the degree to which specific resource-level processes improve a firm's competitive position by operationalizing the independent variable as the interaction of a specific resource and a specific dynamic capability and testing its relationship with some measure of competitive advantage or performance. For example, drawing on Teece *et al*. (1997) and Eisenhardt and Martin (2000), Zhu and Kraemer (2002) argue that firms must possess and exploit valuable, rare, inimitable, non-substitutable resources to outperform competitors. Zhu and Kraemer (2002) then test the effect of the interaction of a firm's information technology infrastructure (a resource) and its e-commerce capability (a dynamic capability) on four measures of performance.

Although the majority of articles employ only one theoretical approach, 10 (18%) articles were found to employ multiple approaches. For example, Hitt *et al*. (2001) test the independent effects of a firm's human resources and its leveraging capability on its performance (resource heterogeneity approach), the effect of the interaction between the firm's human capital and diversification strategy on its performance (organizing approach), and the effect of the interaction of the firm's human resources and leveraging capability on its performance (dynamic capabilities approach).

As can be seen from the results of this classification shown in Table 3, the resource heterogeneity approach is by far the most widely utilized. In fact, this approach was used in 50 (91%) of the articles and 430 (78%) of the tests, 221 (51%) of which were supported. While the overall level of support for this approach seems quite in line with the level of support for the sample as a whole, upon closer inspection it seems that the level of support varies considerably with the relationship tested. Of the 232 tests in which the relationship between a resource and either competitive advantage or performance is analyzed, empirical support is found for only 85 (37%). However, of the 161 tests in which the relationship between a capability and either competitive advantage or performance is analyzed, empirical support is found for 114 (71%) and of the 24 tests in which the relationship between a core competence and performance is analyzed, empirical support is found for 16 (67%). For example, Powell and Dent-Micallef (1997) find support for four (50%) of eight tests of the relationship between two firm resources (human resources and business resources) and various measures of performance. In contrast, Zahra and Nielsen (2002) find support for 16 (80%) of 20 tests of the relationship between four firm capabilities (internal and external human capabilities and internal and external technological capabilities) and four measures of competitive advantage, and de Carolis (2003) finds support for eight (67%) of 12 tests of the relationship between three core competencies (technological, marketing, and regulatory) and four measures of financial performance.

In addition to testing the above relationships, five (9%) articles also tested the relationship between competitive advantage and performance. Of the 13 such tests conducted, six (46%) were supported. For example, Schroeder, Bates, and Junttila (2002) tested the relationship between learning capabilities and competitive advantage as well as the relationship between competitive advantage and performance. The authors find support for all (100%) three tests conducted.

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Table 3. Independent–dependent variable pairs by approach

Independent variable	Dependent variable	# Articles[a]	% Total articles	# Tests	% Total tests	# Supported	% Supported
Resource heterogeneity approach							
Specific resource	Performance	29	53%	189	34%	69	37%
Specific resource	Competitive advantage	5	9%	43	8%	16	37%
Specific capability	Performance	13	24%	88	16%	56	64%
Specific capability	Competitive advantage	6	11%	49	9%	34	69%
Specific capability	Sustained performance	1	2%	24	4%	24	100%
Specific core competence	Performance	3	5%	24	4%	16	67%
Competitive advantage	Performance	5	9%	13	2%	6	46%
Subtotal		50	91%	430	78%	221	51%
Organizing approach							
Capability × Organizing context	Competitive advantage	1	2%	60	11%	39	65%
Capability × Organizing context	Performance	2	4%	12	2%	1	8%
Resource × Organizing context	Performance	4	7%	6	1%	4	67%
Organizing context	Performance	1	2%	2	<1%	2	100%
Subtotal		8	15%	80	15%	46	58%
Conceptual-level approach							
Value	Performance	1	2%	3	1%	3	100%
Rareness	Performance	1	2%	3	1%	3	100%
Inimitability	Performance	3	5%	10	2%	8	80%
Inimitability	Sustained competitive advantage	1	2%	8	2%	4	50%
Inimitability	Competitive advantage	1	2%	2	<1%	2	100%
Subtotal		5	9%	26	5%	20	77%
Dynamic capabilities approach							
Resource × Capability	Performance	3	5%	13	3%	5	38%
Total		55	—	549	—	292	53%

[a] Because several articles employ multiple approaches and multiple independent and dependent variables, the subtotals and total reported for this column do not equal their sums.

The results in Table 3 suggest that the organizing approach is the next most commonly used. This approach is employed in eight (15%) of the articles and 80 (15%) of the tests, 46 (58%) of which were supported. For example, Richard (2000) conducts and finds support for all (100%) three tests relating the effect of the interaction between a firm's racial diversity and its growth strategy on its performance.

As seen in Table 3, the conceptual-level approach is the third most commonly used approach. It is employed in five (9%) of the articles and 26 (5%) of the tests, 20 (77%) of which were supported. For example, McEvily and Chakravarthy (2002) find support for four (50%) of eight tests of the relationship between the inimitability of a firm's technical knowledge and its sustained competitive advantage.

The dynamic capabilities approach is the least employed approach. As the results in Table 3 show, only three (5%) of the articles employed this approach, resulting in 13 (3%) of the 549 tests, five (38%) of which were supported. For example, Zhu (2004) analyzes the impact of the interaction of a firm's information technology infrastructure and its e-commerce capability on a variety of measures of firm performance, finding support for two (50%) of four tests.

In order to better understand the relationships in Table 3, the manner in which the independent variable was operationalized was assessed for each of the four theoretical approaches. Table 4 shows how scholars testing the resource heterogeneity approach have operationalized resources, capabilities, and core competencies. As is clear from these results, there is a great deal of variation in

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Table 4. Operationalization of resource heterogeneity approach[a]

Independent variable	# Articles[b]	% Total articles[c]	# Tests	% Total tests[d]	# Supported	% Supported
Resource						
Human capital	7	13%	33	6%	11	33%
Knowledge	6	11%	46	8%	9	20%
Experience	5	9%	15	3%	5	33%
Social capital	5	9%	11	2%	8	73%
Innovation	4	7%	10	2%	7	70%
Reputation	4	7%	7	1%	5	71%
Service climate	3	5%	15	3%	6	40%
Economies of scale	3	5%	7	1%	4	57%
Financial	3	5%	7	1%	3	43%
Culture	2	4%	13	2%	1	8%
Physical	2	4%	6	1%	1	17%
Entrepreneurial	2	4%	5	1%	1	20%
Customer-related	2	4%	4	1%	4	100%
Organizational	2	4%	4	1%	2	50%
Racial diversity	2	4%	4	1%	0	0%
Top management team	1	2%	11	2%	5	45%
Property-based	1	2%	8	1%	6	75%
Business	1	2%	4	1%	0	0%
Environmental performance	1	2%	3	1%	2	67%
Intangible	1	2%	3	1%	0	0%
Managerial	1	2%	3	1%	1	33%
Price	1	2%	3	1%	0	0%
Tangible	1	2%	3	1%	0	0%
Work–family policy	1	2%	3	1%	3	100%
Technological	1	2%	2	<1%	1	50%
Tenure	1	2%	2	<1%	0	0%
Subtotal	32	58%	232	42%	85	37%
Capability						
Human resource	4	7%	19	3%	12	63%
Innovative	4	7%	8	1%	5	63%
Information technology	3	5%	58	11%	47	81%
Technological	2	4%	13	2%	11	85%
Entrepreneurial	2	4%	7	1%	5	71%
Learning	2	4%	5	1%	5	100%
Cost reduction	2	4%	4	1%	0	0%
Product development	2	4%	4	1%	2	50%
Quality	2	4%	4	1%	0	0%
Client retention	1	2%	3	1%	2	67%
Customer relationship building	1	2%	3	1%	3	100%
Information acquisition	1	2%	3	1%	1	33%
Knowledge	1	2%	3	1%	3	100%
Market orientation	1	2%	3	1%	3	100%
Negotiation	1	2%	3	1%	1	33%
Specialization	1	2%	3	1%	3	100%
Supplier relationship building	1	2%	3	1%	1	33%
Title-taking	1	2%	3	1%	3	100%
Communication	1	2%	2	<1%	1	50%
Distribution	1	2%	2	<1%	2	100%
Research and development	1	2%	2	<1%	1	50%
Ancillary	1	2%	1	<1%	1	100%
Change	1	2%	1	<1%	1	100%
Leveraging	1	2%	1	<1%	1	100%
Merger and acquisition	1	2%	1	<1%	0	0%
Medical	1	2%	1	<1%	0	0%
Pricing	1	2%	1	<1%	0	0%
Subtotal	19	35%	161	29%	114	71%

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Table 4. (*Continued*)

Independent variable	# Articles[b]	% Total articles[c]	# Tests	% Total tests[d]	# Supported	% Supported
Core competence						
Marketing	2	4%	5	1%	3	60%
Technological	2	4%	5	1%	4	80%
Architectural	1	2%	8	1%	4	50%
Regulatory	1	2%	4	1%	3	75%
Component	1	2%	1	<1%	1	100%
Integrative	1	2%	1	<1%	1	100%
Subtotal	3	5%	24	4%	16	67%
Total	50	91%	417	76%	215	52%

[a] Results shown only for tests in which resources and capabilities serve as the independent variable.
[b] Because several articles use a variety of resources and capabilities, the total reported for this column does not equal its sum.
[c] The total number of articles is 55.
[d] The total number of tests is 549.

Table 5. Operationalization of organizing approach

Resource/ capability	Organizing context	# Articles[a]	% Total articles[b]	# Tests	% Total tests[c]	# Supported	% Supported
Technological capability	Integration	1	2%	36	7%	20	56%
Human resource capability	Integration	1	2%	24	4%	19	79%
Quality capability	Quality strategy	2	4%	4	1%	1	25%
Innovation capability	Innovation strategy	2	4%	4	1%	0	0%
Cost reduction capability	Cost reduction strategy	2	4%	4	1%	0	0%
Racial diversity	Growth strategy	1	2%	3	1%	3	100%
Racial diversity	Innovation strategy	1	2%	1	<1%	0	0%
Knowledge	Entrepreneurial orientation	1	2%	1	<1%	1	100%
Human capital	Diversification	1	2%	1	<1%	0	0%
Knowledge	Governance flexibility	1	2%	2	<1%	2	100%
Total		8	15%	80	15%	46	58%

[a] Because some articles use more than one of the listed measures, the subtotals and total reported for this column do not equal their sums.
[b] The total number of articles is 55.
[c] The total number of tests is 549.

the resources, capabilities, and core competencies scholars have examined under the RBV. In fact, only two of the 26 resources (human capital and knowledge), one of the 32 capabilities (information technology), and none of the core competencies are examined in more than 5 percent of the total articles and 5 percent of the total tests. Yet, what is most striking from these results is that an overwhelming minority of resources examined (only 10 of 26, or 38%) have received empirical support at least 50 percent of the time, whereas an overwhelming majority of capabilities examined (26 of 32, or 81%) and all six of the core competencies examined have received empirical support at least 50 percent of the time.

Results for the manner in which scholars testing the organizing approach have operationalized the independent variable are shown in Table 5. As can be seen, three of the variable pairs have been used in multiple articles. For example, both Chandler and Hanks (1994) and Wang and Ang (2004) test for the interaction between a firm's capabilities (quality, innovation, and cost reduction) and its organizing context (quality, innovation, and cost reduction strategies respectively). Each of the remaining variable pairs is used in one study only. Though the support for the various interactions varies considerably, in general, support for tests using this approach is largely consistent with the overall level of support for the entire sample.

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Table 6. Operationalization of conceptual-level approach

Construct and Measure	# Articles[a]	% Total articles[b]	# Tests	% Total tests[c]	# Supported	% Supported
Value						
Perceived degree to which resource had potential to increase customers, occupancy, reputation	1	2%	3	1%	3	100%
Rareness						
Average level of resource possessed by competing firms in same county	1	2%	3	1%	3	100%
Inimitability						
Patent citations	1	2%	4	1%	4	100%
Perceived level of difficulty of imitation by competitors	1	2%	3	1%	3	100%
Number and importance of a resource's components necessary to affect performance	1	2%	2	<1%	2	100%
Inability to explain and predict relationships between product components, design choices, and performance	1	2%	2	<1%	2	100%
Degree to which what a firm knows about its products' components is specific to a customer, application, or component varieties	1	2%	2	<1%	0	0%
Degree to which a firm acquires knowledge about its products' components by tailoring its products for specific customers or applications	1	2%	2	<1%	0	0%
Level of managerial disagreement regarding which resources lead to competitive advantage	1	2%	1	<1%	0	0%
Degree to which managers are able to articulate a resource	1	2%	1	<1%	1	100%
Location of knowledge regarding resources	1	2%	1	<1%	0	0%
Prior experience	1	2%	1	<1%	1	100%
Turnover	1	2%	1	<1%	1	100%
Subtotal	5	9%	20	4%	14	70%
Total	5	9%	26	5%	20	77%

[a] Because some articles use more than one of the listed measures, the subtotals and total reported for this column do not equal their sums.
[b] The total number of articles is 55.
[c] The total number of tests is 549.

Table 6 illustrates how scholars employing the conceptual-level approach have operationalized the independent variable. As can be seen, value, rareness, and inimitability have been empirically examined; however, non-substitutability has not. Of those attributes examined, only inimitability has been measured in more than one article and along more than one dimension, though no dimension has been examined in more than one article. For example, whereas de Carolis (2003) measures the inimitability of firm's knowledge in terms of the number of patent citations, Hatch and Dyer (2004) measure the inimitability of a firm's human resources in terms of the level of experience and turnover. Lastly, it is important to note that support for tests using this approach is consistently high (ranging from a low of 70% to a high of 100%) across the three attributes examined.

The manner in which scholars testing the dynamic capabilities approach have operationalized the independent variable is presented in Table 7. Only two resource-capability interactions have been tested and have received markedly different levels of empirical support. Whereas Zhu (2004) and Zhu and Kraemer (2002) found support for the interaction of information technology

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Table 7. Operationalization of dynamic capabilities approach

Resource	Capability	# Articles[a]	% Total articles[b]	# Tests	% Total tests[c]	# Supported	% Supported
Information technology infrastructure	E-commerce capability	2	4%	12	3%	5	42%
Human capital	Leveraging capability	1	2%	1	<1%	0	0%
Total		3	5%	13	2%	5	38%

[a] Because some articles use more than one of the listed measures, the subtotals and total reported for this column do not equal their sums.
[b] The total number of articles is 55.
[c] The total number of tests is 549.

infrastructure and e-commerce capability on firm performance in five (42%) of 12 tests, Hitt *et al.* (2001) found no support for their one test of the interaction of human capital and leveraging capabilities on firm performance.

In an effort to identify where tests employing the various theoretical approaches have been published, the 55 articles were categorized by journal and approach. As the results in Table 8 show, the articles included in this study appear in 24 separate journals from a variety of fields, such as management, international business, entrepreneurship, marketing, innovation/technology, and information technology. Also evident from these results is the substantial variation in articles published in each journal. A total of 22 (92%) of the 24 journals listed have published three (5%) or fewer articles and, of the 348 empirical tests conducted in these articles, only 166 (48%) have been empirically supported. Of the two journals in which more than three (5%) articles have been published, there is a marked difference in terms of the level of support for the RBV. Specifically, *Academy of Management Journal* has published six (11%) articles in which 38 (7%) empirical tests have been conducted, 17 (45%) of which have been supported. *Strategic Management Journal*, on the other hand, has published 14 (25%) articles in which 163 (30%) empirical tests have been conducted, 109 (67%) of which have been empirically supported.

As Table 8 also shows, the majority of journals in the sample publish articles employing the resource heterogeneity approach. In fact, 22 (92%) of the 24 journals in the sample have published at least one article using this theoretical approach. Only *Information Systems Research* and *Journal of Management Information Systems* have not published any such articles. Furthermore, while 10 (42%) journals have published articles employing one of the remaining three approaches, many use a combination of approaches (typically, the resource heterogeneity approach plus one or two additional approaches). For example, *Strategic Management Journal* has published one article employing both the resource heterogeneity and conceptual-level approaches and two articles employing both the resource heterogeneity and organizing approaches. Lastly, of those journals publishing articles employing approaches other than the resource heterogeneity approach, only two journals have published multiple articles: *Academy of Management Journal* has published two and *Strategic Management Journal* has published five.

Finally, in order to identify temporal trends in tests of the RBV, the sample articles were categorized by year of publication and theoretical approach. Based on the results in Table 9, the number and percentage of tests of the RBV across all four approaches appears to have increased steadily since the mid 1990s. Despite this upward trend in the number of tests, the level of support appears to show no trend (positive or negative) for the resource heterogeneity, organizing, or conceptual-level approaches, but does seem to have increased over time for the dynamic capabilities approach. Table 9 also shows that the publication date of the first article testing each approach varies considerably. Specifically, whereas articles employing the resource heterogeneity and organizing approaches were first published in 1994, articles employing the conceptual-level approach were not published until 1998 and articles employing the dynamic capabilities approach were not published until 2001.

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Table 8. Results by journal

Journal	# Articles[a]	% Total articles	# Tests	% Total tests	# Supported	% Supported
Resource heterogeneity approach						
Strategic Management Journal	12	22%	89	16%	62	70%
Academy of Management Journal	6	11%	33	6%	14	42%
MIS Quarterly	3	5%	62	11%	50	81%
Journal of Small Business Management	3	5%	41	7%	10	24%
Journal of International Business Studies	3	5%	27	5%	13	48%
Journal of Business Venturing	2	4%	25	5%	3	12%
R&D Management	2	4%	17	3%	6	35%
Journal of International Marketing	2	4%	14	3%	11	79%
Journal of Management	2	4%	13	2%	9	69%
Group and Organization Management	2	4%	12	2%	5	42%
Journal of Engineering and Technology Management	2	4%	6	1%	6	100%
Industrial Marketing Management	1	2%	24	4%	9	38%
Research Policy	1	2%	20	4%	4	20%
Journal of Managerial Issues	1	2%	12	2%	4	33%
Healthcare Management Review	1	2%	9	2%	2	22%
International Journal of Entrepreneurship and Innovation Management	1	2%	8	1%	2	25%
The Services Industries Journal	1	2%	5	1%	1	20%
Asia Pacific Journal of Management	1	2%	4	1%	3	75%
Irish Journal of Management	1	2%	4	1%	3	75%
Technovation	1	2%	3	1%	2	67%
Journal of Business Research	1	2%	1	0%	1	100%
Organization Studies	1	2%	1	0%	1	100%
Subtotal	50	91%	430	78%	221	51%
Organizing approach						
Strategic Management Journal	2	4%	61	11%	40	66%
Academy of Management Journal	2	4%	4	1%	3	75%
Journal of Business Venturing	1	2%	6	1%	1	17%
Journal of Small Business Management	1	2%	6	1%	0	0%
Journal of Business Research	1	2%	2	<1%	2	100%
Group and Organization Management	1	2%	1	<1%	0	0%
Subtotal	8	15%	80	15%	46	58%
Conceptual-level approach						
Strategic Management Journal	3	5%	13	3%	7	54%
Journal of Engineering and Technology Management	1	2%	9	2%	9	100%
Journal of Management	1	2%	4	1%	4	100%
Subtotal	5	9%	26	5%	20	77%
Dynamic capabilities approach						
Information Systems Research	1	2%	8	2%	3	38%
Journal of Management Information Systems	1	2%	4	1%	2	50%
Academy of Management Journal	1	2%	1	<1%	0	0%
Subtotal	3	5%	13	3%	5	38%
Total	55	—	549	—	292	53%

[a] Because 10 articles employ multiple approaches, the sub-totals and total reported for this column do not equal their sums.

DISCUSSION AND SUGGESTIONS FOR FUTURE RESEARCH

The present research has been conducted in order to identify the manner in which the RBV has been tested empirically in the literature and to assess its level of empirical support. From this analysis, five general findings warrant additional discussion. First, based on the results presented above, it seems that while the RBV has received

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Table 9. Results by year

Year	# Articles[a]	% Total articles	# Tests	% Total tests	# Supported	% Supported
Resource heterogeneity approach						
2005[b]	8	15%	61	11%	23	38%
2004	8	16%	54	10%	30	56%
2003	8	16%	83	15%	65	78%
2002	6	15%	89	16%	36	40%
2001	5	11%	57	10%	24	42%
2000	5	9%	18	3%	12	67%
1999	3	5%	11	2%	5	45%
1998	1	2%	3	1%	3	100%
1997	3	5%	23	4%	10	43%
1996	1	2%	16	3%	6	38%
1995	0	—	—	—	—	—
1994	2	4%	15	3%	7	47%
Subtotal	50	91%	430	78%	221	51%
Organizing approach						
2005[b]	0	—	0	—	—	—
2004	1	2%	6	1%	0	0%
2003	3	5%	4	1%	3	75%
2002	1	2%	60	11%	39	65%
2001	1	2%	1	<1%	0	0%
2000	1	2%	3	1%	3	100%
1999	0	—	0	—	—	—
1998	0	—	0	—	—	—
1997	0	—	0	—	—	—
1996	0	—	0	—	—	—
1995	0	—	0	—	—	—
1994	1	2%	6	1%	1	17%
Subtotal	8	15%	80	15%	46	58%
Conceptual-level approach						
2005[b]	0	—	0	—	—	—
2004	1	2%	2	<1%	2	100%
2003	1	2%	4	1%	4	100%
2002	1	2%	8	2%	4	50%
2001	1	2%	3	1%	1	33%
2000	0	—	0	—	—	—
1999	0	—	0	—	—	—
1998	1	2%	9	2%	9	100%
1997	0	—	0	—	—	—
1996	0	—	0	—	—	—
1995	0	—	0	—	—	—
1994	0	—	0	—	—	—
Subtotal	5	9%	26	5%	20	77%
Dynamic capabilities approach						
2005[b]	0	—	0	—	—	—
2004	1	2%	4	1%	2	50%
2003	0	—	0	—	—	—
2002	1	2%	8	2%	3	38%
2001	1	2%	1	<1%	0	0%
2000	0	—	0	—	—	—
1999	0	—	0	—	—	—
1998	0	—	0	—	—	—
1997	0	—	0	—	—	—
1996	0	—	0	—	—	—
1995	0	—	0	—	—	—
1994	0	—	0	—	—	—
Subtotal	3	5%	13	3%	5	38%
Total	55	—	549	—	292	53%

[a] Because some articles use more than one theoretical approach, the total reported for this column does not equal their sums.
[b] Data were collected during June 2005.

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considerable attention in the empirical literature, it has only received marginal support. As noted above, only 53 percent of the tests assessed in this study were empirically supported. While such a level of support may seem uncomfortably low to the RBV's supporters, it is similar to levels of support found in reviews of other theories of strategic management. For example, following a similar methodology, David and Han (2004) find support for only 47 percent of tests of TCE. These authors also note that several other quantitative reviews of strategic management theory (Campbell-Hunt, 2000; Dalton *et al*., 1998; Ketchen *et al*., 1997) yield similarly non-compelling levels of support. While the level of support for one theory is certainly not comparable to another, it is at the very least important to note that the level of support for the RBV found herein is by no means atypical.

Nevertheless, the present finding of 53 percent support may seem at odds with Barney and Arikan's (2001) conclusion that only 2 percent of the studies they assessed return results that are inconsistent with the RBV. However, as noted above, these seemingly contradictory conclusions can be reconciled by considering each study's treatment of non-findings. Consider, for example, Henderson and Cockburn's (1994) well-known analysis of the impact of architectural and component competence on the performance of pharmaceutical firms, an article in both Barney and Arikan's (2001) and the present samples. While Henderson and Cockburn (1994) find that component competence and some forms of architectural competence (centralized decision making and emphasis on publication) are significantly and positively related to firm-level and program-level performance, they also find that other forms of architectural competence (integrated worldwide research and rich information flow) are entirely unrelated to performance at either level. In fact, of the nine tests of the competence–performance relationship Henderson and Cockburn (1994) conduct, empirical support is found for only five (56%) and is reported as such herein. However, because Henderson and Cockburn (1994) do not find any significant relationships counter to what the RBV would predict, Barney and Arikan report that 'Henderson and Cockburn's results are consistent with the RBV' (Barney and Arikan, 2001: 172).

Thus, while at face value the conclusions drawn from Barney and Arikan's (2001) and the present study are contradictory, they are actually quite expected. Whereas Barney and Arikan (2001) endeavored simply to identify articles that have reported findings that are consistent with the RBV, the present study has sought to quantify the actual level of support for the RBV. Given that the majority of empirical studies fail to find support for *all* hypothesized effects, it logically follows that some portion of tests (in this case a substantial portion) will yield insignificant results. Thus, the level of support for the RBV reported herein should not be unexpected.

A second finding worthy of discussion is that considerable variation exists regarding the level of support both across and within the theoretical approaches tested. Of primary importance, due to its overwhelming use in the sample, is the resource heterogeneity approach. As was noted above, the level of support for tests employing this approach varies substantially with the independent variable. Whereas 71 percent of the tests relating a specific capability to competitive advantage or performance were found to be supported and 67 percent of the tests relating a specific core competence to performance were found to be supported, only 37 percent of the tests relating a specific resource to competitive advantage or performance were found to be supported. Although in all cases the authors argue convincingly on theoretical grounds that the resources, capabilities, and core competencies under examination are valuable, rare, inimitable, and/or non-substitutable, the empirical results seem to suggest that while capabilities and core competencies do indeed contribute significantly to a firm's competitive advantage and/or performance, resources do not.

Such a finding may seem inconsistent with the early incarnations of the RBV (i.e., Barney, 1991), which suggests that valuable, rare, inimitable, non-substitutable resources *and* capabilities will contribute to these ends. However, given that much of the foundational work on the RBV addresses the importance of deploying and not simply possessing resources (Penrose, 1959; Rubin, 1973) and much of the more contemporary work has attempted to more precisely explain these processes (Amit and Schoemaker, 1993; Barney, 1997; Barney and Mackey, 2005; Barney and Wright, 1998; Eisenhardt and Martin, 2000; Fiol, 1991; Henderson and Cockburn, 1994; Lado *et al*., 1992; Kogut and Zander, 1992; Leonard-Barton; 1992; Mahoney and Pandain, 1992; Peteraf, 1993; Prahalad and Hamel, 1990; Reed and DeFillippi, 1990; Russo

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and Fouts, 1997; Teece *et al*., 1997), it is perhaps no surprise that capabilities and core competencies have been found to be far more significant in explaining competitive advantage and performance than resources. Of course, *if* such a conclusion is indeed not surprising, then why have resources received so much empirical attention?

While it is beyond the scope of the present study to draw any definitive conclusions, it is possible that this methodological trend is due in part to the relative ease of measuring resources as compared to capabilities and core competencies. Consider, for example, the most popularly studied resource in the sample: human capital. This construct is operationalized along such dimensions as the percentage of certain demographics in various roles/positions (Shrader, Blackburn, and Iles, 1997), the number of years of various types of experience (Hayton, 2005), gender, and level of education (Westhead, Wright, and Ucbasaran, 2001). As is obvious, these measures are easily quantified and many are obtainable from secondary sources.

Capabilities and core competencies, on the other hand, are not so easily quantified or accessed. For example, human resource capability, the most widely studied capability in the sample, is operationalized as the perceived importance of 18 human resource policies to the firm (Deniz-Deniz and De Saá Peréz, 2003), education and screening exam criteria used in the hiring process, the type of training required (Hatch and Dyer, 2004), and the manner in which candidates were recruited (De Saá Peréz and Falcon, 2004). Additionally, marketing competence, one of the two most widely studied core competencies in the sample, is operationalized as the perceived ability to manage customer needs, relationships, and processes, distribution and communication channels, and competitor information (Wang, Lo, and Yang, 2004), as well as advertising expenditures relative to total sales (de Carolis, 2003). As is clear from these examples, compared to resources, measuring capabilities and core competencies often necessitates a greater need for primary data collection techniques and often introduces a greater potential for slippage and respondent bias.

Notwithstanding these apparent methodological challenges, temporal patterns of research done under the auspices of the resource heterogeneity approach suggest that the trend toward examining capabilities and core competencies as opposed to resources is on the rise. In fact, of those articles published during 2000 and earlier, 73 percent focused on resources. Since the beginning of 2001, however, only 57 percent have done so. While such a shift may be modest, it hints at the possibility that scholars are responding (and may wish to consider responding) to advances in the theoretical literature and findings from the empirical literature regarding the importance of capabilities and core competencies relative to resources in determining a firm's competitive position.

It must be noted that the lack of support for resources as predictors of competitive advantage and performance may also help explain the low level of support for tests employing the dynamic capabilities approach. Indeed, despite the importance suggested above to the *process* by which resources are exploited, only 38 percent of dynamic capabilities tests have been supported. Though merely speculative, one possible explanation for this finding is that although a dynamic capability may be significantly related to competitive advantage and performance by itself, when interacted with a resource (generally found to be unrelated to competitive advantage and performance) this relationship is eliminated. For example, although Hitt *et al*. (2001) find that a firm's leveraging capability (a dynamic capability) is significantly related to its performance, they also find that a firm's human capital (a resource) and the interaction of these two variables are not significantly related to its performance.

Of course, it may also be that the present findings are simply inconclusive. Because the theoretical work on dynamic capabilities was not published until 1997 (i.e., Teece *et al*., 1997), empirical work on this approach is still in its infancy. Indeed, the first of the three empirical articles in the sample using this approach was published in 2001. Given that tests of this approach are on the rise, it is likely that more definitive answers regarding these relationships will emerge as more empirical research is conducted.[14] Indeed, scholars interested in this area may find the opportunity to contribute to this important and emerging stream of empirical inquiry quite appealing.

Interestingly, results from tests using the organizing approach are markedly different than for those using the dynamic capabilities approach.

[14] The author thanks an anonymous reviewer for helping clarify this point.

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Indeed, support for tests examining organizing contexts designed to exploit resources is notably higher than for those designed to exploit capabilities (75% and 56%, respectively). While such findings may seem to contradict the logic above pertaining to dynamic capabilities, it may simply speak to the nature of the organizing function. Because an organizing context establishes a firm's general approach to the utilization of its resources and capabilities, it may be that a firm-wide strategy or orientation is by its very nature ineffective at exploiting capabilities, which tend to be highly resource-specific (such as capabilities to exploit specific technologies), compared to resources, which are in many cases relatively standardized (such as technology in general).

Of course, as with the dynamic capabilities approach, it is also possible that these findings may be explained by the fact that this approach has (with one exception) only recently been subjected to empirical scrutiny. Aside from a lone study in 1994, all articles adopting this approach were published in 2000 or later. Thus, as with the dynamic capabilities approach, because empirical work in this area is still in its infancy and is still evolving, it may simply be too early to draw definitive conclusions from this line of work. Thus, as with the emerging work on dynamic capabilities, scholars concerned with the contexts by which resources may be effectively exploited may find that the opportunity to contribute to the development of the RBV exists with tests of this relatively under-examined theoretical approach.

In stark contrast to the above three approaches, the conceptual-level approach has found a great deal of empirical support. Such a finding suggests that RBV theorists have identified important resource attributes. More specifically, it seems that firms looking to attain and/or sustain competitive and performance advantages may well need to possess and exploit valuable, rare, inimitable resources, capabilities, and core competencies. While the omission of any tests regarding non-substitutability may at first glance appear disconcerting, it is important to note that over the course of the past decade some scholars have argued that non-substitutability is merely a form of inimitability (see, for example, Barney, 1997); thus, its lack of empirical examination in the present sample is not entirely unexpected.

Third, it is important to acknowledge the myriad ways in which the various independent variables have been operationalized. Of the 417 (76%) tests in which a specific resource, capability, or core competence serves as the independent variable, 26 different resources, 32 different capabilities, and six different core competencies are studied ranging from ancillary capabilities (Brush and Artz, 1999) to work–family policies (Perry-Smith and Blum, 2000). However, relatively few resources, capabilities, and core competencies have received attention in multiple studies. Thus, although the empirical literature assessed herein has informed us about the breadth of resources, capabilities, and core competencies that may confer firm-level advantages, the lack of depth with which most have been examined may warrant that the evidence regarding their importance be accepted guardedly. Because the articles assessed herein represent only a sample of the full population of tests of the RBV, it is possible that additional articles not assessed herein have examined many of the resources, capabilities, and core competencies listed in Table 4 and may provide additional evidence regarding their contribution to a firm's competitive advantage and/or performance. However, in the event that such evidence does not exist, scholars may wish to replicate these studies in an effort to further support or even refute their importance.

Like resources, capabilities, and core competencies, the manner in which inimitability has been operationalized has also varied considerably in the sample. As Table 6 shows, 11 different dimensions of inimitability, all of which rely on operational definitions from the past two decades of theoretical research, have been measured. For example, King and Zeithaml (2001) operationalize inimitability in terms of causal ambiguity (Barney, 1991; Dierickx and Cool, 1989; Lippman and Rumelt, 1982; Reed and DeFillippi, 1990; Rumelt, 1984, 1987), de Carolis (2003) operationalizes inimitability in terms of time compression economies (Barney, 1991; Dierickx and Cool, 1989), Irwin, Hoffman, and Lamont (1998) operationalize inimitability in terms of interconnectedness of asset stocks (Dierickx and Cool, 1989), Hatch and Dyer (2004) operationalize inimitability in terms of learning costs (Rumelt, 1984, 1987), McEvily and Chakravarthy (2002) operationalize inimitability in terms of social complexity (Barney, 1991; Dierickx and Cool, 1989) and tacitness (Reed and DeFillippi, 1990), and both Hatch and Dyer (2004) and McEvily and Chakravarthy (2002) operationalize inimitability in terms of asset specialization (Rumelt, 1984, 1987).

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The fact that an overwhelming majority (70%) of these tests have received empirical support suggests not only that inimitability may contribute substantially to a firm's competitive position, but perhaps more importantly that there are a myriad of ways in which a resource, capability, or core competence may be protected from imitation. These findings are even more encouraging given the arguments that inimitability is the most important attribute in the RBV (Barney, 2001; Godfrey and Hill, 1995; King and Zeithaml, 2001). However, because many dimensions of inimitability were not addressed in the sample, such as path dependence (Dierickx and Cool, 1989; Eisenhardt and Martin, 2000) or switching costs (Rumelt, 1984, 1987), scholars may wish to avoid generalizing the level of support reported herein to the attribute as a whole. Furthermore, scholars may also wish to empirically examine these and similar dimensions that may not have received empirical attention in order to expand our knowledge regarding those isolation mechanisms that hinder imitation.

Like inimitability, the results of the conceptual-level tests of value and rareness received overwhelming empirical support. Of course, it is important to note that because value and rareness were examined in only one article in the sample, the conclusions to be drawn with respect to these attributes are limited. Nonetheless, it is important to note several important issues. With respect to rareness, although the lone test of this construct received support, it focused on one interpretation of this construct (i.e., Barney, 1991). However, much additional theoretical work has been conducted regarding this attribute. For example, as work by Christmann (2000), Penrose (1959), and Teece (1986) suggests, otherwise rare resources often must be bundled with resources that may be quite common (commonly referred to as complementary assets, free goods, or co-specialized assets).

More recently, Peteraf and Bergen (2003) contend that resource rareness must not be measured solely in terms of the amount of the resource possessed by competing firms (as it was measured in the lone study in which it was examined), but also in terms of its function. These authors suggest that if two different resources can be exploited toward the same end (that is, if they are strategic substitutes), then the rareness of each resource is a function of the availability of both. Interestingly, this line of reasoning is similar to Penrose's argument:

> The services yielded by resources are a function of the way in which they are used—exactly the same resource when used for different purposes or in different ways and in combination with different types or amounts of other resources provides a different service or set of services. (Penrose, 1959: 25)

It seems then that although a given resource may be rare by definition (that is, few or no other firms may possess it), the services provided by that resource may not be (many firms may possess an alternative resource that can be used to attain the same ends). In light of this argument, scholars employing a conceptual-level approach in the future may wish to resist the temptation to focus solely on the rareness of the resource under examination and instead focus on the rareness of the resource bundle as well as on the rareness of substitute resources.

With respect to value, it seems that a substantial challenge complicates the measurement of this construct. In adhering closely to Barney's (1991) conceptualization of value, Irwin *et al.* (1998) unavoidably introduce an element of tautology in its operationalization.[15] Specifically, these authors measure value as the degree to which the resource in question can increase customers, occupancy, and reputation and then measure the dependent variable in terms of return on assets, total margin, and occupancy. Given that each of these constructs includes a similar dimension (occupancy), there is a potential for response bias (Podsakoff and Organ, 1986). Although Irwin *et al.* (1998) use multiple items to measure this construct, a technique which has been found to minimize such bias (Harrison, Mclaughlin, and Coalter, 1996), scholars measuring value may wish to seek alternative definitions of these constructs so that the potential for such bias is avoided.

A fourth finding worthy of attention is the observation regarding the diffusion of the RBV. The temporal results discussed above suggest that the scholarly community has begun to embrace a variety of theoretical approaches in tests of the RBV. Whereas almost all empirical work for the first 6 years reflected in the sample employed a resource heterogeneity approach, research since

[15] See Priem and Butler (2001) for an elaborate critique of this tautology.

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then has increasingly incorporated alternative approaches. This increased breadth of empirical analysis given to the RBV is encouraging in that it suggests that our collective understanding of this important theory will continue to evolve.

Additionally, it seems that although management journals in general and *Strategic Management Journal* in particular are clearly leading the way in publishing RBV-grounded empirical research, journals in related fields, such as entrepreneurship, as well as journals in unrelated fields, such as marketing, are also publishing empirical studies in which the RBV is tested with increasing regularity. Such a trend suggests that the scholarly community in general has recognized the RBV as an important and informative theoretical perspective.

Fifth, it seems that a great deal of the empirical work in the sample has relied heavily on work by Barney (1991) and his contemporaries (i.e., Amit and Schoemaker, 1993; Peteraf, 1993; Prahalad and Hamel, 1990) and have in turn eschewed some of the more recent theoretical work that has sought to clarify and revise the RBV. In fact, of the 55 articles in the sample, only 21 (38%) were published within 10 years of the first formalization of the RBV (Barney, 1991); yet, 47 (85%) use this early theoretical work as a central reference in defining the RBV and/or developing hypotheses. As a consequence, the clear majority of articles limit empirical inquiry to the relationships depicted in Figure 1. For example, in one of the most recent articles in the sample, Cho and Pucik assert the following:

> According to the RBV, the sustainable competitive advantage results from the inimitability, rarity, and non-tradability of intangible resources (Barney, 1991, 1997; Grant, 1991; Penrose, 1959; Peteraf, 1993). These studies emphasize that a firm should possess certain intangible resources that competitors cannot copy or buy easily. As a result, the firm possessing intangible resources can gain competitive advantage in this market. (Cho and Pucik, 2005: 556)

The authors then proceed to develop and test hypotheses regarding the relationships between a variety of resources and performance.

As this and similar examples suggest, empirical work is largely focused on early incarnations of the RBV. While the work of these early scholars (i.e., Barney, 1991) is no doubt worthy of inclusion in a discussion of the RBV, they nevertheless fail to exhaust all that is known about the relationships among resources, capabilities, core competencies, organizing contexts, competitive advantage, and performance. As discussed at length above, Barney (1997), Eisenhardt and Martin (2000), Winter (1995), and others have averred that the possession of a valuable, rare, inimitable, non-substitutable resource is a necessary *but insufficient* condition for explaining a firm's competitive position. These scholars suggest that a resource can only contribute to this end when it is paired with an appropriate dynamic capability or organizing context. Thus, scholars conducting empirical research on the RBV in the future may wish to move away from the dominant resource heterogeneity approach toward either the organizing approach or the dynamic capabilities approach in order to test theoretical models that more closely reflect the current state of the RBV than does Barney's (1991) original model.

On a related note, scholars may also wish to infuse their empirical tests with even more recent conceptual work that has sought to reconceptualize many of the relationships within these various approaches. For example, it was noted above that many scholars testing the resource heterogeneity approach have treated competitive advantage and performance interchangeably despite the fact that most claim to be following Barney's (1991) conceptual model in which they are argued to be conceptually distinct. While such a methodological decision may appear to be of little consequence given the purported theoretical relationship among the two constructs and given that competitive advantage is often defined in terms of performance (see, for example, Porter, 1985: 11), Coff (1999) suggests that such treatment in empirical analysis assumes that the rents created through the exploitation of a given resource will be fully appropriated by the firm. However, Coff notes that to the extent that the resource in question is embodied in individuals, such as knowledge, 'a resource-based advantage may result in relatively little rent observable in measures of firm performance' (Coff, 1999: 131).

Building in part off of Coff (1999), Peteraf and Barney argue that 'there is no *necessary* connection between any advantage that a firm has in terms of its ability to generate rents and superior profitability' (Peteraf and Barney, 2003: 316; emphasis

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in original). These scholars argue that '[a]n enterprise has a *Competitive Advantage* if it is able to create more economic value [an additive combination of producer and consumer surplus] than the marginal (breakeven) competitor in its product market' (Peteraf and Barney, 2003: 314; emphasis in original). Of course, how much of the created value the firm accrues in terms of profits is a function of the costs involved in delivering the product or service and of the consumer's perceived value of one firm's product or service compared to that of its competitors.

Despite this logic, the majority (76%) of tests employing the resource heterogeneity approach examine the relationship between a specific resource, capability, or core competence and performance, *not* competitive advantage. In observing this tendency, Powell (2001) reasons that by treating these constructs interchangeably, scholars are adopting the tenuous assumption that if a firm has achieved above normal performance it must have, by default, attained a competitive advantage. Yet, because the relationship between competitive advantage and performance is unidirectional (that is, competitive advantage leads to increased performance but not the opposite), Powell (2001) argues that tests relying on evidence of the latter as proof of the former's existence are methodologically flawed.

It seems then that firms may often fail to appropriate all of the value they create and, thus, the resource-based rents they earn may not accurately reflect the advantages they have attained. In apparent support of this notion, less than half of the tests of the competitive advantage–performance relationship were supported in the present sample. Given these theoretical arguments and empirical results, scholars seeking to use the RBV to explain performance may wish to carefully consider those exogenous factors that may hinder the firm's ability to appropriate rents and, in turn, incorporate some measure of the appropriability regime (Teece, 1986) into their analyses, particularly if examining a resource characterized by a high degree of tacitness (Coff, 1999).

Interestingly, while no studies in the sample reference Peteraf and Barney (2003), Peteraf and Bergen (2003), or Powell (2001), two studies reference Coff (1999), of which one (Ray, Barney, and Muhanna, 2004) astutely acknowledges and addresses empirically the issues he raises regarding the competitive advantage–performance relationship. Of course, because the publication of empirical articles typically lags theoretical articles, it may well be that given the contemporary nature of these theoretical advances additional empirical work is currently being conducted but simply has not yet been published.[16] Either way, scholars may wish to continue to incorporate these and similar theoretical advances to the RBV into their empirical analyses so that we as a scholarly community may continue to enhance our collective understanding of the manner in which resources and capabilities contribute to a firm's competitive position.

CONCLUSION

The purpose of this study was to assess the empirical support for what is argued to be one of the most widely accepted theories of strategic management (Powell, 2001; Priem and Butler, 2001). Given that the RBV not only serves as a major theoretical foundation in the scholarly literature (Rouse and Daellenbach, 2002), but is also prominently featured in all major textbooks on the subject of strategic management, the research, teaching, and consulting agendas of many scholars in the field are increasingly dominated by the assumption that valuable, rare, inimitable, non-substitutable resources, capabilities, and core competencies can confer competitive and performance advantages to the firm. Yet, despite the overwhelming appreciation for the RBV's central tenets, no systematic assessment of the RBV's level of support had been conducted prior to this study.

In response, a sample of RBV-grounded empirical articles was analyzed in order to assess the actual level of empirical support for the RBV. In so doing, great care was taken to ensure that a relevant and representative sample of empirical articles was collected and that findings in support of the RBV were juxtaposed with findings that were both insignificant and counter to the RBV. Despite the attention to methodological rigor, the subsequent findings may be mitigated by the following limitations.

First, the present sample is not exhaustive of all empirical work on the RBV. As David and

[16] The author thanks an anonymous reviewer for suggesting this point.

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Han (2004) note with regard to the TCE literature, ABI/Inform and EconLit do not contain all possible studies published in the field. The same may be true for the RBV literature as well. Thus, to the extent that other articles that empirically test the RBV may have been identified via alternative databases, the results reported herein will vary. However, due to the comprehensive nature of these databases, the sample is argued to be representative of the full population of articles testing the RBV to which the findings presented herein are argued to be generalizable.

Second, the criteria by which articles were selected, both in terms of the objective keywords used (criteria 3, 4, and 5) and the subjective determination of what constitutes a relevant article (criteria 6, 7, and 8), may have defined the sample in ways that other keywords and other researchers may not have. For example, given the inherent tacitness of capabilities and core competencies, it may be that their lack of representation in the present study is due in part to the singular focus on quantitative analyses.[17] Thus, although great care was taken to ensure that the choices made adhered closely to theory and precedent, scholars may wish to reflect on these choices as they interpret the results reported herein. Scholars seeking to replicate this study may also consider employing alternative selection criteria in an attempt to expand or contract the scope of articles identified.

Third, the present study assesses only those RBV-grounded empirical studies that seek to explain a firm's competitive advantage or performance. Although the RBV has been used to explain a variety of additional dependent variables, the present study omits them from examination given the preeminence ascribed to understanding competitive advantage and performance in the strategic management field (Barney and Hesterly, 1999; Teece *et al*., 1997; Winter, 1995). Nevertheless, because of this focus, scholars should be wary of generalizing the present findings to studies seeking to explain alternative dependent variables and may find it fruitful in the future to formally assess the empirical support for such studies.

Notwithstanding these limitations, the finding that little more than half (53%) of tests support the RBV and, more importantly, that the degree of support varies considerably with the independent variable may contribute to our collective understanding of the RBV. Indeed, the findings suggest that it may well be the firm's organizing context and its valuable, rare, inimitable capabilities (dynamic and otherwise) and core competencies rather than its static resources that are essential to determining its competitive position. Of course, because research on the organizing, conceptual-level, and dynamic capabilities approaches is still in its infancy, greater use of these theoretical approaches, coupled with increased attention to recent extensions to the RBV, will no doubt increase the precision with which this important theory is tested and in turn enhance our understanding of how and to what degree resources, capabilities, and core competencies facilitate the attainment and sustainability of a firm's competitive advantage and subsequent level of performance.

It is imperative to note that the suggestions presented above in response to the findings are intended to be neither exhaustive nor absolute. Rather they are offered in an attempt to stimulate thought and discussion regarding past research on the RBV and future directions for testing its core hypotheses. At the very least, this paper has attempted to create awareness about what we actually know about the RBV and in turn propose suggestions for future research that may help strengthen the support for this important theory.

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[17] The author thanks an anonymous reviewer for suggesting this point.

[18] As noted in the results section, all articles in the dataset are listed in the reference list and are preceded by an asterisk. Additional notation is also included for each article in the dataset indicating which theoretical approach(es) was(were) employed to test the RBV: R = resource heterogeneity approach; O = organizing approach; C = conceptual-level approach; D = dynamic capability approach.

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