DISCRIMINATING ALIGNMENT: RESOURCES, DYNAMIC CAPABILITIES, AND THE SUCCESS OF INTERNAL DEVELOPMENT

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ABSTRACT

This paper integrates content-based predictions of the resource-based view of strategy with process-based predictions of dynamic capabilities theory to study the success of firms’ internal development activities. We argue that firms that select internal development projects in theoretically appropriate conditions – consistent with the prescriptions of resource-based and dynamic capability arguments – will tend to achieve more successful internal development than deviant firms. With increased internal development experience, we also expect managers’ decision rules for selecting internal development to align better with their resource stocks and dynamic capabilities. Drawing on a survey of 162 telecommunication firms, we find that firms that follow decision rules that align with resource-based and dynamic capability prescriptions when they select sourcing modes achieve greater success in their internal development than firms that deviate from such decision rules, with some contrasting effects of the role of resource stocks and dynamic capabilities on performance. We also find that experience contributes to a firm’s internal development success by shaping its ability to select viable modes of resource sourcing.
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Firms commonly must choose between internal development and external sourcing when they attempt to develop new skills in response to changing competitive conditions. For example, in its annual report, Johnson and Johnson (1996: 4) notes that “while internal development is our preferred source of growth, we view selective acquisitions as an appropriate mechanism for supplementing our efforts.” Two views in strategy emphasize different factors that influence when internal development will be more successful than external sourcing. The resource-based view of strategy argues that internal development will be most successful when a firm builds on its existing stock of resources (Penrose, 1959; Wernerfelt, 1984). The dynamic capabilities literature, by contrast, argues that internal development will be most successful when a firm can create a social context and organizational processes that facilitate their ability to recombine internal resources into novel configurations (Teece, Pisano, and Shuen, 1997; Eisenhardt and Martin, 2000). Both views implicitly suggest that firms will be most successful when they use consistent decision rules to guide whether they use internal development or external sourcing when attempting to create new resources. Little research, though, has considered the nature of such decision rules or examined how decision rules that guide firms’ choice of sourcing modes influence firms’ ability to create new resources.

This paper examines decision rules that guide a firm’s choice of internal development over external sourcing. We draw on the resource based view of strategy and dynamic capabilities arguments, as well as several related perspectives in the strategy and organizational literatures, to study how adherence to rules that reflect a firm’s resource stocks and its dynamic capabilities affect the success of the firm’s internal development activities. We argue that firms that select internal development projects in theoretically appropriate conditions – consistent with the
prescriptions of resource based and dynamic capability arguments – will tend to achieve more successful internal development than deviant firms.

The focus on decision rules aims to uncover managers’ implicit theories of decision making (Kale and Puranam, 2004), and explore whether the criteria they use when selecting a sourcing mode reflect the criteria proposed by existing theories that emphasize the role of resources and organizational processes. Moreover, the work allows us to investigate the extent to which experience helps firms shape better decision rules. We expect experience to contribute to a firm’s internal development success not only by developing higher implementation ability but also by enhancing managers’ ability to select viable modes of resource sourcing. We thus aim to unpack the way in which internal development experience improves firms’ ability to undertake successful internal development projects.

The empirical analysis uses 26 interviews of managers and experts in the telecommunications industry, plus a survey of 162 telecommunications firms in Europe, North America, Latin America, and Asia in 2000-2001. The results demonstrate the combined influence of alignment of firms' decision rules with resource stocks and dynamic capabilities on the success of firms' internal development activities, while showing that decision rule alignment increases with a firm’s internal development experience. We examine two elements of the success of firms' internal development efforts: the ability to create currently needed resources and the ability to undertake internal renewal.

BACKGROUND: CONCEPTS AND EXAMPLES

Resource Stocks, Dynamic Capabilities, Sourcing Modes, and Decision Rules

The basic concepts in the paper include resources, dynamic capabilities, resource creation via internal development and external sourcing, sourcing success, and decision rules. Resources are stocks of knowledge, skills, financial assets, physical assets, and human capital that are tied...
semi-permanently to a firm and underlie the firm’s ability to produce goods and services (Wernerfelt, 1984; Amit and Shoemaker, 1993). Dynamic capabilities, in turn, are organizational processes that firms use to govern the creation of new resources (Teece, Pisano, and Shuen, 1997), whether by internal development or through external sourcing. Internal development refers to creating a new resource within the existing boundaries of a firm, while external sourcing refers to methods such as purchase contract, alliance, and business acquisition whereby a firm obtains resources from a third party to help it create new resources (Chi, 1994).

Assessing the success of sourcing activity has two main dimensions. In a resource-based efficiency perspective, successful sourcing, whether through internal or external means, means that a firm obtains resources that meet the firm's needs, at acceptable cost and within an acceptable time period (Barney, 1999). In a more dynamic change perspective, successful sourcing activity contributes to the firm’s ability to adapt to market changes and develop innovative activities through strategic flexibility and renewal (Eisenhardt, 1989).

In seeking successful resource creation, internal development offers both advantages and disadvantages relative to external sourcing of new resources. Internal development allows a firm to coordinate activities needed to build on its existing resource stock (Dierickx and Cool, 1989; Kogut and Zander, 1996), while also providing safeguards for protecting the value of new resources (Williamson, 1975). Internally-developed resources can also provide a more stable platform for future development of new resources than those acquired externally (Grant, 1996). At the same time, though, firms often need to resort to external sourcing to strengthen their resources or to enter new resource domains (Stuart and Polodny, 1996; Rosenkopf and Nerkar, 2001). Firms commonly fail when they embark on internal development because they underestimate the weaknesses or irrelevance of their existing resources (Cuervo-Cazarro, 2004; Ahuja and Katila, 2001) or they lack needed dynamic capabilities to govern the process of
creating new resources in-house (Katila and Ahuja, 2002; Eisenhardt and Martin, 2000). Thus, selecting internal development projects under appropriate conditions is a key element in internal development success.

To select appropriate modes of resource sourcing, managers benefit from following decision rules that assess their firm’s resource stocks and dynamic capabilities. Decision rules are the criteria that people take into account when they chose a particular action (Cyert and March, 1963), such as deciding whether to undertake internal development or external sourcing for acquiring a new resource. Decision rules sometimes involve formal algorithms that weight a wide range of benefits and costs. Often, though, decision rules are heuristic assessments that rely on experience with similar situations (Nelson and Winter, 1982; Katila and Ahuja, 2002). Such heuristics commonly become embedded as operating routines that provide consistent guides to organizational action. We discuss the genesis of decision rules in greater depth in the following section, when we assess how internal development experience influences decision rules.

**Resource Gaps in the Telecommunications Industry**

Before developing hypotheses, we will outline an empirical context in which firms commonly make choices between internal development and external sourcing in their efforts to develop new resources. We will return to this empirical setting throughout the paper.

In 2000, we conducted 26 interviews with senior executives of telecommunications companies and telecommunications industry experts, focusing on their attempts to develop new resources that the firms needed to compete in a changing competitive environment. A newly deregulated, highly competitive and technologically fast moving market, the telecommunications industry is an ideal setting for the study of development of new resources. We interviewed people at both established incumbents and recent entrants to the industry, as well as experts who provided consulting services to telecommunication firms. These three main constituencies of the
telecommunication industry offer a well informed and varied picture on the challenges associated
with the search for new resources.

Both established telecommunications firms and industry newcomers faced gaps between
their existing resources and those they needed to compete in the changing environment. On one
hand, deregulation and development of data technologies placed incumbent Public Telephone
Organizations (PTOs) such as KPN, British Telecom, France Telecom, Telefonica, Telia, and
Deutsche Telekom at a disadvantage in key resource areas because they traditionally faced
limited competition and the threat from new technologies had long seemed remote. In the
marketing area, incumbents tended to have weak marketing resources (e.g., limited ability to
manage pricing schemes, analyse traffic, and coordinate corporate accounts). In the technological
area, most incumbents viewed themselves primarily as infrastructure providers. They had
developed strong skills in operating transmission networks, particularly skills needed to operate
voice transmission technologies for local and long distance telephone services, but possessed
limited skills in providing specialized services such as digital data transmission and data
management. On the other hand, entrants from newly deregulated markets or new markets such
as fixed line and mobile telephony, cable, and data communications (e.g., Global Crossing,
Level3, and Mobilcom) typically had more flexibility than the established PTOs, but also faced
challenges in developing new resources. The newcomers – whether they were start-ups or
diversifying firms – needed to build a customer base, create trust, achieve a critical mass and
attract highly-skilled IT and marketing people. The quotes below describe examples of resource
gaps that the telecommunication firms need to close.

“There is a huge gap between the skills we need to deliver an integrated offering in the
ICT business and our current competencies. To deliver such an integrated portfolio, we
need 80% IT competencies versus 20% traditional telecom competencies.”

“Our current skills are based on traditional specialized engineering skills, while we are
looking for engineers with a general view of network architecture and with broader
responsibility. We also need sales and marketing people more specialized in Internet and carrier products.”

The following section develops the core hypotheses of the paper, which we will illustrate with examples from the field work in the telecommunications industry. We test the predictions with data from a large scale survey of the industry.

**HYPOTHESES**

**Discriminating Alignment**

We draw on a research approach from transaction cost economics to develop our core predictions. A central tenet of transaction cost economics is that alignment of transactions with governance modes, which Williamson (1985) refers to as discriminating alignment, leads to a superior outcome. Specifically, “the discriminating alignment hypothesis out of which transaction cost economics work is this: transactions, which differ in their attributes, are aligned with governance structures, which vary in their costs and competencies, so as to effect a (mainly) transaction cost economizing result” (Williamson, 2002: 12). Empirical research finds that firms whose governance choices align with TCE prescriptions outperform misaligned firms (Nickerson and Silverman; 2003; Silverman, Nickerson and Freeman, 1997; Anderson, 1988).

The notion of discriminating alignment applies beyond the context of transaction characteristics. At a general level, the approach involves evaluating the appropriateness of possible forms of organization by assessing the fit between characteristics of an activity to be performed and critical attributes of alternative organizational choices. In particular, a discriminating alignment hypothesis arises in the context of resource development activities: firms will be most effective in developing needed resources when they assign their resource development projects (which differ in their attributes) to modes of resource development such as internal development or external sourcing (which differ in their costs, incentives, and adaptive capacities) in a discriminating way. In the context of resource-based and dynamic capability
theories, the idea of discriminating alignment suggests that firms that select modes of resource
development that suit their resource stocks and dynamic capabilities will be more effective in
developing the needed resources than firms that do align their choices with their resource stocks
and dynamic capabilities. Table 1 below summarizes our main assumptions and provide a
comparison with transaction cost assumptions (Williamson, 2005: 13-14).

********** Insert Table 1 here **********

In our field work, we find that firms often follow decision rules that discriminate in how
they assign their resource development projects to internal development versus external sourcing
modes. The quote below illustrates the extent to which firms assess the characteristics of
resource development projects (the nature of resource gap the firm wants to close) and the
capacities of its internal organization compared to external modes (e.g., existing resource stock,
speed of internal processes, and integration of new resources with existing resources) to attain an
optimal match between needed resources and mode of resource development:

“The first question we ask once we have identified our resource gap and to make our
decision on “Should we do it by ourselves or acquire other firms ?” is: “How far is it
from our current skills ?” And then we ask: How fast ? How easy it is to acquire those
skills compared to training? How much of these skills exist on the labor market ? Or if
not, can we acquire firms ? How costly it is ? What is the impact of the imported skills on
our internal skills, our people ? How do you balance that with our internal people and
context ?.”

Resource stocks

Firms benefit from aligning their sourcing decision rules with their resource stocks. Firms
increase their likelihood of successful internal resource creation if they choose internal
development when they can draw on strong resources that are close to the desired new resources.
By contrast, when the firm’s internal resources are too distant from the needed resources or too
weak, firms benefit by drawing on external sources to acquire the needed resources.
The resource-based view posits that a firm’s stock of resources shapes its selection of resource sourcing mode and its resource development performance (Penrose, 1959). When needed resources are close to a firm's existing resources, i.e., when the firm possesses most of the skills required to develop the new resources, the firm can typically make the effort to develop the resources internally (Leonard, 1995). When new resources are far from the existing resource stock, i.e., when the firm possesses only a limited subset of the skills required to develop the new resources, firms seek to acquire them from outside the firm (Argyres, 1996; Penrose, 1959). In addition, firms tend to develop new resources internally once they have achieved a competitive level close to that required for effective competition (Rao and Drazin, 2002; Cuervo-Cazurra, 1999).

The choice between internal development and external sourcing parallels a spectrum that spans from exploitation to exploration. Internal development is commonly associated with local search (exploitation) as a firm’s internal development for new resources is technologically and geographically bounded (Helfat, 1994; Stuart and Podolny, 1996). External sourcing commonly associates with more distant search (exploration), as turning to external sources help overcome the constraints associated with contextually localized internal development (Powell et al., 1996; Nagarajan and Mitchell, 1998; Rosenkopf and Almeida; 2003). For example, Rosenkopf and Nerkar (2001) find that radical exploration in the optical disk industry builds upon technology outside the firm, while local search builds upon similar technology residing within the firm. Cuervo-Cazurra (1999) finds that a competitive disadvantage in a resource area is likely to lead to the selection of alliances and purchases rather than internal development. Acquisitions or alliances provide opportunities for obtaining distant resources and undertaking path-breaking change (Karim and Mitchell, 2000; Barkema and Vermeulen, 2001; Dussauge, Garrette and Mitchell, 2000).
Possessing a stock of related and strong relevant resources has implications on the cost of developing the needed resources. The diversification and foreign mode of entry literatures examine the relationship between resource gap, cost of entry, and mode of entry (Hennart and Park, 1993; Chatterjee, 1990; Yip, 1982). If an entrant expects a large reduction in operating costs from excess resources that can be shared and requires few complementary resources, it is likely to prefer direct entry. Typically, the probability that an entrant’s current excess physical and knowledge-based resources can reduce operating costs in a new market is higher the more related the new market is to the entrant’s core markets (Teece, 1982). Conversely, unrelated entrants will gain fewer reductions in operating costs from using excess resources and face higher requirements for complementary resources (Chatterjee, 1990).

Our telecommunications fieldwork supports the idea that firms commonly assess resource relatedness and strength when choosing between internal development and external sourcing. The quotes below illustrate those views.

“We went for a long time for internal R&D, but we did not have these competencies. Then we try to bring these competencies through alliance. Now we do acquisitions to fasten R&D. There is a pattern. We realized that we needed to reach a certain threshold of competencies before we could run effective internal development”.

In sum, firms benefit from aligning their sourcing decision rules with their resource stocks. As we noted earlier, successful resource creation includes developing appropriate resources, at acceptable cost, and within appropriate time periods. Accordingly, we propose:

**Hypothesis 1.** The greater the alignment between a firm's internal development choices and its existing stock of resources, the greater the success of its internal development activities.

**Dynamic capabilities**

Firms benefit not only from aligning their sourcing decision rules with their resource stocks, but also from matching their sourcing decision rules with their set of dynamic capabilities. Dynamic capability theory stresses that firms differ in their ability to creating novel combinations of
existing resource within the firm (Eisenhardt and Martin, 2000). Kogut and Zander (1992) argue that new learning is a product of a firm’s combinative capabilities to generate new applications from existing knowledge. Helfat and Raubitschek (2000) argue that firms vary substantially in their integrative ability, that is, the degree to which they are capable of taking existing routines and using them to create new resources. Katila and Ahuja (2002) find that firm’s innovation varies with its ability to use and reuse its existing knowledge. A set of studies in the recombination literature (Eisenhardt, 1989; Henderson and Clark, 1990; Galunic and Rodan, 1998) explores the organizational antecedents of recombination of existing resources. A key implication of these studies is that firms' attempts to develop new resources internally will be most successful when the attempts are consistent with the firms' dynamic capabilities.

As we noted earlier, dynamic capabilities can encompass several organizational mechanisms. We focus here on two organizational processes: (1) the extent to which a firm’s incentive systems suit the development of the needed resources, and (2) the extent to which the firm can manage resource conflicts that arise during the process of creating new resources, including the ability to undertake competing learning paths. We emphasize these two processes because they are common governance requirements that encompass both motivation and adaptability components (Milgrom and Roberts, 1990; Eisenhardt and Schoonhoven, 1990).

First, firms require incentive systems that motivate existing personnel to participate in development activities and to integrate needed new people. Absent appropriate incentive systems to steer peoples’ energy in developing new resources, internal development will fail. The choice of an incentive system influences each individual to perform certain tasks and promotes some types of behaviour at the expense of others (Williamson, 1985; Milgrom and Roberts, 1990; Holmstrom and Milgrom, 1994). In a context of developing new resources, appropriate incentive systems help individuals manage competing demands of both nurturing existing resources and
developing new resources, foster coordination across functions or areas, and reward the contribution of individuals to the development of the needed resources, as our fieldwork quote below illustrates. These incentive systems must motivate existing employees and must facilitate the ability to hire and integrate new people with skills needed to help develop the new resources.

“We have a long history of not sharing knowledge. To overcome this culture, we have developed systems of incentives to improve transversal collaboration. For example, each consultant in the knowledge management unit has the obligation to share and report knowledge (for example, through workshops) in at least three different services among our 23 services. The people receiving the knowledge assign scores to the learning they receive and describe how they can use this new knowledge.”

Second, internal development benefits from the ability to manage resource conflicts that arise during the process of creating new resources. Attempting to create new resources within the firm is likely to entail a certain degree of social conflict as individuals are reluctant to alter entrenched habits and switch to less familiar practices. Individuals may also perceive the replacement of traditional resources with new ones as departing from firm norms and values (Oliver, 1997; DiMaggio and Powell, 1983; Scott, 1987) or as challenging their status and power position (Ocasio, 1994; 1997; Menon and Pfeffer, 2003). The targeted resources might, in theory, be close to existing skills of people but also might, in practice, violate corporate traditions, break people’s working routines, and disrupt the organization by bringing about internal competition. When new resources reduce or eliminate the value of existing capabilities, entrenched individuals will shun the development and use of new resources in order to retain their power, (Abernathy and Clark, 1985; Tushman and Anderson, 1986), as our quote below illustrates.

“In many telecom incumbents, data traffic department used to be a marginal subsidiary compared to the powerful voice traffic department ruled by circuit technology engineers. The boom in data traffic has raised internal political problems due to the vested interest of the people in place. In some firms, investments and resource allocations towards data technologies have been postponed or limited due to this internal competition.”

Avoiding social conflict associated with new resource development helps firm maintain social truce within the firm, but is likely to place the firm on inflexible learning trajectories. As
Powell and Smith Doerr (1994: 393) posit, the “ties that bind may become the ties that blind”. Thus, shared identity and social ties within a firm may bias toward continuing patterns of resource development that extensively utilize existing knowledge and preserve vested interests, but prevent firm from searching newly relevant knowledge that would challenge people background and status.

Competition between different ideas within the firm is often valuable. Introducing conflict as firms consider which routes to follow in creating new resources helps people identify better options that would otherwise not emerge. Eisenhardt and Schoonhoven (1990) argue that task conflict provides different perspectives on problems and thereby may lead to superior solutions. Jehn (1997), meanwhile, finds that groups that accept task conflict are particularly effective. Managed conflict can create opportunities to identify novel reconfigurations of resources. At the same time, though, unconstrained conflict that arises from competition with existing resources and creates resistance to change can damage a firm's internal development efforts. Thus, a firm benefits if it possesses the dynamic capability to manage resource conflicts.

The degree to which a firm's internal development choices match its set of dynamic capabilities such as incentive systems and its ability to manage resource conflict will influence the success of the internal projects. Like alignment with resource stocks, alignment with a firm's dynamic capabilities will contribute to successful development of new resources.

**Hypothesis 2.** The greater the alignment between a firm's internal development choices and its dynamic capabilities, the greater the success of its internal development activities.

**Experience and Discriminating Alignment**

As we argued above, selecting the right mode of resource sourcing helps a firm develop the needed resources. Thus, understanding how decision rules for selecting a resource sourcing mode arise in the first place is an important question.
Various elements can shape the formation of rules. There is clearly an individual component. Each individual possesses unique analytical skills that arise from her or his intellectual ability, education, and professional experience. Thus, each individual creates rules for evaluating and selecting among opportunities and modes of resource development. There is also an organizational component. Each firm possesses a stock of collective knowledge that informs the pattern of decisions that its managers’ make. This collective knowledge is influenced by the experience that the firm has accumulated when performing its resource development activities. Prior research has argued that experience shapes the formation of cognitive frameworks (Weick, 1995) and that experiential wisdom accumulates as a result of reinforcement of prior choices (Levitt and March, 1988; Zollo and Singh, 2004; Mayer and Argyres, 2004). Experience provides opportunities for the firm to learn from its success and failures. Firms develop routines and capabilities from the past experience, which enable them to deal with similar situations and contingencies in the future (Cyert and March 1963; Nelson and Winter, 1982). In turn, the success and failure of prior experience reinforces the routines (Levitt and March 1988). With increased internal development experience, firms are likely to develop an embedded knowledge of what drives the performance of internal development projects and thus of how to choose among sourcing modes. Thus, with increased internal development experience, firms adopt more consistent decision rules for choosing when to develop new resources internally and when to seek outside the firm.

**Hypothesis 3.** The greater a firm’s internal development experience, the greater the alignment between a firm's internal development choices and its resource stocks and dynamic capabilities.

We also expect internal development experience to directly influence internal development success. Experience also provide opportunities for learning-by-doing and for initiating actions to articulate and codify experience (Zollo and Winter, 2002). Empirical studies
find that greater experience leads to higher ability to conduct internal development (Argote, 1999), as well as alliances (Anand and Khanna 2000; Kale, Dyer and Singh, 2002) and acquisitions (Hayward 2002; Mitchell and Shaver, 2003).

In summary, we expect managers to assess both resource stocks and dynamic capabilities when choosing to develop new resources within the firm. We expect internal development performance to increase with the extent to which managers follow decision rules for selecting internal development that reflect their firms’ resource stocks and dynamic capabilities. We further argue that greater internal development experience provides opportunities for firms to learn from success and failure and consequently improve their ability to recognise and adhere to appropriate resource sourcing decision rules. With increased experience, therefore, we expect managers’ choice of internal development to align better with their resource stocks and dynamic capabilities. Figure 1 depicts the propositions.

********** Insert Figure 1 here **********

DATA AND METHODS

Survey of Telecommunications Firms

Instrument and respondents

We tested the hypotheses with a survey of telecommunications firms operating in Europe, North America, South America, and Asia. Following the field interviews, we developed a survey instrument to identify firms' efforts to assess the nature of firms’ resource gaps, their criteria for choosing internal development or external sourcing, and the performance of each sourcing mode. We pre-tested the questionnaire with senior US and European executives from diverse backgrounds. We pilot-tested the revised survey instrument with on-site interviews with other senior executives, leading to the final version of the questionnaire. We designed and administered the mail survey following Dillman’s (1978) “Total Design” method.
We used two sources for respondents. During late 2000 and early 2001 we mailed the survey to about 1,500 senior managers across the world (40% in Europe, 40% in the US, and the remainder distributed throughout the world). All respondents had positions equivalent to vice-president or higher in general management positions such as corporate development. We sent two follow-up letters and two replacement questionnaires within the three weeks following the first mail. We also administered the survey to 90 senior managers from telecommunications firms who were participating in Executive Education programs. We obtained 135 responses to the mail survey, which is a reasonable number, given the seniority of the respondents and the detailed nature of the questionnaire. In addition, 27 of executive education participants mailed back their responses. In total, then, the data includes responses from 162 telecommunications firms.

We check for several biases among the respondent firms. We compared the industry and geographic profile of the respondent and non-respondent samples. The data set has a broad distribution of telecommunications firms across the countries in the survey, although Western European and US firms are somewhat over-represented in the data set, and Asian firms are somewhat under-represented. In addition, the data have a broad distribution of firms in different segments of the telecommunications sector, including telecom/broadcast services (52%), communications/electronics equipment (35%), software design (7%), and other services (6%).

We compared respondent firms in several ways. We found no significant differences in the financial and economic profile of 27 respondents and 63 non-respondents who received the surveys during Executive Education programs. We found no material differences among the 27 Executive Education responses and the rest of the responses. We found no material differences in the profitability of respondents and non-respondents among public firms in the sample. Finally, we found no material differences among early and late respondents, on the assumption that later
respondents and non-respondents are similar (Armstrong and Overton, 1977). The data reflect characteristics of established firms in the telecommunications industry and, more generally, of incumbent firms that operate in rapidly changing and technologically-intensive industries.

Like any survey, one must interpret the responses in the context of the characteristics of the responding firms. Respondent firms are distributed throughout the world (43% are based in Western Europe, 20% are based in the US, 10% in Northern Europe, 8% in Southern Europe, and 5% in the Asia-Pacific region). The data base includes responses from large and small firms (33% have fewer than 500 employees, 27% have 500-5,000 employees, and 39% have more than 5,000 employees). Firm profitability (ROA and ROE) also vary widely. Firm age is the main factor that clusters more strikingly; 69% of the firms are more than 10 years old. In addition, most of the firms have a high proportion of their sales in the telecommunications industry, often complemented by sales in the information technology (IT) sector.

We generated a rich corpus of measurement scales based on a review of the literature and on the on-site interviews with telecommunications senior executives. The survey contained multiple items measuring each construct, which were distributed throughout each section to avoid consistency bias. We also introduced several control questions at different points. For example, we measured the extent to which the firm used internal development, asked respondents to rank them compared to other activities (internal development, external sourcing), and also measured the level of investment in each sourcing mode. We deleted the few cases that exhibited a lack of convergence across similar questions. To address possible response-style biases (e.g., yea-saying), we introduced items that were heterogeneous in content and worded some items positively and others negatively (Baumgartner and Steenkamp, 2001).
**Unit of analysis**

We asked respondents to reflect on the use, motivation and performance of their internal development projects that they had conducted over the three to five years before the survey. This approach seeks to identify firm-wide patterns in decision making and performance, and avoids the selection bias that would arise if respondents focused on a single, self-selected decision. It also forces respondents to think about all the projects that they undertook, and not just the most successful or most recent ones, as this question from our survey illustrates “In the past 3 to 5 years, if you look at the way your firm has acquired new capabilities, what has driven your firm to choose internal development rather than external modes of capability acquisitions (i.e., purchase contracts, alliances/joint ventures and mergers & acquisitions)?

In a first set of questions, we asked senior managers to define the resource gaps that their company faced in technological, commercial and managerial areas. We asked them how often their company had used internal development and external sourcing in the past. We then asked those firms to indicate when they choose internal development over external sourcing. In particular, we measured how concerns about (1) stocks of existing resources, and (2) the nature of dynamic capabilities influenced their decision to use internal development rather than external sourcing. For example, we asked managers to rate on a 7 point-scale their agreement with the following statement: “In the past 3 to 5 years, we used internal development rather than external modes when the needed capabilities fitted our system of incentives and culture”.

Thus, we assess managers’ decision rules for choosing a sourcing mode rather than observing the choice of sourcing mode itself. Deviation from resource-based and dynamic capability prescriptions is contained in the item of our decision rule independent measures. For example, if an informant answered 3 to one of the items about dynamic capability concerns, then this would indicate a deviation of 4 from the prescribed level of 7 (because the theory suggests
that internal development be used when firms have appropriate dynamic capabilities to develop needed capabilities). Our objective is to assess whether managers select their internal development projects in accordance with the prescriptions of resource-based and dynamic capability views. Finally, in a separate part of the survey, we asked the respondents to rate their firms’ effectiveness in developing the needed resources internally.

Managerial judgment

Our use of managerial judgments is consistent with our conceptual framing. Firms’ choices between internal and external sourcing depend on their managers’ assessments of resources and dynamic capabilities, rather than on seemingly-objective measures of these concerns. The respondents were all senior executives with high-level responsibilities, who were knowledgeable of their firms’ decision-making process and who were able to evaluate the overall success of their internal development projects. While a single executive rarely makes all sourcing decisions within a firm, senior executives have sufficient perspective to recognize their firms’ decision rules in resource sourcing activities. Similarly, managerial judgments provide an appropriate measure of the success of internal development. The few existing external measures that could have been used (e.g., patents) have substantial biases and limits, because they focus almost exclusively on technical resources to the exclusion of commercial and managerial resources, as well as differing substantially among firms of different size and nationality.

We recognize that the same respondents provided information about antecedents (conformance of managers’ decision rules with theory) and outcomes (internal development performance), but we took several steps to address those concerns. First, we placed the antecedents and outcome questions at various different points in the survey — this helped limited the chance that answers to one set of questions would determine answers to a subsequent set, and also reduced the possibility that the respondents’ implicit theories about reasons for selecting a
mode would influence how they answered performance questions. We distributed the performance measures throughout the survey, before and after the questions measuring the reasons that firms selected sourcing modes. Second, we asked a wide range of questions so that respondents could not easily discern relationships among questions. Third, we used an extensive set of questions and measures for both antecedents and outcome, in order to provide variation in the types of antecedents and outcome issues that the respondents needed to consider. The results report substantial differences among performance outcomes, suggesting that there was no systematic bias in how respondents assessed antecedents and outcome. Fourth, as we describe later, we obtained external measures of longer term performance, based on firm survival, which provide support for the survey-based measures.

Appendix 1 reports the items we used for the questions. Most scales were seven-point Likert scales: responses ranged from “Fully disagree” to “Fully agree”, with a neutral centre point. Using verbal anchors helped ensure that respondents interpreted the questions the same way. A “Not applicable” option for each item allowed respondents to note that the relationship implied in the questions asked was not a valid generalization of their firms’ experience.

**Measures**

Table 2 provides descriptive statistics of the items we use in our structural equation model.

********** Insert Table 2 here **********

**Internal development performance**

We created two constructs to measure internal development performance. The first construct, which we refer to as internal development effectiveness, addresses the effectiveness of the firm in developing resources for its current needs. The construct includes four items that encompass efficiency criteria (quality and cost of internally developed resources – items 1 & 2) plus the
quality of internal governance (coordination of newly-created resources with existing resources and provision of a platform for future developments – items 3 & 4).

The second performance construct measures the extent to which internal development helps the firm transform its dynamic capabilities, which we refer to as internal renewal ability. This construct includes two items. The first renewal ability item assesses the extent to which internal development has led the firm to become more entrepreneurial and responsive to market changes. The second item assesses the degree to which the firm has increased the speed of its change and learning processes.

We use the performance constructs in two empirical models. Each model assesses how alignment of a firm's internal development choices with resource-based and dynamic capability prescriptions affects internal development performance.

Alignment with resource stocks

To assess the extent to which firms selected internal development when their resources were close and strong, we split the resource stock concept into two sub-constructs.

Our interviews indicated that managers distinguish two sets of resources, technical and commercial. For instance, in technical areas, they refer to a gap between the traditional circuit technology for voice traffic and new packet technology for data traffic. In parallel, commercial distance arose in gaps between current and targeted skills due to the traditional low marketing sophistication of PTOs and the emergence of aggressive new competitors.

The first resource-alignment construct measures the extent to which managers assess technical resource considerations when choosing internal development over external sourcing. We used two items for the technical resource measure. These items report the respondents’ assessments of the extent to which they prefer internal over external sourcing when their existing technical resources closely approach needed resources (resource closeness – item 1) and when
their technical skills were strong relative to those of their competitors (resource strength – item 2). We found that the closeness and strength dimensions correlate highly.

The second resource-alignment construct measures the extent to which managers assess commercial resources when choosing internal development over external sourcing. We used three items for the commercial resource measure. These items report the respondents’ assessments of the extent to which they prefer internal over external sourcing when the firm was already familiar with the customer (two items for resource closeness) and enjoyed market credibility (a third item for resource strength) in the targeted resource area.

Alignment with dynamic capabilities

We developed two dynamic capability constructs to measure incentive systems and resource conflict management ability. The first dynamic capability construct measures the extent to which managers assess incentive systems that enable the development and integration of new resources when choosing internal development over external sourcing. Two items report the respondents’ assessments of the extent to which they prefer internal over external sourcing when the needed resources fit their firm's organizational culture and incentive systems (motivation incentives) and when the firm had systems in place to integrate newly hired people (integration incentives).

The second dynamic capability construct measures the extent to which managers assess their firms' ability to generate and manage resource conflict to explore new learning paths. For this construct, we use three items that account for “resource conflict avoidance”. The items report the respondents’ assessments of the extent which they prefer internal over external sourcing when the needed capabilities “triggered little or no internal competition” (avoidance of conflicting resource development), “created little or no internal resistance” (preservation of social truce), and “brought only limited changes to our organization” (preservation of vested
interests). We then reversed the scale, so that the measure reflects the firm's willingness to manage resource conflict.

**Internal development experience**

We used three items to measure internal development experience. The first item assesses the frequency of internal development use. The second item refers to the level of investments in internal development. The third item assesses the extent to which the firm dedicated substantial resources to training internal people to develop the needed capabilities.

**Control measures**

We control for transaction cost factors, which suggest that firms may prefer internal development to external sourcing when they want to avoid the risks associated with exchanges with external partners. We include one variable that reflect the extent to which fear of information leakage with external partners will drive managers’ decision to choose internal development to external sourcing. Alignment with transaction cost prescriptions may help firm’s performance.

Several variables address other firm and environmental factors that might influence internal development performance. The controls include firm size (worldwide employees), firm geographic scope, firm R&D and advertising investments, and the nature of resource gap to be closed (the firm’s R&D and marketing needs). Larger firms may find it more difficult to change successfully. Different geographic spread of firm activities may impose constraints that inhibit resource development but can also provide opportunities to develop resources. A firm’s investments in key resources can also enable its internal resource creation activities. The scope nature of resource gap to be closed may also influence firm’s internal development performance.
Structural Model

Model structure

We used a structural modelling approach, using AMOS 4.0 (Arbuckle, 2002) to estimate the model. AMOS belongs to the second generation of the multivariate analysis family of techniques, which also includes LISREL².

A model for AMOS estimation consists of two primary parts: (1) an inner structural model that captures the structural relationship between the endogenous and exogenous latent variables, and (2) an outer measurement model that captures the manifestation of constructs or latent variables in terms of observable measures.

The inner structural model specifies the relations among the theoretical constructs (or latent variables) and can be written as:

\[ \eta = \beta \eta + \Gamma \xi + \zeta \]

where \( \eta \) is a \((m \times 1)\) vector of latent endogenous variables, \( \xi \) is a \((n \times 1)\) vector of exogenous latent variables, \( \beta \) is a \((m \times m)\) matrix of endogenous variable coefficients, \( \Gamma \) is a \((m \times n)\) matrix of exogenous variable coefficients, and \( \zeta \) is a \((m \times 1)\) vector of residuals. The latent endogenous variables (\( \eta \)) in this model are the four alignment constructs (two constructs for resource-based considerations, and two constructs for dynamic capability-based considerations), and the internal development performance construct (we will estimate two models because we use two performance constructs). The latent exogenous variables (\( \xi \)) is the internal development experience and control variables.

In turn, the outer measurement model can be written as:

\[ y = \Lambda_y \eta + \varepsilon \]
\[ x = \Lambda_x \xi + \delta \]
where \( y \) is a \((p \times 1)\) vector of endogenous indicators, \( x \) is a \((q \times 1)\) vector of exogenous indicators, \( \Lambda_y \) is a \((p \times m)\) matrix of regression coefficients of \( \eta \) on \( y \), \( \Lambda_x \) is a \((q \times n)\) matrix of regression coefficients of \( \xi \) on \( x \), \( \varepsilon \) is a \((p \times 1)\) vector of measurement error for the indicators of endogenous variables, and \( \delta \) is a \((q \times 1)\) vector of measurement error for the indicators of exogenous variables.

In order to provide a metric, one indicator of each latent construct was specified as having a factor loading equal to one (Bollen, 1989). AMOS estimated the structural and measurement models using the Full Information Maximum Likelihood estimator, which is recognized as an efficient estimator in the presence of missing data.

**Measurement Model Results**

Consistent with the two-step approach advocated by Anderson and Gerbing (1988), we estimated a measurement model prior to examining structural model relationships. We modelled the two resource-alignment constructs, the two capability-alignment constructs, the internal development experience construct, and the two performance constructs as seven correlated first-order factors in two distinct models. We tested the measurement model by examining individual item reliability, internal consistency, and discriminant validity. Table 3 reports the measurement model. All the non-fixed indicator loadings for each construct are significant \( (p<0.01) \), and range from 0.53 to 0.96. A common rule of thumb is to accept items with more explanatory power than error variance (Carmines and Zeller, 1979). In practice, this implies accepting loading greater than 0.7. This criterion is met for all items but four, which are superior to 0.50. We decided to retain those items in order to maintain a richer measure of our constructs (the results were not sensitive to dropping those items).

Evidence of internal consistency is provided by a measure suggested by Fornell and Larcker (1981), which they view as acceptable if it exceeds 0.70. Table 4 reports that all scales
demonstrate adequate internal consistency. Table 4 also includes estimates of the “average variance extracted”, which assess the average amount of variance in the indicators explained by the latent variable (relative to their average measurement error), and the correlations ($\phi$ estimates) among the latent constructs in the model. All estimates are higher than the 0.50 threshold that Fornell and Larcker (1981) recommend to demonstrate convergent validity.

Lastly, in order to assess discriminant validity, we verified that each construct shares more variance with its measures than it shares with other constructs. Discriminant validity is supported when the correlation between two constructs ($\phi$ estimates) is less than the square root of the average variance extracted of the two constructs (Fornell and Larcker, 1981). This criterion is met across all possible pairs of constructs. Table 4 shows the correlation matrix for the constructs. The diagonal of this matrix reports the square root of the Average Variance Extracted. Our constructs exhibit adequate discriminant validity because the diagonal elements are significantly greater than the off-diagonal elements in the corresponding rows and columns.

********** Insert Table 3 about here **********

RESULTS

Descriptive Results

We present descriptive results before turning to the theoretical model results. The charts in Figure 2 provide two types of summary information: first, the extent to which managers use criteria for choosing internal sourcing over external sourcing that reflect resource-based and dynamic capabilities prescriptions and, second, the extent to which internal development experience influences managers’ decision rules. We split our sample between high (79 observations) versus low (81 observations) internal experience at the median value. Table 4 provides frequencies across the two sub-samples.

********** Insert Figure 2 and Table 4 about here **********
First, on average, criteria pertaining to resource-based considerations in sourcing decisions (5.1 on a seven-point scale for technical resource stocks and 5.0 for commercial stocks) receive higher scores from respondents than criteria that are related to dynamic capabilities (4.5 for role of incentive systems and 3.5 for ability to manage resource conflicts). Paired-sample T-tests show that the differences between the two types of criteria are statistically significant. Managers may be more aware of the immediate need of drawing on relevant existing resources to build needed resources internally. Criteria that pertain to dynamic capabilities (such as incentive systems and, even more so, the ability to manage resource conflict) may be perceived as less important to undertake internal development effort.

Second, a significant proportion of the respondents agree with the prescriptions of the resource-based view. For instance, fifty percent of managers agree to a great extent (score equal or greater than 5 on a seven-point scale) that internal development was preferred to external sourcing when they possess relevant internal resource stock (technical or commercial). Responses on technical resource stock and commercial resource stock correlate at least moderately ($r = 0.45$).

Table 4 shows that internal development experience makes managers more likely to account for the role of resources in their sourcing decisions. For instance, when asked whether internal development was chosen over external sourcing when the firm possesses relevant technical resources, 71% of managers in the high internal experience sub-sample assigned a score equal or superior to 5 (on a seven-point scale), while 55% of managers from the low internal experience sub-sample assigned a score equal or superior to 5. For the same question, 47% of managers in the high internal experience sub-sample assigned a score equal or greater than 6. This proportion falls to 19% for managers from the low internal experience sub-sample. Similarly, we find differences for similar questions pertaining to the role of commercial resource
stock in resource sourcing decisions (although the differences between sub-groups are of lesser magnitude). T-test on the means of each sub-sample provided significant results for both alignment with technical resource stocks (5.42 versus 4.72 in high vs. low internal experience groups; p<0.01), and alignment with commercial resource stocks (5.08 versus 4.89 in high versus low internal experience groups; p<0.10).

Third, our results show that a significant proportion of managers assess the role of incentive systems in their sourcing decisions. For instance, forty-two percent of managers agree to a great extent (score equal or greater than 5 on a seven-point scale) that internal development was preferred to external sourcing when they possess relevant incentive systems to motivate internal people or attract external people to develop in-house new resources. Table 4 shows that internal development experience makes managers more likely to consider incentive systems in their sourcing decisions. For instance, when asked whether internal development was chosen over external sourcing when the firm possesses appropriate incentive systems, 55% of managers in the high internal experience sub-sample assigned a score equal or greater than 5 (on a seven-point scale), while only 29% of managers from the low internal experience sub-sample assigned this high score. For the same question, 24% of respondents in the high internal experience sub-sample assigned a score equal or superior to 6, for only 4% of respondents from the low internal experience sub-sample. T-tests on the means of the construct reflecting alignment with incentive systems produced significant differences across sub-samples (4.80 versus 4.24 for high versus low internal experience; p < 0.01). Also, note that the correlations between responses on the role of incentive systems in sourcing decisions with those on the role of technical resource stock (r=0.14) or commercial resource stock (r=0.18) in sourcing decisions are low.

Finally, the results show that a lesser proportion of respondents value the role of their firms’ ability to manage resource conflicts when making sourcing decisions. Forty percent of
respondents assign a score equal or greater than 5 (on a seven-point scale) when asked about the role of their ability to manage resource conflict in their sourcing decision; this proportion falls to 14% for score equal or greater than six. We did not find significant differences for scores on this criterion across the two sub-samples of high versus low internal development experience. Last, note that the responses concerning criteria that account for resource conflict correlate negatively with the technical and commercial resource alignment measures (r = -0.13 and r = -0.09) as well as with the incentive fit measure (r = -0.27). The negative correlation between the two constructs that account for dynamic capabilities is intriguing and suggests that respondents tend to see the two aspects of dynamic capabilities as generating countervailing influences. Incentive fit accounts for alignment with current systems, whereas the ability to manage resource conflict requires challenging the current organization. These differences may produce a tension between alignment and adaptability, which can be beneficial in the long-run but may interfere with shorter run activities.

**Structural Model Results**

Table 5 reports the results of the two structural models. In the first model, the performance dependent variable assesses the effectiveness of internal development in creating needed resources, using items that reflect both efficiency and governance quality criteria. The first model accounts for 38% of the performance variance (53% with the control variables). In the second model, the performance dependent variable assesses the ability for internal renewal. The second model accounts for 29% of the performance variance (38% with the control variables).

********** Insert Table 5 about here **********

Model 1 strongly supports hypothesis 1, which expected internal development to be more successful when firms select projects that fit their internal resource stocks. Firms that undertake internal development projects that fit their technical and commercial resource stocks are more
effective in developing the needed resources than firms that do not take resource-based
c onsiderations into account. Alignment with commercial and technical resource decision rules
have somewhat different influences. Alignment with commercial resource stocks has a stronger
effect on performance than alignment with technical resource stocks, although both have
significant positive impact. The stronger effect of alignment with commercial resource stocks
suggests that firms often benefit by building new resources that extend their existing commercial
strengths, while extending technical skills may provide more marginal benefits. Some recent
research also suggests that a history of increased efforts for developing and maintaining
marketing resources is an enduring source of competitive advantage while economic rents from
prior resources dissipate rapidly in technical areas (Kor and Mahoney, 2005).

Model 2, by contrast, does not support hypothesis 1. Our analysis shows that alignment
with resource stocks does not have a significant impact on a firm’s internal renewal ability. Thus,
alignment of sourcing with resource stocks has more influence on effectiveness for closing a
resource gap (model 1) and less influence on how a firm renews itself (model 2). This contrast
suggests that resource fit may not generate a sufficient degree of novelty over time to enable
firms to change sufficiently as their competitive environments change.

Both models support Hypothesis 2, which expected alignment with existing dynamic
capabilities to improve internal development success. The results are strongest for the internal
renewal ability (model 2), as both incentive system alignment and conflict management ability
contribute to success. For effectiveness in closing specific resource gap (model 1), by contrast,
only alignment with incentive systems contributes to success. Although the earlier descriptive
results showed that managers assigned higher scores to the role of resource stocks than that of
dynamic capabilities in their sourcing decisions, the analytic results show that alignment with
incentive systems influences the ability of the firm to renew itself.
The differential impact on effectiveness and internal renewal of the second dimension of dynamic capabilities—the ability to manage resource conflict—is particularly intriguing. In model 1, firms that avoid resource conflicts by selecting internal developments projects that do not trigger internal competition or resistance are no less effective than firms that are willing to undertake internal projects that generate resource conflicts. By contrast, in model 2, which captures internal renewal, firms that avoid resource conflicts by selecting internal projects that do not trigger internal competition or resistance under-perform firms that are willing to undertake internal projects that generate resource conflicts. It appears that the multiple perspectives and differences of opinion that arise with conflict have more benefit in identifying paths for future change than for immediate resource development effectiveness. This difference might arise because of the need to take time to consider and integrate differences in opinion, which would limit the ability to solve current issues but would help create a basis for future actions.

The results in the bottom panel of Table 5 are consistent with hypothesis 3, which expected that managers’ decision rules for selecting internal development projects will become more likely to conform with resource-based and capabilities-based prescriptions as their firm accumulates internal development experience. The results of our structural models confirm the earlier descriptive results. Except for the ability to manage resource conflicts, we found that experience has a strong positive effect on the likelihood of managers to adhere to decision rules that reflect prescriptions of the RBV and dynamic capabilities view. We found consistent results across models. These results suggest that experience helps managers to select appropriate sourcing modes to develop needed resources. We also found a positive direct effect of experience on internal development performance. The direct experience results were strongest in model 1, concerning current effectiveness.
Investigating how experience affects performance via decision rule alignment unpacks the benefits of experience. We distinguish between benefits that stand at the level of implementation ability and those that arise at earlier stage in the selection itself of the resource development projects. The results suggest that experience facilitates success both by helping with implementation and by helping managers to select appropriate modes.

In sum, we found empirical support for the role of resource stocks and dynamic capabilities in influencing firms’ sourcing decisions and performance. Firms with internal development choices that align with resource-based or capabilities-based prescriptions were more successful in developing new capabilities and renewing themselves than deviant firms. At the same time, we find interesting variations in the relationship between internal development performance, resource-based considerations, and dynamic capability-based considerations.

Taking resource stocks into account in sourcing decisions has more immediate impact by improving firms’ effectiveness in closing their resource gaps, while taking dynamic capabilities into account when making sourcing decisions leads to broader benefits by promoting a firm’s internal renewal ability. Thus, firms that do not pay heed to aligning their resource development projects with their incentive systems and providing a social context that can house conflicting resource development activities pay a longer-term performance penalty. We also find that experience makes managers more likely to select internal development projects that draw on relevant internal resource stocks and appropriate incentive systems.

Controls and Sensitivity Analyses

The other control variables in Table 5 offer insights. Larger firms report lower performance of their internal development efforts, possibly because they face more inertia as their size increases. We observe intriguing results for the effects of geographic scope on internal development performance. Firms with larger geographic scope report lower internal development
effectiveness, possibly because they face higher complexity and costs associated with greater geographic scope. Yet, firms with greater geographic scope report greater success in renewal ability, possibly because access to geographically-dispersed markets provides opportunities to tap more diverse pools of knowledge.

We took advantage of the time that has passed since we conducted the survey, by determining whether the firms in the study continued to operate successfully in early 2004 or, alternatively, whether they had undergone substantial restructuring or exited the industry. We were able to identify the current status of 150 of the responding firms, and found that 35 (23%) had either exited the industry (8 dissolutions and 16 acquisitions) or had undergone substantial restructuring (11 cases that were equivalent to filing for Chapter 11 bankruptcy in the US). We defined these 35 cases as “troubled firms”, after checking that the acquisitions involved firms that had encountered financial problems. We used this information to assess the reliability of the respondents’ survey answers. We compare the means of reported ROE (return on equity) and ROA (return on assets) across three main sub-samples: (1) the surviving firms, (2) the financially distressed firms, and (3) the non-surviving firms (firms which were dissolved or acquired). We expected reported ROE and ROA to be significantly higher in the surviving firms than in the troubled firms. As Figure 3 shows, we found significantly higher reported ROE and ROA from firms that survived than firms that did not survive or faced financial problems after the survey period. This result helps provide external validation of the survey information.

********** Insert Figure 3 here **********

DISCUSSION AND CONCLUSION

We argued that firms that select internal development projects using decision rules that reflect criteria of resource-based and dynamic capabilities theories will be more successful in their internal development efforts than firms that do not use such decision rules. We also argue that
experience shapes managers’ ability to select appropriate modes of resource sourcing, as well as improving implementation ability. The analysis supports our core propositions, with intriguing variations in the relationship between internal development performance, resource-based criteria, and dynamic capabilities criteria.

The research provides support for arguments that draw on resource-based and dynamic capabilities theories. Using the notion of discriminating alignment, which the transaction cost literature has developed, we find support for the idea that using decision rules that match the nature of the resource gap with the features of the sourcing mode leads to a superior outcomes. Most studies have focused on the choice of governance using a transaction cost lens, but little work has tested the notion of discriminating alignment in a resource-based or dynamic capabilities perspective (for an exception, see Poppo and Zenger, 1998). While the resource-based view of the firm has been criticized for being an ex-post rationalization with no prescriptive value (Priem and Buttler, 2001a; 2001b), we found that firms that properly consider the role of resource stocks and dynamic capabilities in their sourcing decision fare better than firms that do not take into account criteria that the resource-based and dynamic capability theories highlight.

An emerging line of research increasingly argues that we need to understand resources and dynamic capabilities in order to understand firm boundaries (Langlois and Roberston, 1995; Santos and Eisenhardt, 2005). Recent empirical research on firm’s boundaries has combined transaction cost arguments with resource-based factors (Jacobides and Winter, 2005; Delmas, 1999; Poppo and Zenger, 1998; Argyres, 1996) and dynamic-capability based arguments (Gulati, Lawrence and Puranam, 2005). However, little work has examined the combined influence of resources and dynamic capabilities in sourcing mode decision and performance (recent exceptions include Villalonga and McGahan, 2005). Our research reveals important links
between performance, resources, and dynamic capabilities that go beyond finding additive effects of resource and dynamic capabilities on performance. Instead, we find variation in their roles, with resources playing a more immediate role on firm’s effectiveness in closing a well-defined resource gap while dynamic capabilities play a more dominant role in facilitating a firm’s longer-term renewal ability. Thus, resource fit provides immediate benefits of effective exploitation, while dynamic capabilities facilitate exploration and adaptability.

Consistent with recent work, our results suggest that focusing on existing resource stocks and preserving a tight resource fit may reinforce existing management processes and create configurations of deeply entwined resources that become inertial (Siggelkow, 2001). Dynamic capabilities matter to promote strategic flexibility and renewal, while resources themselves need to be more loosely coupled in more dynamic environments (Eisenhardt and Bingham, 2005). Also, note that successful internal development requires to strike a subtle balance between different types of organizational processes that nurture legacy (alignment with current incentive systems) and favor adaptation (ability to introduce competing business models and organizational setting). In our study, these two dimensions of dynamic capabilities were negatively associated, and very few respondents value their role simultaneously. Firms that can pay proper attention to these two dimensions simultaneously may value an “organizational ambidexterity” mindset. The literature on organizational ambidexterity sees alignment with current organizational processes and adaptability as a desirable organizational trait of a learning organization (Tushman and O’Reilly, 1996; Gibson and Birkinshaw, 2004).

The study also sheds light on the relationship between experience and firm performance. Most work on learning has focused on how experience helps firms manage a particular mode of resource development through a mix of learning-by-doing and deliberative investments in knowledge articulation and codification activities (Zollo and Winter, 2002). Thus, the literature
focuses on how experience helps firms implement their decisions. In our study, we examine the extent to which experience influence managers’ decision rules. In doing so, we distinguish between the benefits of learning that stem from making better decisions in selecting a mode of resource development and benefits that arise from better implementing a resource development mode. No empirical research has tested the extent to which experience increases the likelihood that managers will make better decisions about sourcing modes. Our results support the intuition that firms need to make good decisions as well as become good implementers in order to succeed. Accumulating experience helps firms address both aspects of performance.

Our work has limitations. First, the study aims to capture resource-based and capability-based criteria that are difficult to measure. Most of empirical work that aim to measure variations in internal capabilities use cost differences or differences in scale as a proxy (Poppo & Zenger, 1998) or product relatedness (Villalonga and McGahan, 2005; White, 2000; Masten, Meehan and Snyder, 1991). We develop fine-grained perceptual measures of resources and dynamic capabilities. Like any-survey based data, concerns about the retrospective data collection arise. Prior research indicates that memory degrades exponentially with time (Sudman & Bradburn, 1973) and that retrospective accounts, even by top managers, degrade over time (Golden, 1992). Furthermore, top managers often attempt to cast past behaviours and outcomes in a desirable light, especially when they have a reputational or emotional investment in such outcomes (Golden, 1992). We recognize that the nature of our questions may induce ex-post rationalizations and/or a desirability bias. We attempted to triangulate some measures using post-survey survival data. Nonetheless, future research could usefully apprehend resources and dynamic capabilities with objective data. Second, we focus on managers’ decision rules, rather than the decisions themselves. Future research could examine the choice of specific resource development projects and their respective governance features (Bidwell, 2003). Third, we
operationalize two aspects of dynamic capabilities: incentive systems and the ability to manage resource conflict. Other work could enrich these measures, such as assessing the recombination processes and linkages that help firms trade knowledge and people within the firm. We also believe that qualitative research could deepen the notion of a firm’s capability to manage resource conflict and how firms frame internal contexts in order to balance legacy and change.

To conclude, this study shows that assessing resources and dynamic capabilities when making sourcing decisions influences firms’ resource development performance. Our study shows that RBV and dynamic capabilities view offer prescriptive implications that complement those that are highlighted in TCE. Last, our work suggests that further research could fruitfully explore further the source of experience benefits, by making the distinction between the ability to select viable mode of resource sourcing and the ability to implement resource sourcing decisions.

ENDNOTES

1 The internal-external sourcing distinction raises two conceptual issues. First, sourcing processes often combine internal and external modes (Foss and Eriksen, 1995). Nonetheless, many sourcing choices emphasize internal development while others derive primarily from external inputs. Second, one could unbundle the external sourcing modes. In this study, however, we seek to identify factors that lead to the success of a firm’s internal sourcing activities. We view the different external sourcing modes as a continuum (Leonard, 1995), where motives for external sourcing strengthen as firms move from purchase contract to alliances, to acquisitions. The initial drivers for the choice of external modes are similar, in that it is appropriate to distinguish between internal and external modes. Arora and Gambardella (1990), for instance, show that the use of external modes, including purchase agreements, alliances, and acquisitions, tends to co-vary.

2 Structural modelling addresses structural and measurement issues frequent in survey-designed research and has been used increasingly in strategic management research. Structural modelling is appropriate to test the hypothesized model because of its ability to (1) consider multiple regressions simultaneously to permit the analysis of direct, indirect, and spurious relationships, (2) estimate models with latent variables, (3) estimate the loadings of each observed variable in the context of the full model rather than in isolation, (4) accommodate measurement errors in both dependent and independent variables, (5) accommodate reciprocal causation, simultaneity, and interdependence, and (6) account for correlations among error terms (Bollen, 1989).
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Figure 1. Theoretical Model

**RBV-DISCRIMINATING ALIGNMENT**
Selection of internal development projects aligned with the firm’s resource stocks, i.e. when

- Relevant Technical Resource Stocks
- Relevant Commercial Resource Stocks

**DYNAMIC CAPABILITY-DISCRIMINATING ALIGNMENT**
Selection of internal development projects aligned with firm’s dynamic capabilities, i.e. when

- Appropriate Incentive Systems
- Ability to Manage Resource Conflicts

**P1**
**P2**
**P3**
Figure 2. Managers’ decision rules for selecting internal development over external sourcing

2A- Alignment with resource-based prescriptions (fit with technical resource stock)

2B- Alignment with resource-based prescriptions (fit with commercial resource stock)
Figure 2 (continued). Managers’ decision rules for selecting internal development over external sourcing

2C- Alignment with dynamic capabilities prescriptions (fit with incentive systems)

2D- Alignment with dynamic capabilities prescriptions (ability to manage resource conflict)
Figure 3. Comparison of Reported Firm Performance in Surviving versus Distressed or Non-surviving Surveyed Firms

Non-surviving surveyed firm = Bankrupt or being taken over by another firm (1999-2004)
Table 1. Discriminating Alignment Approaches

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<th>Transaction cost economics</th>
<th>Resource based and dynamic capabilities theories</th>
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<tr>
<td>Discriminating alignment hypothesis</td>
<td>Discriminating alignment of transactions with governance modes leads to superior outcome via reduction of transaction costs</td>
<td>Discriminating alignment of resource development projects with sourcing mode leads to superior outcome through greater success (fit, cost, speed) in developing needed resources</td>
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<tr>
<td>Unit of analysis</td>
<td>Transaction</td>
<td>Resource development projects</td>
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| Attributes of transactions or projects | • Asset specificity  
• Uncertainty  
• Frequency | • Nature of resource gap to be closed  
• Resource requirements: Local versus distant search  
• Organizational requirements: Knowledge identification & integration, employee motivation |
| Mode of organization      | Three modes of governance:  
• Spot exchange  
• Hybrid contractual  
• Hierarchy | Two main modes of resource development:  
• Internal development  
• External sourcing (spot exchange, hybrid contractual, acquisition) |
| Organization attributes   | • Incentive intensity  
• Administrative control  
• Contract law | • Stock of existing resources (create differences in costs)  
• Endowments of dynamic capabilities (create differences in incentives & adaptive capacities) |
| Outcome                   | Minimize transactions costs | Maximize success in developing needed resources     |
Table 2. Summary Statistics and Correlations

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<td>2. Strength of existing technical resources</td>
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<td>4. Familiarity with customer in targeted resource area</td>
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<td>25. Cost of internal development</td>
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<td>26. More entrepreneurial and responsive to market changes</td>
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Mean: 4.98
Standard deviation: 1.41
Range: 1_7
N=162
### Table 3. Measurement Model

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<th>Latent variables</th>
<th>Internal consistency</th>
<th>Average Variance Extracted</th>
<th>Correlations between latent variables$^1$</th>
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<tr>
<td>($\xi_1$) Internal development experience</td>
<td>.87</td>
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<tr>
<td>($\eta_1$) Alignment with technical resource stock</td>
<td>.92</td>
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<td>($\eta_2$) Alignment with commercial resource stock</td>
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<td>($\eta_3$) Alignment with incentive systems</td>
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<td>($\eta_4$) Alignment with resource conflict ability</td>
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<td>($\eta_{5a}$) Internal development effectiveness</td>
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<tr>
<td>($\eta_{5b}$) Internal renewal</td>
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#### Measurement paths

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<th>Unstandardized Estimates</th>
<th>Critical ratio (Estimate/SE) (1)</th>
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1. Internal consistency = ($\sum \lambda_{y_i}^2$) / [$($\sum \lambda_{x_i}^2$) + $\Sigma (1- \lambda_{y_i}^2)$]. The internal consistency measure is similar to Cronbach’s alpha, except that the alpha measure assumes that each indicator of a construct contributes equally (i.e., the loading is equal to unity). Fornell and Lacker (1981) argue that their measure is superior to Cronbach’s alpha because their measure uses item loadings estimated within the causal model.

2. Average variance extracted = $\sum \lambda_{x_i}^2$ / [$($\sum $\lambda_{x_i}^2$) + $\Sigma (1- \lambda_{y_i}^2)$]. The square root of average variance extracted assesses discriminant validity (Fornell and Larcker, 1981).

3. The on-diagonal elements are the square root of the average variance extracted.

---

(1) CR values greater than 1.64, 1.96, and 2.32 are statistically significant at 90%, 95%, and 99% confidence level, respectively.
Table 4. Differences of Scores on Criteria for Sourcing Decisions Between Firms with High versus Low Internal Development Experience

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<thead>
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<th>Importance of criteria in firm's internal development choice over external sourcing</th>
<th>High Internal Development Experience n= 79</th>
<th>Low Internal Development Experience n= 81</th>
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<td>Score 1-7 (7= highly important)</td>
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<td>Ability to Manage Resource Conflicts</td>
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<tr>
<td></td>
<td>6</td>
<td>5.1</td>
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<td></td>
<td>5</td>
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<td></td>
<td>4</td>
<td>37.2</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>62.8</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>91</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>100</td>
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</table>
Table 5. Theoretical Model Results
(Positive coefficient = greater success of internal development projects, 162 cases)

<table>
<thead>
<tr>
<th></th>
<th>1a</th>
<th>1b</th>
<th>2a</th>
<th>2b</th>
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<tr>
<td><strong>Alignment with resource-based prescriptions (H1)s</strong></td>
<td></td>
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</tr>
<tr>
<td>1. Alignment with technical resource stocks</td>
<td>.13(*)</td>
<td>.12**</td>
<td>.10</td>
<td>.12</td>
</tr>
<tr>
<td>2. Alignment with commercial resource stocks</td>
<td>.29**</td>
<td>.19**</td>
<td>.07</td>
<td>.11</td>
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<tr>
<td><strong>Alignment with capability-based prescriptions (H2)</strong></td>
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<tr>
<td>3. Alignment with incentive systems</td>
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<td>.05(*)</td>
<td>.45***</td>
<td>.33***</td>
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<tr>
<td>4. Alignment with resource conflict management ability</td>
<td>.04</td>
<td>.01</td>
<td>.16*</td>
<td>.14*</td>
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<tr>
<td><strong>Control variables</strong></td>
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<td>5. Internal development experience</td>
<td>.24***</td>
<td>.13**</td>
<td>.06</td>
<td>.12</td>
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<td>6. Transaction cost (concern for information leakage to partners)</td>
<td>-.03</td>
<td>.07</td>
<td></td>
<td></td>
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<tr>
<td>7. Firm size (worldwide staff)</td>
<td>-.08**</td>
<td>-.20***</td>
<td></td>
<td></td>
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<tr>
<td>8. Firm geographic scope</td>
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<td>.18*</td>
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<td>9. Firm R&amp;D investments</td>
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<td>-.04</td>
<td></td>
<td></td>
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<tr>
<td>10. Firm advertising investments</td>
<td>.05</td>
<td>.17   *</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Firm R&amp;D resource needs</td>
<td>.05*</td>
<td>-.11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Firm marketing resource needs</td>
<td>.04</td>
<td>.15*</td>
<td></td>
<td></td>
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<tr>
<td><strong>Indirect effects of experience on performance through effect on alignment (H3)</strong></td>
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<tr>
<td>Experience → Alignment with technical resource stock</td>
<td>.40***</td>
<td>.42***</td>
<td>.42***</td>
<td>.42***</td>
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<tr>
<td>Experience → Alignment with commercial resource stock</td>
<td>.11**</td>
<td>.12**</td>
<td>.11**</td>
<td>.11**</td>
</tr>
<tr>
<td>Experience → Alignment with incentive systems</td>
<td>.26***</td>
<td>.26***</td>
<td>.24***</td>
<td>.24***</td>
</tr>
<tr>
<td>Experience → Alignment with ability to manage resource conflict</td>
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<td>-.11</td>
<td>-.10</td>
<td>-.10</td>
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<tr>
<td>R-square</td>
<td>0.38</td>
<td>0.53</td>
<td>0.29</td>
<td>0.38</td>
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</table>

*** p < .01, ** p<.05, * p<.10 (two-tailed tests); (*) p< .10 (one-tailed tests)
Appendix 1. Survey Instrument

**Internal development:** refers to the changes that a firm undertakes internally by recombining its own existing capabilities or developing new capabilities on its own.

*Examples: training internal staff, internal product development, hiring new staff, building new plants.*

### A. “Alignment with theory” constructs

“In the past 3 to 5 years, if you look at the way your firm has acquired new capabilities, what has driven your firm to choose internal development rather than external modes of capability acquisition (i.e., purchase contracts, alliances/joint ventures and mergers & acquisitions)?”

**In the past 3 to 5 years, we used mergers & acquisition rather than alliances/joint ventures when**

<table>
<thead>
<tr>
<th>Fully Disagree</th>
<th>Fully Agree</th>
<th>N/A</th>
</tr>
</thead>
</table>

**Alignment with RBV prescriptions**

- Our existing technical capabilities were close to the needed technical capabilities. 1 2 3 4 5 6 7 na
- We had a very strong competitive position in the technical area. 1 2 3 4 5 6 7 na
- Our existing marketing capabilities were close to the needed marketing capabilities. 1 2 3 4 5 6 7 na
- We already knew the customers in the targeted capability area. 1 2 3 4 5 6 7 na
- We already had market credibility in the targeted capability area. 1 2 3 4 5 6 7 na

**Alignment with dynamic capability-based prescriptions**

- The needed capabilities fitted our system of incentives and culture. 1 2 3 4 5 6 7 na
- Our system of incentives suited hiring the needed people. 1 2 3 4 5 6 7 na
- We had systems in place to integrate newly hired people. 1 2 3 4 5 6 7 na
- Developing the needed capabilities triggered little or no internal competition. (reverse coding) 1 2 3 4 5 6 7 na
- Developing the needed capabilities created little or no internal resistance. (reverse coding) 1 2 3 4 5 6 7 na
- The needed capabilities brought only limited changes to our organization. (reverse coding) 1 2 3 4 5 6 7 na

**Alignment with TCE prescriptions (control)**

- We feared information leakage when negotiating with external partners. 1 2 3 4 5 6 7 na

### B. Internal development experience

In the past 3 to 5 years, if you look at the way your firm has acquired new capabilities, how often have you used internal development?

**In the past 3 to 5 years:**

<table>
<thead>
<tr>
<th>Fully Disagree</th>
<th>Fully Agree</th>
<th>Not applicable</th>
</tr>
</thead>
</table>

- We have frequently used internal development. 1 2 3 4 5 6 7 na
- We have dedicated substantial investments to internal development. 1 2 3 4 5 6 7 na
- We have dedicated substantial resources to training our internal people to develop the needed capabilities. 1 2 3 4 5 6 7 na
C. Internal development performance

C1. Effectiveness of internal development

Overall, in the past 3 to 5 years, has your firm been satisfied with the effectiveness of internal development?

<table>
<thead>
<tr>
<th>In the past 3 to 5 years, internal development has been effective in terms of:</th>
<th>Fully Disagree</th>
<th>Fully Agree</th>
<th>Not applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of the capabilities created by internal development</td>
<td>1 2 3 4 5 6 7</td>
<td>na</td>
<td></td>
</tr>
<tr>
<td>Smooth coordination/integration of the capabilities created by internal development with our existing capabilities.</td>
<td>1 2 3 4 5 6 7</td>
<td>na</td>
<td></td>
</tr>
<tr>
<td>Creating a platform for future developments.</td>
<td>1 2 3 4 5 6 7</td>
<td>na</td>
<td></td>
</tr>
<tr>
<td>Cost efficiency</td>
<td>1 2 3 4 5 6 7</td>
<td>na</td>
<td></td>
</tr>
</tbody>
</table>

C2. Ability of internal renewal

Overall, in the past 3 to 5 years, what has been the impact of using internal development on your firm’s capabilities, people and culture?

<table>
<thead>
<tr>
<th>In the past 3 to 5 years, internal development has led to:</th>
<th>Fully Disagree</th>
<th>Fully Agree</th>
<th>Not applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Becoming more entrepreneurial and responsive to market changes.</td>
<td>1 2 3 4 5 6 7</td>
<td>na</td>
<td></td>
</tr>
<tr>
<td>Speeding up our learning and change process.</td>
<td>1 2 3 4 5 6 7</td>
<td>na</td>
<td></td>
</tr>
</tbody>
</table>

D. Controls

Number of employees: <200 200-500 01-1000 1001-5000 >5000
Return on assets: <5% 5-10% 11-15% 16-20% >20%
Return on equity: <5% 5-10% 11-15% 16-20% >20%
R&D expenses/sales: <2% 2-5% 6-10% 11-15% >15%
Advertising expenses/sales: <2% 2-5% 6-10% 11-15% >15%

Geographic scope of your company’s operations

Domestic International (regional focus) Global

Firm Resource needs:

In the past 3 to 5 years, we have needed the following capabilities:

- R&D capabilities.
- Marketing expertise (customer knowledge, branding, pricing).