FIRM SURVIVAL AND THE DYNAMIC CAPABILITY TO BALANCE INTERNAL DEVELOPMENT AND EXTERNAL SOURCING

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ABSTRACT

Recent arguments in the dynamic capabilities literature suggest that firms need to develop skills with both internal development and external sourcing to be able to thrive over time. We have a limited understanding of the conditions that best suit internal and external sourcing, however, while no large-scale study has examined the extent to which firms’ ability to form coherent portfolios of internal development and external sourcing projects improves their ability to renew their capabilities and survive in dynamic environments. This study examines the role of capability and institutional constraints in shaping firms’ choices of capability sourcing modes and, in turn, their ability to successfully create new capabilities and survive in their industries. Thus, the research focuses on an under-emphasized form of dynamic capability: the ability to identify appropriate modes of capability sourcing. We test the arguments with a detailed survey and longitudinal study of the international telecommunications industry. We find intriguing variations in the way that heeding capability constraints and various forms of institutional constraints influences firms’ ability to change successfully.
Firms that strike a balance between internal development and external growth for obtaining new capabilities may gain long-term performance advantages. Internal development allows a firm to exploit its specific knowledge while protecting its knowledge and coordinating its development activities (Helfat, 1994). In parallel, external growth through acquisitions and alliances helps a firm develop new capabilities that guard against obsolescence and resolve organizational inertia (Rosenkopf and Nerkar, 2001). Recent arguments in the dynamic capabilities literature suggest that firms need to develop skills in both internal development and external sourcing to be able to thrive over time (Helfat, et al., 2006). However, firms often struggle to achieve such a balance. For instance, Vermeulen and Barkema (2001) showed that firms find it difficult to maintain internal and external mechanisms concurrently, and may oscillate between internal and external sourcing over time. In the face of such difficulties, firms that discriminate between conditions that suit internal and external sourcing, and then achieve a balance in sourcing modes, should gain competitive advantage. Although we have a growing understanding of the conditions under which internal and external sourcing are most appropriate, substantial open questions remain concerning the nature of such contingencies (Eisenhardt and Martin, 2000) and firms’ ability to select sourcing modes appropriately (Shaver and Mitchell, 2003). Moreover, no large-scale study has examined the extent to which firms’ ability to select source modes and form coherent portfolios of internal development and external sourcing projects improves their ability to create new capabilities and survive in dynamic environments.

Discussing the implications of their longitudinal study, Vermeulen and Barkema (2001: 470) stressed that “an interesting issue for future research would be to explore which contingencies (managerial, structural, institutional, and so forth) stimulate firms to strike a balance between the two modes over time, or push them into a strategy of external growth through acquisitions only”. Building on their point, we argue that selectively employing both internal and external modes of expansion is often necessary for firms to “achieve new resource configurations as markets emerge”, as Eisenhardt and Martin (2000: 1107) put it. In order to strike such a balance, firms need to understand the conditions under which internal development or external sourcing will be most appropriate for seeking new capabilities.
Although internal development and external sourcing can serve similar capability-sourcing objectives, they present differences in their capacity to cope with constraints that arise from firms’ existing stock of capabilities and from their internal social institutions, such as organizational practices and incentive to change. Internal development offers firms an effective way to develop new capabilities that are relatively close to their existing capabilities (Penrose, 1959; Helfat, 1994) and compatible with their internal institutional context (Nelson and Winter, 1982). In contrast, external sourcing provides a more effective way of acquiring capabilities that are more distant from the firm’s capabilities or create a threat to its existing social context. Spanning the firm’s boundaries through alliances and acquisitions provides it with an important way of obtaining radically new capabilities (Rosenkopf and Nerkar, 2001) and dealing with internal conflict, a point that is reflected in several definitions of dynamic capabilities (Helfat, et al., 2006). For example, the ability of a firm to acquire and use external knowledge is part of its architectural competence (Henderson and Clark, 1990) and combinative capability (Kogut and Zander, 1992). Taylor and Helfat (2006) introduce the notion of linking mechanisms which connect the new core technology to existing, as well as newly acquired, complementary assets.

We posit that a firm’s ability to renew its capabilities and ultimately to survive in turbulent environments is contingent upon its ability to choose the most appropriate mode of obtaining new capabilities. We expect that firms that assess capability and institutional constraints appropriately when choosing between internal development and external sourcing will be more effective at developing new capabilities, and will ultimately survive longer than firms that do not take those constraints into account.

We test our arguments in the international telecommunications industry from 2000 to 2005. The industry provides a particularly rich setting to study how firms acquire new capabilities in the face of rapid industry changes including deregulation, price competition, technological convergence, and entry of foreign competitors (Williams and Mitchell, 2004). Institutional changes such as deregulation reset an industry’s clock (Delmas and Tokat, 2005; Walker, Madsen and Carini, 2002). Both established telecommunications firms and industry newcomers faced a substantial need to acquire new capabilities that would suit the changing environment (Chen, Williams, and Agarwal, 2006). To obtain new
capabilities, telecommunications firms have resorted to active use of internal development and external sourcing modes.

This study uses three sets of data to develop and test our predictions. While developing our conceptual arguments, we conducted 26 interviews at large telecommunications companies to understand what type of capabilities firms needed to develop to survive in their fast-changing environment and how they closed their capability gaps; we use quotes from these interviews to illustrate our arguments. We then administered a large-scale survey of telecommunications firms operating in Europe, North America, South America, and Asia to assess firms’ criteria for choosing from among different modes of capability sourcing and the initial success of their capability development activities. We followed up by collecting longitudinal survival data of the respondent firms during the five years following the survey.

INTERNAL AND EXTERNAL MODES OF CLOSING CAPABILITY GAPS

Definitions

The term ‘capability’ denotes the stock of knowledge, skills, financial assets, physical assets, and human capital that determines what a firm is able to do (Wernerfelt, 1984; Amit and Shoemaker, 1993). More precisely, following Richardson (1972), we define capabilities as the means by which firms use physical and knowledge-based factor inputs to create goods and services. We use the term ‘targeted capabilities’ to refer to new capabilities that firms want to create.

We distinguish between two modes of obtaining targeted capabilities: internal development and external sourcing. Internal development refers to creating a new capability within the existing boundaries of a firm by recombining the firm’s existing capabilities or creating entirely new ones. Examples of internal development include internal training, internal product development, and opening new R&D labs. External sourcing means trading in a strategic capability that stems from external sources. Trading in a strategic capability can occur by three means (Chi, 1994): purchase contracts, alliances, and acquisitions.¹

¹ One could unbundle the three external sourcing modes, but this study seeks to identify factors that lead to the success of a firm’s internal sourcing activities versus its external sourcing. The three external sourcing modes lie along 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 sourcing are similar, so that it is
Purchase contracts are cases in which firms buy distinct capabilities from third parties, such as buying off-the-shelf technologies and services, or hiring new people, and employing consulting services. Alliances are ongoing relationships among distinct organizations that retain strategic autonomy but agree to work together for a period of time. Examples of alliances include equity and non-equity joint ventures, R&D and marketing partnerships, and multi-party consortia. Acquisitions involve obtaining majority control of another firm or entity, and encompass acquiring entire corporations or individual businesses from ongoing multi-business corporations.

Firms often face gaps between their existing and targeted capabilities, which we refer to as ‘capability gaps’. Prior research has discussed capability gaps in terms of patents and industry categories, but little research addresses more multi-dimensional gaps in technical, marketing, and administrative capabilities. We define capability gaps in terms of closeness and strength. Capability closeness is the extent to which two capabilities share the same routines. Capability strength is the degree to which the routines that make up a firm’s capabilities suit targeted capabilities when compared to other firms’ capabilities. A capability gap is the extent to which a firm’s current capabilities provide the base for desired changes, both in comparison to targeted capabilities (closeness) and relative to competitors’ capabilities (strength).

Our discussions with telecommunications executives and industry analysts showed that both established telecommunications firms and industry newcomers faced substantial gaps between their existing capabilities and those they needed to compete in the changing telecommunications environment. On the 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 capability areas. Incumbents had weak marketing capabilities (e.g., limited ability to manage pricing schemes, analyze traffic, and coordinate corporate accounts) because they traditionally faced limited competition. In the technological area, incumbents had developed strong

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 whereas internal sourcing does not.
skills for operating voice transmission networks but had low capabilities in digital data transmission and data management. On the other hand, new firms and diversifying entrants from markets such as mobile telephony, cable, and data communications (e.g., Global Crossing, Level3, and Mobilcom) typically had more flexibility than the established PTOs, but usually lacked customer base, reputation and critical size. In our fieldwork, as the quotes below illustrate, executives referred to a capability gap between traditional circuit technology for voice traffic and new packet technology for data traffic. They also cited capability gaps in the marketing area due to the traditional low marketing sophistication of PTOs and the emergence of commercially aggressive new competitors.

“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.”

**Internal development versus external sourcing for obtaining new capabilities**

In attempting to create new capabilities, internal development offers advantages and disadvantages relative to external sourcing. Internal development allows a firm to coordinate activities needed to build on its existing capability stock (Dierickx and Cool, 1989; Kogut and Zander, 1996), while providing safeguards for protecting the value of new capabilities (Williamson, 1975). Internally developed capabilities can also provide a more stable platform for future development of new capabilities than those acquired externally (Grant, 1996). Managers may also prefer to turn to internal development because they lack the skills to govern external exchanges (Kale, Dyer and Singh, 2002; Mayer and Argyres, 2004; Zollo and Singh, 2004).

In contrast, firms may need to resort to external sourcing to enter new capability domains (Stuart and Podolny, 1996; Rosenkopf and Nerkar, 2001). Internal development is bounded by the firm’s existing capability endowments and routines. Several studies examine how historical capability endowments affect a firm’s propensity to search for new capabilities (Penrose, 1959; Cohen and Levinthal, 1990; Kraatz and Zajac, 2001), and to look inside rather than outside the firm (Pisano, 1990; Barney, 1999; Rao and Drazin,
The choice between internal versus external acquisition of new capabilities parallels the spectrum that spans from exploitation to exploration (Vermeulen and Barkema, 2001). Internal development is commonly associated with local search (exploitation) as a firm’s internal development of new capabilities is technologically and geographically bounded (Helfat, 1994; Stuart and Podolny, 1996). Further exploitation and internal development may make a firm’s culture stronger but may also lead to oppressive conformity, blindness, and competency traps (Miller, 1993). In contrast, external growth is commonly associated with more distant search (exploration) and helps capability-seeking firms overcome the constraints associated with contextually localized internal search (Rosenkopf and Nerkar, 2001; Rosenkopf and Almeida, 2003). Acquisitions and alliances may help unfreeze mental maps, structures, and processes (Miller, 1993; Singh and Mitchell, 2005).

Our interviews report that firms often emphasize systematic criteria when choosing from among the various modes of capability sourcing. The quote below illustrates how one firm assesses its capability needs and the organizational capacities of its internal organization compared to its external sourcing options.

“The first question we ask once we have identified our resource gap, and to make our decision on whether we should we do it by ourselves is ‘How far is it from our current skills?’ And then we ask: ‘How fast? How easy is it 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?’ ”

The following section discusses how capability and institutional constraints will both influence sourcing choices. Capability constraints arise from the lack of appropriate capabilities within the firm to pursue the development of the targeted capabilities. Institutional constraints arise when the firm lacks the appropriate internal social contexts and organizational processes to undertake successful internal development of the needed capabilities.

INTERNAL DEVELOPMENT V. EXTERNAL SOURCING: CONTINGENCY FACTORS

Taking capability constraints into account
Several streams of literature are relevant for discussing capability constraints. The resource-based view of the firm (RBV) posits that a firm’s specific capabilities determine the range of strategic options that it can use to create new capabilities (Penrose, 1959). The basis on which the firm makes this decision is its assessment of the distance between its existing capabilities and the targeted capabilities, that is, when strategically important expertise or capabilities are unavailable internally or inadequate to support the development of this capability (Leonard, 1995). When the capability gap is narrow, a firm can typically make the effort to develop the targeted capabilities internally (Leonard, 1995), assuming that these capabilities are critical to the strategy. When the capability gap is wide, i.e., when the firm possesses only a limited subset of the capabilities required to develop the new capabilities, firms seek to acquire them from outside the firm (Penrose, 1959; Cuervo-Cazurra, 1999).

Empirical studies show that firms tend to develop internally new capabilities in areas closely related to their existing technological capabilities (Helfat, 1994; Helfat and Lieberman, 2002; Tripsas and Gavetti, 2000). Rosenkopf and Nerkar (2001) find that radical exploration in the optical disk industry builds upon technology that resides outside the firm, while local search builds upon similar technology residing within the firm. In their study on the development of technological variation among Japanese semiconductor companies, Stuart and Polodny (1996) found that Matsushita, through the extensive use of alliances with other firms that gave them access to different technologies, was able to reposition itself technologically by moving away from local search. Technical capabilities often involve tacitness, complex organizational processes, and social complexity that require complex linkages with other of the firm functions such as sales and marketing (Teece, 1986; Winter, 1990). Such linkages constrain firms from developing truly innovative technical capabilities through internal development. Similarly, internal development can be inappropriate for developing truly innovative marketing capabilities. Marketing capabilities, such as brand names and sales networks, often embody socially complex incentive mechanisms and tacit knowledge about the competitive environment (Anderson and Schmittlein, 1984; 1985).

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1 In addition, a firm may outsource development of capabilities that the firm is familiar with and capable in but which have only low strategic value.
Dierickx and Cool, 1989). Thus, marketing capabilities often lose value when redeployed outside their initial market. Consequently, when a competitive context changes dramatically, such as industry deregulation, as in the case of the telecommunications industry, firms commonly need to acquire marketing capabilities from external sources.

A quote from our telecommunications fieldwork illustrates the idea that firms need to learn to assess capability constraints when choosing between internal development and external sourcing.

“We went for a long time for internal R&D, but we did not have these competencies. Then we tried to bring these competencies through alliances. Now we do acquisitions to speed up 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 parallel with resource-based arguments, the knowledge-based perspective on strategy emphasizes organizational factors that constrain firms from developing new capabilities that relate closely to their existing capabilities. As a result, the firm’s search process for new capabilities is likely to be local, in the sense that a firm is likely to search in the neighborhood of its current technological position (Nelson and Winter, 1982; Dosi, 1982). Cohen and Levinthal (1990) argue that firms tend to undertake internal changes that build on their existing ability to evaluate and utilize particular knowledge, which they refer to as absorptive capacity. As the firm moves away from its technological and commercial capability base, its probability of success converges, at best, to that for a start-up operation (Kogut and Zander, 1992). The firm may even consider abandoning the development of the targeted capabilities if the capability gap is too wide. The alternative to abandonment can be to search outside the firm and attempt to import external capabilities that the firm could not have created with its existing internal capabilities. Kogut (1992) argues that firms develop internally projects that build related capabilities and rely on joint ventures or acquisitions when the capabilities are distantly related.

In line with RBV and knowledge-based literature arguments, the diversification literature examines the relationship between a firm’s capability constraints and the nature of its diversification. An entrant with a high degree of relatedness to a market favors direct entry (Yip, 1982; Chatterjee, 1990). If an entrant expects a large reduction in operating costs from excess capabilities and requires few
complementary capabilities, it is likely to prefer direct entry (Teece, 1982; Chatterjee, 1990). Empirical studies in the foreign direct investment literature generally support this pattern, showing that as Japanese firms enter new lines of business in the US, they prefer joint ventures or acquisitions to greenfield investment (Hennart and Park, 1993). Similarly, Barkema and Vermeulen (1998) found that firms that expanded abroad into related industries were more likely to set up new ventures than firms that expanded into unrelated businesses, which were more likely to acquire existing firms.

In turn, the literature on acquisitions and alliances show that external sourcing enables technological and commercial renewal by exposing the firm to a variety of technological domains, product environments, and geographical markets (Barkema and Vermeulen, 1998). Empirical studies show that managers often search for targets or allies with strong capabilities that complement the acquiring firm’s weaknesses, with a view to redeploying the stronger capabilities from the target (Capron, 1999) or use the ally’s strength (Dussauge, Garrette, and Mitchell, 2000). Examining the product line evolution of firms in the US medical equipment sector, for instance, Karim and Mitchell (2000) find that acquisitions provide opportunities for undertaking path-breaking changes by seeking targets that offer capabilities that differ markedly from a firm’s existing skills. They also find that acquirers are more likely than non-acquirers to possess capabilities that have only recently entered the industry, suggesting that firms that use internal development are more likely to pursue path-dependent changes than path-breaking changes. Through acquisitions, firms both acquire unfamiliar new capabilities and learn how to use their existing capabilities in new organizational settings and under competitive conditions (Mitchell, 1994; Zollo and Singh, 2004). In sum, external sourcing offers opportunities for firms to overcome their capability deficiencies, allowing for a more distant search and much faster capability reconfiguration than internal development (Barkema and Vermeulen, 1998; Krishnan, Satish and Krishnan, 2004; Carow, Heron and Saxton, 2004). Accordingly, we propose:

**Hypothesis 1.** Firms will be more effective in obtaining new capabilities and, in turn, will survive longer when their choice of internal development versus external sourcing for new capabilities reflects their capability constraints.
Taking internal institutional constraints into account

Complementing the RBV and knowledge-based perspectives, which focus on capability constraints as explanations for the choice between internal development and external sourcing, evolutionary and institutional theories emphasize the role of institutional factors within the firm such as social stability and legitimacy as key underlying enabling factors of capability development (Nelson and Winter 1982; DiMaggio and Powell, 1983; Oliver, 1997). We will use the term institutional constraints to refer to barriers that arise from the existing social context within a firm.

The evolutionary argument stresses that a firm's irreversible investments and limited range of operating routines constrain its ability to develop and use capabilities within the firm (Nelson and Winter, 1982). Firms tend to develop proximate capabilities that do not disrupt their existing routines and processes, thereby maintaining the social fabric that weaves together the firm’s capabilities (Cyert and March, 1963; Nelson and Winter, 1982). Therefore, switching to new capabilities is difficult, both because the social knowledge embedded in the current capabilities is only partially understood and it is unclear what social fabric would be required to support the new learning (Kogut and Zander, 1992). Indeed, the very stability of this social fabric within existing relationships yields valuable firm-specific capabilities. Therefore, internal development will be more common for capabilities that reinforce the existing systems and build incrementally on existing routines. At the same time, the fear of disrupting existing routines and social stability is a powerful force, which tends to hold organizations on relatively inflexible paths. When a firm needs capabilities that conflict with its existing routines, it is more likely to turn to external modes of sourcing to gain access to routines that cannot be developed within the firm’s existing social context.

In parallel, although starting from a different research tradition, institutional theory argues that the firm’s institutional context, and notably the social legitimacy and political acceptance of its capabilities, is key to capability sourcing decisions. From this perspective, firms operate within a social framework of norms, values, and taken-for-granted assumptions about what constitutes appropriate or acceptable
economic behavior (DiMaggio and Powell, 1983; Scott, 1987). These institutional factors surrounding capability decisions constrain the potential of firms to develop new capabilities (Oliver, 1997; Ginsberg, 1994). Firms are more likely to use internal development of new capabilities that are socially accepted. Internal development of new capabilities that build on new routines meets institutional barriers. As Oliver (1997: 701) notes, “Whereas knowledge-based theorists assume that managers make rational choices bounded by uncertainty, information limitations, and heuristic bias, institutional theorists assume that managers commonly make nonrational choices bounded by social judgment, historical limitations, and the inertial force of habit”.

Attempts to develop capabilities that depart from firm values and traditions often face internal resistance. Replacing the firm’s existing capabilities with new ones, even when those changes are economically rational, is likely to trigger social rejection as individuals are reluctant to alter an entrenched organization’s habits, and switch to less familiar practices. Individuals may also perceive the replacement of traditional capabilities with new ones as departing from firm norms and values (Oliver, 1997; DiMaggio and Powell, 1983; Scott, 1987) or as challenging their status and position of power (Ocasio, 1997; Menon and Pfeffer, 2003). Therefore, social rejection is more severe when the targeted capabilities compete with or replace the firm’s existing capabilities. In particular, targeted capabilities might, in theory, be close to an organization’s existing capabilities, but, in practice, entrenched individuals may shun the development and use of new capabilities in order to retain their power, notably when they reduce or eliminate the value of existing capabilities. A quote from our fieldwork below illustrates this point.

“In many telecom incumbents, the 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 toward data technologies have been postponed or limited due to this internal competition.”

Avoiding conflict associated with new capability development may help maintain a social truce within the firm, but is likely to place it on rigid capability trajectories if a firm does not find alternative means of obtaining new capabilities. 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 capability development that focus on existing knowledge and preserve vested interests, while preventing the firm from searching for new knowledge that would challenge people’s background and status.

External sourcing may offer a means of circumventing internal resistance to change. In several case studies, for instance, Menon and Pfeffer (2003) found that managers tended to view external knowledge more favorably than internal knowledge for reasons of internal competition and self-enhancement. They argued that when the targeted capabilities posed status threats for insiders, due to the high symbolic and social costs of using internal knowledge, external sourcing might provide a better solution. These status threats are less present when acquiring knowledge from more indirect external sources.

The notion of internal institutional constraints complements the earlier discussion of capability constraints, because the social conflict involves non-rational, emotional components of the firm’s capacity to develop new capabilities internally. The internal legitimacy argument also closely parallels Abernathy and Clark’s (1985) and Tushman and Anderson’s (1986) notion of competence destruction, which arises when new capabilities are likely to reduce the value of existing capabilities. The initial argument concerning competence destruction is that firms will tend to avoid changes that involve substantial competence destruction. An extension of the argument, though, is that the presence of competence destruction will influence the mode of capability sourcing of firms that attempt to change despite the potential for competence destruction.

As a result, we expect that firms are more likely to use internal development for developing new capabilities that fit with their existing social context and turn to external sourcing for new capabilities that face social rejection. When the targeted capabilities require significant changes in the firm’s internal social context, and particularly if the needed changes conflict with the existing capabilities, firms will tend to use external sourcing modes. The core reason is that the firm will have no immediate need to attempt to adjust existing routines in the face of substantial resistance. Instead, the firm can attempt to obtain new capabilities from outside the firm, and only then undertake the process of adjusting existing routines. Accordingly, we propose:
**Hypothesis 2.** Firms will be more effective in obtaining new capabilities and, in turn, will survive longer when their choice of internal development versus external sourcing for new capabilities reflects their internal institutional constraints.

**DATA AND METHODS**

**Sample**

We collected survey data and survival data for telecommunications firms based in multiple countries to determine the criteria and outcome of the firms’ efforts to create new capabilities. We administered the survey to identify the firms’ efforts to assess the nature of their capability gaps, their use of the various capability sourcing modes, and their criteria for choosing between internal development and external sourcing. We pre-tested the survey with senior North American 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 held positions equivalent to vice president or higher in general management areas such as corporate development. We sent two follow-up letters and two replacement questionnaires within the three weeks following the first mailing. 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 the executive education participants mailed back their responses. In total, our data includes 162 telecommunications firms that responded to the survey.

Most of the firms have a high proportion of their sales in the telecommunications industry, often complemented by information technology sales. 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, 5% in the Asia-Pacific region, and the rest in other regions). The database includes responses from large and small firms (33% have fewer than 500 employees, 27% have 500-5,000 employees, and 40% 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.

**Performance variables**

One performance variable assesses the extent to which the firms were effective at obtaining targeted new capabilities ($\eta_1$). To do this, we asked respondents to assess the effectiveness of their firms in creating new capabilities compared to that of their main competitors, in several capability areas: 1) R&D capabilities, 2) IT capabilities, and 3) marketing capabilities (customer knowledge, branding and pricing). The three items use a seven-point scale, with one for “behind competition” and seven for “ahead of competition”. We use this variable as a mediating variable in the analysis of survival, which is the ultimate dependent variable in the study.

The survival variable ($\eta_2$) assesses whether the responding firms continued to operate in 2005, five years after the survey was carried out. We were able to identify the current status of 153 of the responding firms. Among those 153 firms, we found that 93 firms (61%) had survived, 35 firms (23%) had shut down, and 25 firms (16%) had been acquired (most or all cases of acquisition involved target firms that were struggling, rather than successful firms that had reached the limits of their growth). We created a dependent variable that took the value of one for dissolved firms, the value of two for acquired firms, and the value of three for surviving firms. Although both dissolved firms and acquired firms typically represented “troubled firms”, we maintained the distinction between those two types of outcome. In some cases, firms might be acquired to achieve critical scale or access needed capabilities, so that acquisition does not necessarily represent a negative economic outcome.

**Independent variables**

We asked the respondents to reflect on the use and motivation of internal development and external sourcing projects that they had conducted over the three to five years prior to the survey. This approach
seeks to identify firm-wide patterns in their capability development activities 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 projects, 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 and acquisitions)?”

The survey questions allowed us to measure how concerns about capability constraints and institutional constraints influenced managers’ decision to use internal development rather than external sourcing. The first independent variable ($\xi_1$) assesses the extent to which respondents assess the distance between targeted technical capabilities and their own existing technical capabilities when they choose between internal development and external sourcing. For example, we asked managers to rate on a 7-point scale (1= fully disagree; 7= fully agree) their agreement with the following statement: “In the past 3 to 5 years, we used internal development rather than external modes when our existing technical capabilities were close to the needed technical capabilities”. We used two items to construct the first independent variable. These items report the respondents’ assessment of the extent to which they preferred internal over external sourcing when their existing technical capabilities were close to the needed capabilities (capability closeness, item 1) and when their technical skills were strong relative to those of their competitors (capability strength, item 2).

The second independent variable ($\xi_2$) assesses the extent to which respondents took into account the distance between the targeted marketing capabilities and their own marketing capabilities when they chose between internal development and external sourcing. For example, we asked managers to rate on a 7-point scale (1= fully disagree; 7= fully agree) their agreement with the following statement: “In the past 3 to 5 years, we used internal development rather than external modes when our existing marketing capabilities were close to the needed marketing capabilities”. We used three items to construct this
variable. These items report the respondents’ assessment of the extent to which they preferred internal over external sourcing when their existing marketing capabilities were close to the needed capabilities (capability closeness, item 1), when their marketing skills were strong relative to those of their competitors (capability strength, item 2), and whether they had a good knowledge of the customer in the targeted capability area (capability strength, item 3).

The third independent variable ($\xi_3$) assesses the extent to which respondents took into account the fit of the targeted capabilities with their existing systems and culture when they chose between internal development and external sourcing. For example, we asked managers to rate on a 7-point scale (1= fully disagree; 7= fully agree) 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”. Three items report the respondents’ assessments of the extent to which they preferred internal over external sourcing when the needed capabilities to fit their firm’s system of incentives and culture (item 1), when the firm’s system of incentives suited hiring the needed people (item 2), and when their firm had systems in place to integrate newly hired people (item 3).

The fourth independent variable ($\xi_4$) assesses the extent to which respondents took into account the social acceptance of the targeted capabilities. For example, we asked managers to rate on a 7-point scale (1= fully disagree; 7= fully agree) 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 created little or no internal resistance”. The two items for this variable report the respondents’ assessments of the extent to which they preferred internal over external sourcing when the needed capabilities “triggered little or no internal competition” (item 1) or “created little or no internal resistance” (item 2).

**Control variables**

We assessed several other factors that might influence the firm’s chances of survival.

*Firm size.* Size confers both greater status and greater opportunity for cultivating outside options, and thereby influences the likelihood of a firm to survive in its environment (Uzzi, 1996). Size affects
patterns of inter-organizational social exchanges because of its direct association with status and power; larger firms may find it more difficult to change successfully because of higher inertia compared to smaller firms. We measured firm size using a five-point scale that accounts for the number of employees worldwide (with 1 for firms that have fewer than 200 employees and 5 for firms that have more than five thousand employees).

**Firm age.** Young firms operate under unrefined routines and do not have capabilities to withstand a sustained period of poor performance (Levinthal, 1991). Furthermore, they tend to have low expertise in corporate development activities and limited administrative skills. They also have inferior access to external relationships due to a liability of newness, and lack skills to search, select, price and integrate good alliance or acquisition partners. We measure firm’s age using a five-point scale (with 1 for firms that are younger than two years old and 5 for firms that are older than twenty years old).

**Firm international scope.** The geographic diversity of the acquirer’s activities can help screen and integrate capabilities from different environments (Bartlett and Ghoshal, 1989). Firms spanning several geographic settings tend to develop capabilities of managing complex information-processing and decision-making requirements. In contrast, a more focused domestic firm may lack the necessary organizational routines that the multinational form grants. We used a three-point variable to measure the firm’s international scope: domestic (1), regional (2), and global (3).

**Firm profitability.** A highly profitable firm is likely to have valuable capabilities to be leveraged in internal development capabilities. Strong profitability also commands bargaining power in acquisition and makes the firm more attractive to alliance partners and acquisition candidates. We used a five-point scale to assess the firm’s return on equity (ROE), with 1 equal to an ROE inferior to five percent and 5 equal to an ROE superior to twenty percent.

**Firm R&D and advertising investments.** A firm’s investment in key capabilities can also enable its internal development of new capabilities, and help screen and absorb external knowledge. Building on Morck and Yeung’s (1991) measure, we calculated the firm’s investment in R&D compared to its sales with a five-point scale (with 1 for firms that spend less than two percent of their sales on R&D and 5 for
firms that spend more than fifteen percent of their sales on R&D). We developed a similar measure for the firm’s investment in advertising.

Firm dependence on regulation. In the telecommunications industry, firms are often highly dependent on regulation, such that they deploy political strategies to shape a political environment that is favorable to their economic survival (Bonardi, Hillman and Keim, 2005). A regulation that favors the firm’s interests helps its survival, whereas a regulation that is counter to the interests of the firm reduces its likelihood of success in its environment. Using a five-point scale (with 1 for “not at all”, and 5 for “to a very large extent”), we measured the extent to which the firm is dependent upon regulation.

Firm ownership structure. Some telecommunications firms were supported or owned, to a significant degree, by their national governments. We expect government linked firms to be more protected from the competitive pressures, and thus more likely to survive in their environment compared to their privately-owned and stock-listed peers. We controlled for that effect by adding two dummy variables: one dummy that takes the value of 1 when the firm is privately-held and a second dummy that takes the value of 1 when the firm is stock-listed (our baseline is when the firm is state-owned).

Assessing sampling and method biases

Our use of managerial judgments is consistent with our conceptual framing. Firms’ choices between internal and external sourcing depend on their managers’ assessment of their own capability-based and institutional constraints rather than on seemingly objective measures of these concerns. The respondents were senior executives with high-level responsibilities, who were knowledgeable of their firms’ decision-making process and who were able to reflect on the composition of their firm’s capability development projects. While a single executive rarely makes all sourcing decisions within a firm, our fieldwork indicates that senior executives have sufficient perspective to recognize their firms’ decision rules in capability sourcing activities.

At the same time, we recognize several limitations associated with our study design. As with any survey, concerns about retrospective data collection arise. Research indicates that memory degrades exponentially with time (Sudman and Bradburn, 1973). Furthermore, top managers often attempt to cast
past behaviors 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 took several steps to reduce the biases. We examined differences between respondents and non-respondents to establish whether sampling bias was a problem. 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. Similarly, we found no significant differences among the 27 executive education responses and the rest of the responses. Nor did we find any significant differences in the profitability of respondents and non-respondents among public firms in the sample, or among early and late respondents (Armstrong and Overton, 1977).

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 various points. 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).

To check whether common method bias between the independent variables \((\xi_1, \xi_2, \xi_3, \xi_4)\) and the mediating variable \((\eta_1)\) influenced the results, we followed the unmeasured latent variable approach from Podsakoff, MacKenzie, Lee, and Podsakoff (2003). Using AMOS, we added a single unmeasured latent factor with all the observed measures as indicators to a measurement model containing all measured items and their corresponding latent constructs. This approach separates trait effects from method effects and random effects. The analysis found no systematic variance among the items, while adding the first-order factor produced low parameter estimates for its indicators. These results suggest that using the questionnaire for the variables of interest did not seriously bias the results. Furthermore, we conducted a Harman one-factor test on the items in our analysis. The factor analysis extracted four factors, with the
first factor accounting for 23 percent of the variance. Since no single factor emerged as a dominant factor accounting for most of the variance, common method variance is unlikely to be a serious problem in the data (Podsakoff and Organ, 1986).

We also placed questions concerning antecedents and outcomes at various points in the survey – this limits the chance that answers to one set of questions would determine answers to later questions, and also reduces the possibility that the respondents’ implicit theories about reasons for selecting a mode would influence how they answered performance questions.

Last, we used objective data to measure our key dependent variable, firm survival. By using different sources of information for building dependent and independent variables, we reduce the potential impact of common-method bias (Podsakoff, et al., 2003).

**Structural Model**

We used AMOS 4.0 (Arbuckle, 2002) to estimate a structural model. AMOS belongs to the second generation of the multivariate analysis family of techniques, which also includes LISREL. Structural modeling addresses structural and measurement issues frequent in survey-designed research. This method 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).

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

The inner structural model specifies the relations among the theoretical constructs (latent variables) and is written as:  \( \eta = \beta \eta + \Gamma \xi + \zeta \), where  \( \eta \) is a \((m \times 1)\) vector of endogenous latent 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 x n) matrix of exogenous variable coefficients, and ζ is a (m x 1) vector of residuals. The latent endogenous variable in this model is the firm’s survival (η₂). The four measures that assess the extent to which firms take into account their capability and institutional constraints when forming their portfolio of internal and external sourcing projects and the control variables are latent exogenous variables (ξ). The mediating performance variable is the firm’s effectiveness in creating new capabilities (η₂).

In turn, the outer measurement model is written as: \( y = \Lambda_y \eta + \varepsilon \); \( x = \Lambda_x \xi + \delta \), where \( y \) is a (p x 1) vector of endogenous indicators, \( x \) is a (q x 1) vector of exogenous indicators, \( \Lambda_y \) is a (p x m) matrix of regression coefficients of \( \eta \) on \( y \), \( \Lambda_x \) is a (q x n) matrix of regression coefficients of \( \xi \) on \( x \), \( \varepsilon \) is a (p x 1) vector of measurement error for the indicators of endogenous variables, and \( \delta \) is a (q x 1) vector of measurement error for the indicators of exogenous variables.

To provide a metric, we set the factor loading for an indicator of each latent construct at one (Bollen, 1989). AMOS estimated the structural and measurement models using the Full Information Maximum Likelihood estimator, which provides an efficient estimator in the presence of missing data.

**Measurement Model Results for Latent Variables**

Consistent with Anderson and Gerbing’s (1988) two-step approach, we estimated a measurement model prior to examining the structural model. We modeled the two capability constraint constructs (ξ₁, ξ₂), the two institutional constraint constructs (ξ₃, ξ₄) and the mediating performance measure (η₁) as five correlated first-order factors. Table 1 reports factor loadings, internal consistency, convergent validity, and discriminant validity, based on measures from Fornell and Larcker (1981).

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

All the non-fixed indicator loadings for each construct are significant (p<0.01), and range from 0.55 to 0.98. 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 loadings greater than 0.70. The data meet this criterion for all but three items. We retained those items in order to maintain a richer measure of our constructs (the results were robust to dropping the items). The estimates of the “average variance
“extracted” range from 0.63 to 0.93, which are higher than the 0.50 threshold that Fornell and Larcker (1981) recommend to demonstrate convergent validity. Each construct shares more variance with its measures than it shares with other constructs (the correlation between any two constructs is less than the square root of the average variance extracted of the two constructs), demonstrating discriminant validity.

RESULTS

Figure 1 reports the structural model. The results strongly support the first hypothesis, concerning capability constraints. Firms with portfolios of internal development and external sourcing projects that fitted their technical and marketing capabilities were more effective in developing the needed capabilities and, in turn, more likely to survive than firms that did not take capability constraints into account.

********** Figure 1 about here **********

The results support partially the second hypothesis, concerning institutional constraints, with an intriguing exception. As expected, firms with portfolios of internal development and external sourcing projects that suited their internal systems and culture were more effective in developing the needed capabilities and, in turn, more likely to survive than firms that did not take into account the compatibility of the targeted capabilities with such systems.

In contrast, counter to hypothesis 2, we found that firms that undertook internal development of new capabilities that faced internal competition and social conflict were more successful in developing new capabilities and more likely to survive than firms that used internal developments only for projects that would not create social conflicts. Hence, although paying attention to institutional factors when forming the portfolio of internal development and external sourcing projects is valuable on some dimensions, too much attention to avoiding conflict and preserving a social truce within the firm can reduce its ability to renew its capabilities. We return to this intriguing result in the discussion section.

Several control variables influenced survival. Older firms, firms with higher levels of advertising investment, and state-owned telecommunications firms were more likely to survive. Surprisingly, we found a negative relationship between a firm’s R&D investment and its likelihood of survival, perhaps because too much focus on internal R&D activities rendered firms inward-focused and less prone to
searching for radical new capabilities that reside outside of the firm.

We conducted supplemental analyses to ensure the robustness of our results. We first changed the coding of our survival dependent variable ($\eta_2$). In the reported model, our dependent variable took the value of one for dissolved firms, two for acquired firms, and three for surviving firms. We re-estimated the analyses by collapsing the dissolved and acquired categories, thereby creating a dummy that took the value of one for surviving firms and zero otherwise. Our results did not change qualitatively, although the relationship between ($\eta_1$) and ($\eta_2$), while still statistically significant, was slightly weaker. This comparison suggests that maintaining the distinction between dissolution and acquisition yields more predictive power, as we initially argued.

We also added direct paths between our four dependent variables ($\xi_1, \xi_2, \xi_3, \xi_4$) and survival, in addition to their indirect influence on survival through the mediating outcome variable ($\eta_1$). None of the direct paths between the four dependent variables and the firm’s survival were significant, while the reported results did not change qualitatively.

Self-selection issues might also arise in the study. Firms that survive may also be firms that accumulated the highest experience in both internal development and external sourcing, which would generate potential confounding influences between the firm’s ability to select the appropriate mode of sourcing (based on capability and institutional constraints) and other benefits that stem from its experience, such as learning-by-doing or other contingencies that play a role in the selection of the different modes of capability sourcing. To control for potential self-selection, we created a new variable that measured the firm’s combined internal development and external sourcing experience. We then developed a two-stage model where, in addition to a direct effect of the firm’s combined experience in internal development and external sourcing on its ability to renew resources and its survival, the experience variable constituted an antecedent of the firm’s ability to select its modes of capability sourcing (i.e., has an effect on $[\xi_1, \xi_2, \xi_3, \xi_4]$). We then assessed the remaining effect of the relationship between the consideration of the capability and institutional constraints in sourcing decisions and the
firm’s ability to renew its capabilities beyond the pure experience effect. The results remained qualitatively similar.

At the same time, two results concerning sourcing experience had intriguing implications. First, there was no systematic direct effect of the firm’s combined internal development and external sourcing experience on its ability to change and survive. This null result suggests that simply resorting to both modes of sourcing does not guarantee superior performance outcome. Instead, firms must select sourcing modes that reflect particular contexts. Second, we also found that firms with substantial experience in both modes of capability sourcing were more likely to take into account their technical capability gaps and the fit of the targeted capabilities with their internal systems when making capability sourcing choices. In other words, experience helped firms develop the dynamic capability to select appropriate sourcing modes.

**DISCUSSION AND CONCLUSION**

In this paper, we predicted that firms that take their capabilities and institutional constraints into account appropriately when choosing between internal development and external sourcing will be more effective at developing new capabilities and, in turn, will survive longer than firms that mis-assess those constraints. The core argument is that firms require two skills as part of their dynamic capability to change: first, they need to balance their modes of capability sourcing; second, they need to develop the ability to use the most appropriate mode of capability sourcing in the face of constraints that arise from their existing stocks of capabilities and their internal institutional contexts. The analysis supports most core predictions, with intriguing variations in the relationship between the role of some forms of institutional factors in capability sourcing decisions and a firm’s performance. Overall, our results suggest that capability and institutional arguments complement the insights of transaction cost economics, in which external market failures drive firms’ capability sourcing choices (Jacobides and Winter, 2005; Santos and Eisenhardt, 2005).

The empirical results concerning capability constraints add voice to a central debate in extending the resource-based view of the firm to an understanding of dynamic capabilities by which firms can attempt
We found that firms that properly consider the role of their existing capabilities in their capability sourcing decisions fare better than firms that do not consider criteria that the resource-based view highlights. While the resource-based view of the firm has been criticized for being an *ex post* rationalization (Priem and Butler, 2001), our study suggests that capability-based perspectives can offer prescriptive implications.

The results also highlight both the benefits and the costs of heeding institutional factors when forming the portfolio of internal development and external sourcing projects, which has received only limited attention in prior research. In particular, the results demonstrate the role of more socially and emotionally-based factors in capability sourcing, as a complement to the seemingly more “objective” role of stocks of capabilities. Indeed, the opposing results we obtained between the impact of the two institutional variables – the benefits of “systems fit” and the costs of “conflict avoidance” – on a firm’s performance can be interpreted in the light of our fieldwork and the literature that discusses the benefits of conflict for ambidextrous organizations.

The value of undertaking internal development when the activities would generate conflict rather than avoid conflict initially appeared counter-intuitive. A tentative explanation emerged, however, in interviews with telecommunications industry executives. In particular, as well as having a potential for disruption, conflict creates the potential for taking new views of problems and generating new insights for solutions. Firms that have learned how to take advantage of conflict, while limiting the potential harms, may benefit by initiating internal projects in conflict-strewn environments.

Drilling down into the conflict literature reinforces this interpretation. Traditionally, theorists have viewed conflict as disruptive. More recently, though, some theorists suggest that conflict may help people identify better options, so that firms that learn how to manage conflict may actually benefit by making sourcing choices that engender conflict (McGrath, 1984; Eisenhardt and Schoonhoven, 1990). Jehn (1997), for instance, finds that groups that accept task conflict are particularly effective. Thus, conflict can be a useful tool for business development. Firms that can strike a subtle balance between organizational processes that nurture legacy (align with current incentive systems) and favor adaptation...
(introduce competing business models and organizational settings) may be able to achieve a degree of organizational ambidexterity that will help them create new capabilities (Tushman and O’Reilly, 1996; Gibson and Birkinshaw, 2004).

Several limitations of our study offer paths for future research. More empirical work could enrich our capability and institutional measures. Additional qualitative research would deepen the notion of a firm’s ability to manage capability conflict and clarify how firms frame internal contexts to balance legacy and change. Other measures that arise in the dynamic capabilities literature, such as assessing recombination processes and linkages that help firms trade knowledge and people within and across firms (Eisenhardt and Martin, 2000; Katila and Ahuja, 2002; Szulanski, 1996), could complement our measures. In addition, other contingencies, such as broader social connections in the external environment and leadership skills within the firm, may mediate the relationship between the firm’s survival and the nature of its capability sourcing choices. It would also be useful to examine how the influences of capability constraints, institutional constraints, and external factors such as market failures might interact. Moreover, it would be helpful to break the unitary category of external sourcing into a more diverse set of external modes.

Nonetheless, this study advances the emerging discussion of how firms change. Research in strategy, economics, and organizational theory on organizational change has been animated by two conflicting perspectives (Levinthal, 1991). On the one hand, extensive literature identifies many barriers to firm’s change. Indeed, a presumption of inertia or, at best, path dependent change, may be the dominant theme of organizational research during the past two decades (e.g., Nelson and Winter 1982; Hannan and Freeman, 1984; Tushman and Anderson, 1986; Cohen and Levinthal, 1990). On the other hand, there is a large and diverse branch of literature on adaptive organizational change, addressing topics such as boundary choices for new transactions (Williamson, 1975), top management turnover (Hambrick, Cho and Chen, 1996), and changes in senior leadership decision-making criteria (McNulty and Pettigrew, 1999). Traditionally, these two hands have tended to wave past each other, stressing either constraints or adaptability.
This study helps address the intersection between inertial and adaptive pressures. A small body of research has focused on the interface between constraints and change, attempting to identify ways that firms change in the face of constraints to change. Early work developed the idea of punctuated equilibria (e.g., Gersick, 1991; Romanelli and Tushman, 1994; Sastry, 1997), arguing that major changes occurred infrequently. More recently, strategy research has suggested the idea of dynamic capabilities (Teece, Pisano and Shuen, 1997; Eisenhardt and Martin, 2000), with discussions of change processes that firms use to make substantial ongoing changes. The conceptual framework for the dynamic capabilities perspective is still emerging. One task in pursuing research on firm renewal lies in identifying mechanisms that firms use to overcome constraints to change (Siggelkow, 2001; Zollo and Winter, 2002).

Most generally, then, this paper suggests that internal and external modes of capability sourcing are key mechanisms by which firms can attempt to change in the face of capability and institutional constraints to change. Ultimately, the ability to manage the challenge of selecting appropriate sourcing modes has a substantial impact on a firm’s long-term survival.
REFERENCES


Katila, R., A. Ahuja. 2002. Something old, something new: A longitudinal study of search behavior and


### Table 1. Measurement Model

<table>
<thead>
<tr>
<th>Latent variables</th>
<th>Internal consistency</th>
<th>Average Variance Extracted</th>
<th>Correlations between latent variables&lt;sup&gt;3&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\xi_1) Capability constraints: Distance with existing tech. capabilities</td>
<td>0.98</td>
<td>0.97</td>
<td>0.98</td>
</tr>
<tr>
<td>(\xi_2) Capability constraints: Distance with existing mark. capabilities</td>
<td>0.85</td>
<td>0.66</td>
<td>0.45</td>
</tr>
<tr>
<td>(\xi_3) Institutional constraints: Fit with systems</td>
<td>0.91</td>
<td>0.63</td>
<td>0.23</td>
</tr>
<tr>
<td>(\xi_4) Institutional constraints: Social acceptance of targeted capabilities</td>
<td>0.98</td>
<td>0.97</td>
<td>0.14</td>
</tr>
<tr>
<td>(\eta_1) Firm’s ability to create the targeted capabilities</td>
<td>0.90</td>
<td>0.76</td>
<td>0.38</td>
</tr>
</tbody>
</table>

#### Measurement paths

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unstandardized Estimates</th>
<th>Critical ratio (Estimate/SE) (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\lambda_{x_1}) Closeness of existing technical capabilities</td>
<td>0.98</td>
<td>4.96***</td>
</tr>
<tr>
<td>(\lambda_{x_2}) Strength of existing technical capabilities</td>
<td>1.00</td>
<td>Fixed</td>
</tr>
<tr>
<td>(\lambda_{x_3}) Closeness of existing marketing capabilities</td>
<td>0.82</td>
<td>8.26***</td>
</tr>
<tr>
<td>(\lambda_{x_4}) Strength of existing marketing capabilities</td>
<td>1.00</td>
<td>Fixed</td>
</tr>
<tr>
<td>(\lambda_{x_5}) Familiarity with customer in targeted capability area</td>
<td>0.55</td>
<td>6.48***</td>
</tr>
<tr>
<td>(\lambda_{x_6}) Fit of targeted capabilities with firm’s systems and culture</td>
<td>1.00</td>
<td>Fixed</td>
</tr>
<tr>
<td>(\lambda_{x_7}) Fit of incentive systems to hire new people</td>
<td>0.70</td>
<td>5.83***</td>
</tr>
<tr>
<td>(\lambda_{x_8}) Fit of incentive systems to integrate newly-hired people</td>
<td>0.62</td>
<td>5.46***</td>
</tr>
<tr>
<td>(\lambda_{x_9}) Development of needed capabilities triggered little or no internal competition</td>
<td>0.98</td>
<td>5.98***</td>
</tr>
<tr>
<td>(\lambda_{x_{10}}) Development of needed capabilities triggered little or no internal resistance</td>
<td>1.00</td>
<td>Fixed</td>
</tr>
<tr>
<td>(\lambda_{Y_1}) R&amp;D capabilities</td>
<td>1.00</td>
<td>Fixed</td>
</tr>
<tr>
<td>(\lambda_{Y_2}) IT capabilities</td>
<td>0.99</td>
<td>4.06***</td>
</tr>
<tr>
<td>(\lambda_{Y_3}) Marketing capabilities</td>
<td>0.55</td>
<td>2.86***</td>
</tr>
</tbody>
</table>

(1) CR values greater than 1.64, 1.96, and 2.32 are statistically significant at 90%, 95%, and 99% confidence level, respectively.

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1. Internal consistency = \((\Sigma \lambda_{yi})^2 / [\Sigma \lambda_{yi}^2 + \Sigma (1 - \lambda_{yi}^2)]\). 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 Larcker (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 (AVE) = \(\Sigma \lambda_{yi}^2 / [\Sigma \lambda_{yi}^2 + \Sigma (1 - \lambda_{yi}^2)]\). AVE reports 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.

3. The on-diagonal elements are the square root of the average variance extracted, which assesses discriminant validity (Fornell and Larcker, 1981).
Figure 1. Structural Model Results

Use of internal development vs. external capability sourcing based on firm's capability constraints

Distance from Existing Technical Capabilities \( \xi_1 \)
Distance from Existing Marketing Capabilities \( \xi_2 \)

Fit of Targeted Capabilities with Internal Systems \( \xi_3 \)
Social Acceptance of Targeted Capabilities \( \xi_4 \)

Firm's Effectiveness in Creating Capabilities \( \eta_1 \)
Firm's Survival \( \eta_2 \)

\( R^2 = 0.51 \)
\( R^2 = 0.25 \)

*** \( p < 0.01 \); ** \( p < 0.05 \); * \( p < 0.10 \)

Controls:
- Firm size
- Firm age (+)
- Firm geographic scope
- Firm R&D/Sales (-)
- Firm Adv./Sales (+)
- Firm ROE
- Firm Private Firm (-)
- Firm Listed Firm (-)
- Importance of regulation