DOES SELECTING THE “RIGHT” MODE OF ACQUIRING NEW CAPABILITIES IN THE FACE OF INSTITUTIONAL FAILURES PAY OFF?

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ABSTRACT
This paper argues that a joint set of institutional failures, including internal failures and market failures, affect firms’ sourcing choices and, in turn, the performance of their capability development activities. We identify three types of internal failures, including capability gaps, social conflict, and weak internal reconfiguration skills. We also identify three types of market failures, stemming from protection needs, a lack of available markets, and weak external governance skills. We expect firms to benefit when their sourcing choices conform to institutional failure incentives and suffer when they deviate. By conformance with sourcing incentives, we mean that a firm’s choices of internal versus external sourcing align with the incentives. The analysis surveys 162 established telecommunications firms in Europe, the U.S., Latin America, and Asia in 2000-2001. We find that several institutional failures influence firms’ use of internal sourcing, especially protection needs and the three internal failures. We then find that sourcing in conformance with most institutional failure incentives helps firms develop needed capabilities, while departing from the incentives harms performance. At the same time, however, firms often suffer when they turn to internal sourcing as a “second best” choice because they lack the ability to manage external exchange.
Managers in dynamic environments need to develop new capabilities to help their firms prosper. In seeking new capabilities, their firms need to choose between external and internal sourcing modes, within a web of market and internal institutional failures that promote some sourcing choices and discourage others. Institutions are organizing mechanisms that guide agents’ interaction with one another to accomplish tasks, while institutional failures are problems that interfere with an agent’s ability to use a particular set of institutions to carry out tasks or reap the benefits of its activities (Scott, 1987; North, 1990). Early studies of capability sourcing stressed that internal sourcing is common when failures in market institutions for governing exchanges arise from opportunism risks (Williamson, 1975), coordination needs (Coase, 1937), or simply from the lack of external sources (Stigler, 1951; Dierickx and Cool, 1989). In addition to market failures, problems that interfere with internal organizing mechanisms, which we refer to as internal failures, also affect sourcing choices. Institutional failures that inhibit internal sourcing include substantial gaps in a firm’s existing capabilities (Leonard, 1995), social conflicts that arise in developing new knowledge (Oliver, 1997), and low-powered incentives that reduce employees’ commitment to internal projects (Williamson, 1985). Little research, however, has considered the joint effects of market failures and internal failures on firms’ sourcing choices, especially when firms that align their capability sourcing with incentives that arise from institutional failures out-perform firms with misaligned choices.

The need to consider how failures of market and internal institutions affect mode choices points to an important issue in the strategy literature. Research in strategy, economics, and organizational theory has a somewhat schizophrenic view of organizational change. On the one hand, an extensive literature identifies many barriers to business 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; Stuart and Podolny, 1996; Klepper and Simons, 2000). On the other hand, there is a large and diverse 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. In practice, though, it is clear that firms are able to change more frequently than theories of inertia might suggest, while facing more constraints that adaptability theories commonly identify.
A smaller 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 dynamics capabilities perspective is still emerging.

One task in developing theories of ongoing business change, such as dynamic capabilities, lies in identifying mechanisms that firms use to overcome constraints to change (Capron, Mitchell and Oxley, 2000; Eisenhardt and Santos, 2002). We argue that internal and external modes of capability sourcing are key mechanisms of substantial ongoing change. This paper helps extend theories of business change by identifying the circumstances under which firms use different change modes and how the choices influence business performance. The term business dynamics theory describes our conceptual approach.

The study focuses on how institutional failures influence the choice and effectiveness of internal versus external capability sourcing. We examine multiple dimensions of capability development performance, including coordinating the use of existing capabilities, creating new capabilities, and protecting the value of capabilities, as well as improving firms’ ability to change and to generate competitive advantage. This approach uses a novel combination of arguments concerning sourcing choices to frame the study, while allowing us to explore empirical dimensions of institutional failures, sourcing modes, and capability development performance. Thus, the study has both deductive and inductive elements.

The analysis uses a survey of 162 telecommunications firms in Europe, North America, Latin America, and Asia in 2000-2001. The results reveal the influence of internal and external failures on capability sourcing choices. We find that sourcing choices that conform with institutional failure incentives commonly help firms develop needed capabilities, while deviations from the incentives harm performance. Several variations of these core results also provide intriguing implications.

BACKGROUND

We start by defining the key concepts that we will build on throughout the study. These include institutions, capabilities, behavioral assumptions, and sourcing modes.
Several literatures identify the importance of institutions in shaping the way that agents interact with each other. Institutional theorists define institutions as the norms that agents take for granted in shaping their exchanges (DiMaggio and Powell, 1983; Scott, 1987). Similarly, North (1990) defines institutions as the formal and informal rules of the game that reduce uncertainty and guide how people interact with each other. Institutions exist both across broad social communities and within the societies of individual organizations. These market and internal institutions shape human interactions that produce goods and services. Thus, institutions shape what firms are able to do and how firms change what they are able to do.

At a general level, 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. In turn, capabilities consist of sets of organizational routines, which are patterns of activity embodied in human or capital assets (Winter, 1990). Routines are tacit, co-specialized with other routines, and embedded in organizational contexts (Kogut and Zander, 1992; Capron and Mitchell, 1998). Several routines combine to create capabilities, which are often imperfectly tradable owing to the tacitness, co-specialization, and organizational embeddedness of their underlying routines. The imperfect tradability of capabilities means that firms have important roles as governance structures, where governance includes protecting the value of capabilities, coordinating the use of existing capabilities, and creating new capabilities (Peteraf, 1993; Mitchell and Shaver, 2003). We refer to new capabilities that firms want to create as targeted capabilities.

Our behavioral assumptions concerning the incentives that influence firms’ governance choices as they attempt to obtain targeted capabilities include potential self-interest and bounded rationality with foresight (Williamson, 1999). Thus, we assume that actors can look ahead and recognize opportunities and risks that affect them and their firms, although expectations about the outcome of an activity may vary across firms (Karim and Mitchell, 2000). Although we recognize that firms sometimes remain inert as their environments change, we focus on situations in which firms recognize a need to obtain new capabilities.

We contrast the use of internal and external sourcing to obtain targeted capabilities. Internal sourcing refers to new capabilities that a firm creates by recombining its existing routines or creating new routines. Internal sourcing examples include internal training, internal
product development, and building new facilities. External sourcing means acquiring capabilities from outside the existing boundaries of a firm. External sourcing has three forms (Chi, 1994): 1) purchasing a specific capability (purchase contracts), 2) collaborating to transfer capabilities and their underlying routines between firms (alliances), and 3) acquiring a firm or part of a firm (acquisitions). Firms use purchase contracts to buy distinct capabilities from third parties; examples include buying off-the-shelf technologies and services, licensing technology, and employing consulting services. Alliances are ongoing multi-party relationships in which the partners retain strategic autonomy. Acquisitions obtain control of another business. We compare internal sourcing to a single external sourcing category that includes the three external modes.

The internal-external sourcing distinction raises two conceptual issues. First, capability-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 a firm to pursue internal sourcing and those that trigger external search. We view the three external sourcing modes as a continuum (Leonard, 1995), where motives for external sourcing strengthen as firms move from purchase contract to acquisition, with alliances arising between the two extremes. Thus, 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.

The term business dynamics theory describes our conceptual approach. Business dynamics theory combines the opportunism emphasis of transaction cost economics (Williamson, 1999) with the knowledge management emphasis of evolutionary research (Nelson and Winter, 1982) and dynamics capabilities arguments (Teece, Pisano, and Shuen, 1997). The business dynamics approach differs from opportunism perspectives in that we focus on firms’ sets of routines and capabilities, rather than on individual transactions. In turn, this leads us to emphasize firms’ coordination and creation roles in governance, in addition to their protection activities. The combined emphasis on protection, coordination, and creation credits the firm with a critical role in creating new capabilities as well as enhancing the value of existing capabilities. Our focus on routines and capabilities as units of analysis brings our approach close to that of evolutionary economics, because we emphasize patterns in firms’ governance choices and the process of creating new capabilities rather than choices around single transactions, but with
greater emphasis on factors that allow firms to overcome path-dependent constraints to change. In parallel, the focus on business change aligns with dynamic capabilities arguments, but with greater attention to the factors that cause firms to choose between internal and external mechanisms for undertaking path-breaking changes.

**INSTITUTIONAL FAILURES AND CAPABILITY DEVELOPMENT PERFORMANCE**

We first identify internal and market failures that influence firms’ choices of sourcing modes, and then turn to how conformance with the influences of institutional failures affects sourcing performance. Figure 1 depicts the framework that we develop in this section.

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

The performance predictions provide a baseline for our analysis. In addition, the study has an extensive exploratory aspect, as we will examine multiple dimensions of internal and external institutional failures, as well as several dimensions of capability development.

**Internal Failures**

Internal institutions are organizing mechanisms that arise inside a firm’s boundaries and guide the activities that a firm’s members undertake with one another (Oliver, 1997). Internal failures are problems that interfere with a firm’s ability to use internal organizing mechanisms successfully. We focus on three types of problems that interfere with internal development activities: capability gaps, social conflict, and weak internal reconfiguration skills. We discuss each internal failure concept in terms of its general aspects, while the analysis provides multi-dimensional measures. These three types of internal failures provide a complementary set of “functional” and “social” issues that may operate independently within firm boundaries.

**Capability gaps**

Gaps between a firm’s existing and targeted capabilities, which we refer to as capability gaps, create the first type of problem that interferes with internal institutions for developing new capabilities. Gaps may arise between existing routines in areas of technical development, marketing, and administration, and the routines that firms need to develop targeted capabilities. Prior research has discussed capability gaps in terms of patents and industry categories, but little research addresses more multi-dimensional gaps.

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). A greater gap creates greater problems in using internal organizing mechanisms, and therefore reflects greater internal failure. This institutional failure arises because the firm lacks a means of organizing activities that it must undertake to develop targeted capabilities – the routines underlying current capabilities are too weak or the targeted capabilities need routines that differ substantially from a firm’s existing routines. Capability closeness and capability strength both influence sourcing choices.

Several arguments suggest that the closeness of the gaps between a firm’s existing capabilities and targeted capabilities influences sourcing choices. In the resource-based view, firms tend to undertake internal sourcing when current capabilities may provide the base needed to create new capabilities (Wernerfelt, 1984; Barney, 1999). Similarly, Cohen and Levinthal (1990) argue that firms undertake internal changes that build on their existing capabilities to evaluate and utilize particular knowledge, which they refer to as absorptive capacity. Capability closeness aligns with the notion of local search (Nelson and Winter, 1982), a view that holds that firms prefer to search for new capabilities that are close to existing capabilities (Stuart and Podolny, 1996), but also recognizes that firms may search distantly if they believe that local search would fail. 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. Diversification studies also suggest that entrants with relatedness to a new market typically favor internally generated entry (e.g., Chatterjee, 1990; Busija, et al. 1997; White, 2000), while external sourcing is more common when firms need capabilities that differ substantially from their existing capabilities (Kogut, 1991; Mitchell and Singh, 1992; Mitchell, 1994; Barkema and Vermeulen, 1998). In addition, Galunic and Rodan (1998) suggest that a narrow gap between needed and desired capabilities increases the likelihood of novel reconfigurations within a firm while decreasing implementation costs.

In parallel, several literatures address capability strength, suggesting that a firm has incentives to develop new capabilities internally when the firm has strong capabilities in the targeted area. Cuervo-Cazzura (1999) argues that firms develop capabilities internally once they have already achieved a competitive level close to that required for effective competition, but seek externally when they face large competitive gaps. Acquisition and alliance studies show that managers often search for targets or allies with capabilities that complement the focal firm’s weaknesses, intending to redeploy the stronger capabilities from the target (Seth, 1990; Bowman
Thus, capability gaps will influence firms’ internal versus external sourcing choices. Firms use internal sourcing when their managers believe that capability gaps between the targeted and existing capabilities are small. In parallel, they use external sourcing when they believe that gaps are large.

**Social conflict**

The second form of internal failure arises from social conflicts, which are institutional failures that reflect tensions within a firm’s social community. Scholars have long recognized that firms sometimes do not use available capabilities to pursue changes owing to social problems (Coch and French, 1948). Social conflict sometimes simply creates inertia, causing a firm to avoid change. In other cases, however, firms will turn to external sources when internal sourcing would engender substantial conflict, rather than avoid change altogether.

Attempting to create new capabilities within the firm often encounters resistance to change due to individual and organizational limitations. At the individual level, employees are bounded by what they know and by what they value, and are sensitive to norms of what is appropriate behavior (Kogut and Zander, 1996). In addition, changes such as developing new capabilities may cause power to shift to new people (Argyris, 1970; Ashforth and Mael, 1998). Vulnerable employees and powerful vested interests reinforce existing routines and oppose path-breaking changes (Ocasio, 1994), while entrenched managers will tend to focus their attention on changes that reinforce their existing positions (Ocasio, 1997). Moreover, new capabilities that would reduce the value of existing capabilities often heighten resistance to change (Abernathy and Clark, 1985; Tushman and Anderson, 1986). When new capabilities reduce or eliminate the value of existing capabilities, entrenched individuals will shun the development and use of new capabilities in order to retain their power.

At the organizational level, potential violation of corporate culture and identity (DiMaggio and Powell, 1983; Scott, 1987; Oliver, 1997), established routines (Cyert and March, 1963; Senge, 1993), and political distribution of power (Polanyi, 1967) often dampens path-breaking internal change. Oliver (1997) argues that a firm’s historical cultural and political context, along with the psychological costs associated with organizational change, can cause resistance to creating new capabilities. In the same vein, Kogut and Zander (1996) argue that identity generates a cost on limiting the search for new avenues of exploration. Similarly,
Ginsberg (1994: 158) notes that “strong institutional pressures abide in the evaluation of current resource allocations and in hindering acceptance of knowledge deployments”. As a result, internal sourcing is easiest when new capabilities maintain an intra-organizational truce among the individuals and organizational subunits within a firm.

An alternative route for change that would encounter social conflict is to turn to external sources to acquire the needed resources. Case studies by Menon and Pfeffer (2001), for instance, find that managers tend to view external knowledge more favorably than internal knowledge. They argue that, when the targeted capabilities pose status threats for insiders, external sourcing may provide a better solution due to the high symbolic and social costs of using internal knowledge. When the needed capabilities engender social conflict, firms may turn to external sources to postpone conflict rather than take the immediate risk of disruption associated with major reshuffling of their internal capabilities. Instead, the firm can obtain new capabilities from outside the firm, and only undertake the process of adjusting existing capabilities once the presence of the new capabilities has become a fait accompli and has gained a degree of acceptance (Haspeslagh and Jemison, 1991).

Some studies of social conflict suggest that different types of conflict have different effects on group performance and, by implication, on ability to change. Jehn (1997) argues that conflicts that affect relationships interfere with group performance, while conflicts in tasks that do not affect relationships facilitate group performance. Eisenhardt and Schoonhoven (1990) argue that task conflict provides different perspectives on problems and thereby may lead to superior solutions. Rather than moving immediately to examine change effectiveness, though, a two-stage approach to this question lies in first considering how conflict affects a firm’s choice of change modes, before turning to the effectiveness of the change itself. As we discuss below, it is possible that these two influences diverge, such that conflict may inhibit the incidence of internal change, but facilitate effectiveness when firms overcome the internal reluctance. We will first determine whether firms often avoid changes that would create conflict, and then consider whether such conflict avoidance affects change performance.

Weak internal reconfiguration skills

Even if a firm possesses the ability to develop targeted capabilities, and the targeted capabilities would not encounter social conflict with existing capabilities, a third internal failure may interfere with the firm’s ability to undertake internal development. The potential for the
third form of internal failure arises because the firm must establish processes that help people work together to develop new routines and recombine them with existing routines.

We use the term internal reconfiguration skills to refer to a firm’s ability to organize its personnel and systems to undertake effective internal capability development. Internal reconfiguration skills are multi-dimensional. The skills include creating incentives for people to work with others within the firm, systems for integrating and rotating personnel, and systems for firms to transfer capabilities among units. Firms with strong internal reconfiguration skills will tend to carry out capability development activities internally, while firms with weaker internal reconfiguration skills may be more likely to seek new capabilities externally.

The notion of internal reconfiguration skills extends the notion of appropriate incentive systems. Early boundary choice literature focused on internal failures that arise because “internal organization is unable to replicate the high-powered incentives of market and is subject to bureaucratic disabilities” (Williamson, 1985: 403). From this perspective, internal costs may rise due to self-interested activities, such as bargaining costs in inter-divisional exchanges (Milgrom and Roberts, 1990; Poppo, 1995). However, attempting to replicate high-powered incentive systems through contingent compensation and asset ownership also incurs unwanted side effects, such as accounting manipulation, focusing efforts on the most measurable tasks, and non-cooperative behavior. Holmstrom and Milgrom (1994:989) note that the “use of low-powered incentives within the firm, although sometimes lamented as one of the major disadvantages of internal organization, is also an important vehicle for inspiring cooperation and coordination.” This stream of literature emphasizes how the choice of an incentive system influences each individual to perform certain tasks and promotes one type of behavior at the expense of others. In a context of the development of new capabilities, a firm has to develop an incentive system that enables and rewards individuals to develop such capabilities. Appropriate incentive systems help individuals manage competing demands for nurturing existing capabilities and developing new skills, foster coordination across functions or areas, and reward the contribution of individuals to the development of the needed capabilities.

In addition to incentives, more recent work in the knowledge-based stream of literature emphasizes the role of communication channels, transversal mechanisms, codification, replication templates, and knowledge sharing cultures as mechanisms that helps firms recombine their existing routines and capabilities into novel uses. Building on this idea, 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 capabilities. Similarly, Mitchell and Shaver (2003) show that integrative capability influences a firm’s capability sourcing activities.

When firms lack the appropriate internal reconfiguration skills, even if nominally relevant routines and capabilities reside within the firm, they may turn to external modes of sourcing to acquire targeted capabilities. For both incentive- and knowledge-based reasons, trading and integrating external resources can be easier than trading within the firm.

The three types of internal failures that we have discussed in this section encompass complementary functional and social problems that interfere with internal institutions. Capability gaps are functional forms of internal failure, in that a firm lacks the expertise to undertake a change. Social conflict and weak internal reconfiguration skills, on the other hand, derive from social roots, including organizational and emotional components of a firm’s capacity to develop new capabilities internally. Thus, the failures address situations in which firms lack the technical ability to accomplish a needed change, as well as situations in which firms may well possess needed technical ability, but would risk violating corporate traditions, breaking working routines, and disrupting the organization if they tried to pull together the functional skills. In practice, we expect divergence in managers’ assessments of the three types of internal failures.

**Market Failures**

We now turn to market failures that influence sourcing decisions. Market institutions are organizing mechanisms that cross a firm’s boundaries and guide the exchanges that a firm undertakes with external parties (North, 1990). Market failures are problems that interfere with a firm’s ability to use external organizing mechanisms successfully. We consider three forms of problems that interfere with market exchange activities: the lack of an external market, the need to protect capabilities, and the presence of weak external governance skills.

**Lack of markets**

The simplest form of market failure arises from a lack of available external markets for capabilities. Scholars have long noted that the ability to undertake market exchanges requires the presence of an external market. Needed capabilities may not be available from external sources for at least three reasons. First, tradable resources might not yet exist (Stigler, 1951). Second, available resources might not provide sufficient distinctive advantages for a firm to be willing to use them (Dierickx and Cool, 1989). Third, dominant firms may hoard resources to
limit rivals’ ability to create new capabilities (Krattenmaker and Salop 1986; Ordover, Saloner, and Salop, 1990; Chatain and Capron, 2003; Noakes, 2003). Firms that lack access to high quality external capabilities will tend to turn to internal sources for developing new capabilities.

**Protection needs**

The need to protect capabilities is the second form of failure that creates problems in the use of market institutions. We use the term protection needs to refer to situations in which firms attempt to protect capabilities from appropriation by other actors. This idea arises most directly in transaction cost economics, which argues that firms commonly organize activities internally when they want to protect the value of specialized assets, because they fear opportunistic behavior on the part of external exchange partners (Williamson, 1975; Klein, *et al*., 1978).

Transaction cost theory views firms as preferring market institutions rather than internal institutions to govern exchanges, unless market failures would impose high transaction costs on external exchanges. Despite the preference for the market, external sourcing of transaction-specific assets that firms need to develop new capabilities often raises concerns about opportunism due to difficulties in screening, trading, and transferring capabilities into the firm, thereby creating incentives for internal sourcing in order to protect the value of the capabilities. Transaction costs also arise when firms fear that opportunistic behavior would lead to uncontrolled leakage of capabilities to third parties (Teece, 1986; Gulati and Singh, 1998). Although business acquisitions provide partial solutions to overcoming opportunism-based market failures, as they bring the targeted capabilities under the acquirer’s ownership, acquisitions incur substantial problems in valuing assets and then combining acquired capabilities with existing capabilities, as well as with retaining people from the target firm whose skills are part of the targeted capabilities (Walsh, 1988). When a targeted capability has high value to the firm, internal sourcing provides stronger safeguards to protect its value and prevent leakage (Chi, 1994). Several empirical studies support the argument that fear of capability leakage leads to greater use of internal sourcing (e.g., Monteverde and Teece; 1982; Anderson and Schmittlein, 1984; Joskow, 1985; Mowery and Rosenberg, 1989; Pisano, 1990).

**Weak external governance skills**

The presence of weak external governance skills creates the third form of market failure that leads to a preference for internal sourcing. We define external governance skills as a firm’s ability to manage the process of resource reconfiguration during external exchanges, including both protecting and creating value.
Arguments underlying the concept of external governance skills arise from several literatures. In the transaction cost literature, scholars such as Liebeskind (1996), Argyres (1996), Poppo and Zenger (1998), and Silverman (1999) argue that firms differ in their ability to manage external exchanges in ways that will protect the value of specialized assets from being appropriated by others. Acquisition and alliance literatures also suggest that firms differ in their ability to integrate capabilities that they acquire from other firms (Singh and Zollo, 2004; Kale, Dyer and Singh, 2002).

Moreover, the idea of external governance skills complements the emphasis on internal governance that is central to the resource-based and knowledge-management literatures. These literatures posit that firms play a critically important role in the creation of new capabilities, by recombining existing routines and in creating new routines (Peteraf, 1993; Grant, 1996). From this perspective, creating new capabilities is difficult to accomplish through external exchange because of uncertainties in how the capabilities will work and in the stability of the cooperating organizations (Conner and Prahalad, 1996; Spender, 1996). Organizations provide internal governance mechanisms for developing capabilities because they act as social communities, which create productive and administrative routines (Kogut and Zander, 1992). These internal mechanisms facilitate the exchange of information that firms need to recombine current routines and develop new routines (Foss, 1996).

Despite a potential bias toward internal development of new capabilities, the resource-based and knowledge-management literatures suggest that firms differ in their ability to import capabilities across organizational boundaries. Doz and Santos (1997) and Brannen, Liker and Fruin (1998), for instance, argue that firms differ in their ability to decontextualize and recontextualize knowledge, while Takeishi (2002) notes that some firms have superior capabilities in managing inter-firm divisions of labor. Firms with stronger external governance skills will be more willing to turn to market exchange to obtain targeted capabilities, given that there will typically be a larger available selection of potential resources outside a firm than within it. In contrast, firms with weak external governance skills will tend to rely on internal sourcing for new capabilities.

Issues concerning capability protection and the strength of external governance skills often arise jointly, because the same factors that create the need for protection may create needs for governance skills (Steensma and Corley, 2001). Nonetheless, there is a conceptual and empirical distinction between the notions, because the need for capability protection arises from
attributes of the capability, while the idea of external governance skills arises from attributes of the firm (Liebeskind, 1996). In a figurative sense, then, the two types of market failure reflect two sides of the same coin, but each side requires its own die in order to mint the composite coin. Variation in either die can lead to a coin with substantially different appearance and value. In particular, firms may end up with substantially different capabilities if their primary sourcing drivers arise from protection or governance concerns, or if focusing on capability protection leads them to focus on using routines that already exist within the firm, while greater emphasis on leveraging external governance skills might allow firms to gain access to a broader set of routines, and thereby have more scope for capability creation. Thus, it is important to take an integrated view of market failures, reflecting both the protection and external governance aspects, if we are to understand how market failures influence sourcing choices and performance.

This discussion helps address criticism of transaction cost arguments, by introducing firm-level elements of market failure. In part, this addition returns to the roots of the transaction cost argument, as Coase (1937) cited the need for managing related activities as a market failure that can lead to internal sourcing. Williamson (1999: 1098) himself recognizes that the transaction cost and firm skill perspectives “deal with partly overlapping phenomena, often in complementary ways” and agrees that a firm’s history and capability endowments matter to boundary choices. Williamson (1999: 1003) recommends that the traditional TCE query ‘What is the best generic mode (market, hybrid, firm) to organize X’ be replaced by the following question ‘How should firm A – which has pre-existing strengths and weaknesses (core competences and disabilities) – organize X?’.

**Propositions: Capability Development Performance**

The concluding stage of our argument lies in considering how sourcing choices affect the success of a firm’s capability development activities. We expect firms to benefit when their sourcing choices conform to the institutional failure incentives and suffer when they deviate. By conformance with sourcing incentives, we mean alignment between the predictions and a firm’s choices of internal versus external sourcing. “Conforming” to the incentives means making choices that the model suggests, while “deviating” means making unexpected choices.

If the arguments concerning sourcing incentives are right, we expect most sourcing decisions to reflect the problems that arise from internal and market failures for obtaining targeted capabilities. However, firms typically face conflicting pressures that interfere with their ability to optimize on individual decisions. Thus, we expect misaligned choices to occur. In turn,
we expect deviations to lead to capability development problems. This means that we expect “conformists” to achieve higher performance than “deviants” in their capability development. Anderson (1988) uses a similar approach to test the impact of boundary choices on performance.

**Proposition 1.** The more a firm’s sourcing choices conform to the predicted incentives of internal failures, the greater the firm’s capability development performance.

**Proposition 2.** The more a firm’s sourcing choices conform to the predicted incentives of market failures, the greater the firm’s capability development performance.

The propositions address the general concepts of institutional failures and capability development performance. The analysis will disaggregate the institutional failures in terms of the six types of internal failures and market failures that we discussed above. We will also disaggregate capability development performance, based on dimensions that arise in dynamics capabilities arguments and in our conceptual assumptions, as well as with an overall measure of capability competitive advantage.

Dynamic capabilities arguments focus on the process of change (Teece, Pisano and Shuen, 1997). Two aspects of the change process include the ability to be responsive to market changes and the general ability to undertake internal development. The key point is to assess a firm’s ability to undertake ongoing changes.

Business dynamics theory, as we noted earlier, suggests that three aspects of a firm’s capability development performance will be important: the ability to protect the value of capabilities, to coordinate the use of existing capabilities, and to create new capabilities. The key point here is similar to basic dynamic capabilities arguments, but disaggregates the change process more finely. The analysis will explore similarities and differences in how conformance with the different types of institutional failure incentives affects the different dimensions of capability development performance.

It is not clear at this point whether sourcing choices will have the same influence on different dimensions of capability development performance. On the one hand, firms that develop successful approaches to one aspect of capability development may be able to build on that success in order to succeed on other dimensions of capability development. We used this convergence premise for the baseline propositions, as a simplifying assumption in which the ability to undertake one form of change creates momentum for broader sets of changes. It is possible, though, that differences in the need to protect, coordinate, and create capabilities will cause trade-offs with respect to different sources of institutional failures.
In summary, we first identify institutional failures that influence a firm’s choice of internal and external sourcing modes and then predict that conformity with the expected influences will lead to greater capability development performance. Figure 1 summarizes the argument. We expect smaller internal failures, stemming from small capability gaps, limited social conflict, and effective internal reconfiguration skills, to lead to greater use of internal sourcing. In parallel, we expect greater market failures stemming from protection needs, ineffective external governance skills, and limited external markets to lead to internal sourcing. We expect conformance with the market and internal failure influences to improve multiple dimensions of capability development performance.

Together, the arguments offer an integrated perspective on institutional failures that arise across and within firm boundaries, and insights into how the failures affect incentives for where firms obtain capabilities. The analysis will help determine whether the same factors that influence a firm’s behavior also influence the performance that follows from that behavior. Of course, the choice of internal or external sourcing will depend on the degree of market and internal failures in particular cases. Nonetheless, changes in the magnitude of one type of failure will alter the balance of the influences, so long as the failures are independent of one another.

METHODS

We chose the international telecommunications sector as an arena in which to study capability sourcing. Telecommunications network operation and service provision has evolved rapidly during the past two decades, owing to changes in regulatory, technical, competitive, and market environments throughout the world (Beardsley, Raghunath and Wilshire, 2000). In both the European Union and the United States, for instance, continental and national regulators have forced incumbents to unbundle services and allow competitors to use their local customer-access networks to compete for traditional and innovative telecommunications services. Traditional telecommunications firms, spurred by competition and by attempts to capture volume economies, have invested heavily in new technologies and infrastructure for network operations.

Competition in network operations also affects telecommunications service provision. As access to infrastructure becomes more open, pure infrastructure providers risk seeing value in the industry accrue to content providers and aggregators, potentially relegating infrastructure firms as commodity sellers of bandwidth. Infrastructure providers must offer new value-added services. The market for most enhanced services is highly competitive, and firms with strong
information technology competencies are challenging telecommunications incumbents (Armstrong, 1998). Therefore, firms face strong incentives to obtain new capabilities.

Changes that telecommunications firms seek to undertake emphasize all five key aspects of Schumpeter’s (1934) change typology: components, products, production processes, markets, and organization. Most strikingly, the changes entail more than changing a stock of assets; change also means transforming organizations and the processes needed to integrate new capabilities. The telecommunications sector suits this research because the firms have resorted extensively to internal and external capability sourcing as they have sought new capabilities.

Sample and Data

Our data consist of survey responses from 162 telecommunications firms in Europe, North America, South America, and Asia. We mailed the survey to telecommunications firms during late 2000 and early 2001, following detailed in-person pre-tests. The survey asked senior managers to assess the incentives, prevalence, and success with the four modes of capability acquisition, to consider barriers to creating capabilities, and to answer questions concerning general firm demographics. We asked them to answer the survey from the perspective of their corporation or business unit, depending on the scope of their responsibilities.

Owing to the senior level from which we needed responses and the length of the survey (more than 250 questions and 20 pages of text), we sampled heavily in order to ensure that we would have enough responses for analysis. We obtained names and addresses for about 1,500 firms and senior managers, with about 40% based in Europe, 40% in the U.S., and the remainder distributed throughout the world. We also administered the survey to 90 senior managers from telecommunications firms who were participating in Executive Education programs at our universities (27 of the 90 responded). Overall, our response rate was 11%, with all responses coming from different businesses. All respondents had positions equivalent to vice-president or higher in general management positions such as corporate development. All respondents had at least two years’ tenure at their firms, which provided sufficient history to identify their firms’ tendencies. The number of responses and the extent of the information that we obtained from senior managers balanced the relatively low response rate. We point out that, like any survey, one must interpret the responses in the context of the characteristics of the responding firms.

Table 1 reports demographic characteristics of the respondent firms. The firms have extensive geographic dispersion of home countries, with 43% in Western Europe, 20% based in the U.S., 10% in Northern Europe, 8% in Southern Europe, and 5% in the Asia Pacific region.
Although the geographic dispersion of the responses is somewhat unbalanced with respect to the original sample (e.g., the U.S. provided 40% of the sample and 20% of the responses), there is sufficient distribution across countries to reflect a wide variety of contexts. The responses also provide a reasonable size distribution of firms, based on employment: about 33% have fewer than 500 employees, 27% have 500-5,000 employees, and 39% have more than 5,000 employees. In addition, about half have less then $500 million annual corporate sales, while the other half have up to $60 billion corporate sales. Firm profitability (ROA and ROE) and the geographic scope of the firms’ activities 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 (there is some overlap of telecommunications and IT activities). Thus, the sample reflects a wide variety of moderately-focused established telecommunications firms.

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

We believe that the results will generalize to the context of moderately-focused established firms, but would be cautious in applying them to new or highly diversified companies, given that there are relatively few such firms in the data. The varied size distribution helps ensure that the results do not apply only to large firms. In addition, and of particular importance, there is no apparent response bias in terms of firm success, which alleviates concerns that profitability extremes might induce the responses.

We note an additional response characteristic, concerning language skills. The survey was conducted in English, which limited the responses to companies with senior executives with English language skills. While we would have preferred to undertake a multi-language approach, this was not possible, given that we sampled across more than 30 countries. Fortunately for our purposes, the telecommunications sector had sufficient international activity by 2000 that English had become a common commercial language among firms in many countries.

The survey took place before the recent slow-down in the telecommunications sector. As we note in the sensitivity analysis section, we undertook exploratory analysis of the firms’ responses conform to their ability to weather the difficult telecommunications competitive environment that emerged after the period of the survey.
Measures

The measures record firm-specific patterns of sourcing choices and performance, using the respondents’ assessments of their firms’ experience. This approach avoids a sample selection bias that would arise if we focused on specific successful or failed projects. Instead, we asked the respondents to assess tendencies in their firms’ sourcing choices and outcomes. The approach is consistent with our theory, which emphasizes the relevance of firm-specific routines and patterns of behavior. The respondents are senior executives with high-level responsibilities and perspectives, who are knowledgeable of their firms’ capabilities and tendencies.

The anchor for the measures is a respondent’s perception of their firm’s status. Using managerial judgment about sourcing incentives in the survey reflects our conceptual framing. Firms’ sourcing choices depend on their managers’ assessments of market and internal failures, rather than on externally-imposed “objective” measures of institutional failures. Hence, it was necessary for us to identify a target group of respondents who had the responsibility of making judgments concerning the level and importance of different institutional failures. While a single executive rarely makes all sourcing decisions within a firm, senior executives have sufficient perspective to recognize their firms’ tendencies in capability sourcing activities. The survey asks the senior executives to address the question of why their firms select different modes to obtain needed capabilities in different situations and, in turn, how the choices affect performance.

We created constructs using scale-based measures for the influences and outcomes. The items used questions in which respondents assessed how the institutional incentives influenced sourcing choices and performance. We placed these questions at several different points in the survey, in order to separate questions concerning cause and effect.

The measures provided reliable estimates of sourcing influences. All scales were seven-point Likert scales: responses ranged from “Fully disagree” to “Fully agree”, with a neutral center point. Using verbal anchors helped ensure that respondents interpreted 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.

We describe the primary measures in the following discussion. We determined the measures based on confirmatory factor analysis of our concepts, followed by fine-tuning based on convergent and discriminant validity. We outline empirical relationships among the measures in the analysis section. Appendix 1 describes the survey. Table 2 reports descriptive statistics.

********** Table 2 about here **********
**Conformance with institutional failures**

Three variables measure internal failures. “Capability gap” conformance measures the extent to which firms make their sourcing choice according to the degree of capability gaps. We use the mean of four items, two for capability closeness and two for capability strength (Chronbach’s alpha = 0.77). These items report the respondents’ assessments of the extent to which they prefer internal over external sourcing when their existing technical and customer knowledge closely approach targeted capabilities (capability closeness) and when their technical and market skills are strong relative to those of their competitors (capability strength). Our definition of capability gaps distinguishes between closeness and strength, but we found that the closeness and strength dimensions correlate highly within the capability gap measure.

The “social conflict” conformance construct takes the mean of two items: the degree to which firms prefer internal sourcing when new capabilities create little internal competition (item 1) and/or internal resistance (item 2) (Chronbach’s alpha = 0.81; we found that adding items concerning the obsolescence of existing capabilities and the degree of organizational change produced equivalent results). As we noted, some approaches distinguished between different forms of social conflict, but we found that the items loaded within a single construct.

The “internal reconfiguration skills” conformance measure takes the mean of three items: the degree to which firms will turn to internal sourcing when the targeted capabilities fit the firms’ incentives and culture, when the incentives would suit new people, and when systems for integrating personnel have been set up (Chronbach’s alpha = 0.71).

We reverse coded the capability gap and the social conflict conformance measures. This means that we expect small gaps and limited conflict to lead to internal sourcing.

Three variables measure market failures. The “lack of market” conformance measure takes the mean of three items. These include the degree to which firms turn to internal sourcing when targeted capabilities cannot be found in active resource markets, alliance markets, or acquisition markets (Chronbach’s alpha = 0.79).

The “protection needs” conformance construct is the mean of two items: the degree to which firms turn to internal sourcing when new capabilities would help a firm differentiate itself and when they need to protect the new capabilities (Chronbach’s alpha = 0.71). These are appropriate items for addressing protection needs, because they identify circumstances where firms will be concerned that external agents might take advantage of them.
“External governance skills” conformance takes the mean of three items: the degree to which firms turn to internal sourcing when they lack skills for importing capabilities, when they lack skills needed to manage external modes of capability acquisition, or when firms are not attractive to partners with needed capabilities (Chronbach’s alpha = 0.63).

Table 2 shows that the six institutional failure variables correlate only weakly with one another. This independence suggests that the respondents were able to discriminate among different influences on their sourcing choices.

**Capability development performance**

The survey also provides six measures of capability development performance. Two of the performance variables focus on dynamic capabilities measures. “Ability to change” includes the mean of two items: the extent to which the firm has become more entrepreneurial internally and the degree to which the firm has increased the speed of its internal development processes (Chronbach’s alpha = 0.84). “Effectiveness of internal development” uses a single item that asked the respondents to assess the degree to which they had been effective in acquiring needed capabilities via internal development.

Three performance variables focus on business dynamics measures. “Protection ability” uses a single item that asked the respondents to assess the degree to which they were able to protect the value of new capabilities in their internal development activities. “Coordination ability” uses a single item that asked the respondents to assess the degree to which they could integrate new capabilities with existing capabilities during internal development. “Creation ability” uses the mean of two items that asked the respondents to assess the degree to which they could create a platform for future developments and their ability to diffuse the abilities that they generated internally through the entire organization (Chronbach’s alpha = 0.63). These first five performance variables focus on the success of internal development activities.

The sixth variable, “Capability competitive advantage”, assesses the overall performance of the firms’ internal and external capability sourcing activities. The measure uses 12 questions concerning the firms’ overall ability to use all sourcing modes to create new capabilities relative to their main competitors (Chronbach’s alpha = 0.75). The 12 dimensions within the capability competitive advantage variable include strength in R&D, IT, manufacturing, marketing, distribution, international presence, supplier relationships, managerial skills, entrepreneurial talent, project management, network management, and regulatory experience.
Table 2 shows that the performance variables correlate only moderately. The independence suggests that the measures identify different aspects of capability development.

**Other factors**

Several variables address other influences on sourcing performance. Single-item measures address firm and environmental differences, including the firms’ “internal development bias” relative to other sourcing modes, “firm size” (worldwide employees), and “home country” (the U.S., France, and the U.K. versus other countries). Firms with a bias for internal development may suffer from path-dependence constraints that inhibit the success of their changes. Larger firms may find it more difficult to change successfully. Different national environments may impose constraints that inhibit or facilitate change (we include the three countries with the largest representation in the data). Sensitivity analyses added several other controls, as we discuss later.

**Data Reliability**

Several steps assess the survey instrument and the measures: (1) content validity of our measures through pre-testing based on expert panel assessment, cross validation in executive interviews, and a pilot test; (2) survey design via the question sequence and use of multiple items; (3) analysis of respondent bias; and (4) analysis of the internal validity of the measures.

**Content validity**

The survey process had four phases. First, we developed measurement scales by reviewing literature and conducting 25 on-site interviews with academics, telecommunications senior executives, and consultants. This first phase generated a rich list of items concerning our core concepts. Second, we pre-tested the questionnaire in on-site interviews and with senior executives who were attending telecommunications Executive Education programs at our business schools in the United States and in Europe. The executives came from a wide range of backgrounds, including finance, marketing, and production. The pre-tests helped ensure that the respondents understood the questions in the context that we intended. This second phase clarified some questions and added items that the executives suggested. Third, a pilot survey used the revised survey instrument during on-site interviews with CEOs and executives in charge of corporate development. This led to the final version of the questionnaire. The content validity of our measures derives from this careful process of developing the categories and pre-testing the questions. Fourth, we designed and administered the mail survey using guidelines established in Dillman’s (1978) Total Design Method. We addressed the surveys to the chief executives in
charge of corporate development. We also sent two follow-up letters and two replacement questionnaires within the three weeks following the first mail. Appendix 2 lists respondents that agreed to be identified.

Survey design

The survey separated items specific to constructs from one another to minimize consistency bias. We also introduced several control questions at different points. For the use of a specific sourcing mode, for instance, we used questions pertaining to the frequency, the ranking of that mode compared to other modes, and the degree of investment in that mode. We deleted the few cases that exhibited a lack of convergence across similar questions.

Two steps addressed biases that could arise from different response styles. First, we introduced items that were heterogeneous in content. Second, we worded some items in a scale positively and other items negatively, to address acquiescence and disacquiescence responses. This controls for stylistic responding because a high (low) score will not arise simply because of yea-saying/nay-saying (Baumgartner and Steenkamp, 2001).

We asked respondents to reflect on practices of internal and external sourcing during the previous three to five years. This approach identifies firm-specific patterns and avoids a sample selection bias that arises if respondents focus on single projects. Three to five years is sufficiently recent for respondents to have reliable memory of the activities.

We recognize that the same respondents provided information about causes (sourcing incentives) and outcomes (sourcing performance), but we took this approach in order to gather sufficient data to examine our questions. Several steps addressed concern about this issue. First, we placed the cause and outcome questions at several different points in the survey, to limit the chance that answers to one set of questions would determine answers to a subsequent set, and to limit the chance that the respondents’ implicit theories about institutional failures would influence how they answered performance questions. We also placed different sets of outcome questions at different points in the survey. Second, we asked a wide range of questions so that respondents could not easily discern relationships among questions and, instead, would focus on individual sections. Third, we used an extensive set of questions and measures for both causes and effects, in order to provide variation in the types of cause and effect 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 incentives.
and performance. 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.

**Respondent firm bias**

We performed several tests to check for biases among the respondent firms. We compared the industry and geographic profile of the respondent and non-respondent samples. As we noted earlier, the data set has a broad distribution of acquiring and target firms across the countries in the survey, although Western European firms and U.S. 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.

**Measure internal validity**

Multi-item measures examine the drivers of sourcing choices and performance, based on confirmatory factor analysis. Each multi-item measure meets conventional levels of internal validity, based on Chronbach’s alpha tests. Although two of the more exploratory constructs meet only a less-stringent 0.60 cut-off, this is reasonable for exploratory analysis (Nunnally, 1978). Moreover, we experimented with eliminating items from different constructs, finding consistent results in the performance analysis.

**RESULTS**

We use least square regression techniques to test the propositions. The dependent variables are the capability performance measures, while the independent variables are the institutional failure variables and control variables.
**Institutional failures conformance**

We first discuss the conformance variables. Figure 2 depicts the relative level of the conformance responses, that is, the degree to which the firms make sourcing choices that are consistent with the institutional failure incentives, based on the mean values of the conformance variables from Table 2. All six of the conformance variables differ significantly from the neutral point (4.0), based on t-tests (the mid-point of the scale is the point at which respondents were indifferent to mode choice, while values above 4.0 indicate a preference for internal sourcing). In four cases – including all three internal failure cases and the protection needs market failure – the firms tended to use internal sourcing when they faced the failure and, by inference, external sourcing when they did not. Capability gaps and protection needs create particularly strong incentives. In contrast, with the other two types of market failures – lack of markets and weak external governance skills – firms pay little heed to the institutional failure incentives. Thus, firms pay most heed to internal issues and protection needs in making their sourcing choices, with less attention to other external factors. The next part of the analysis will determine whether firms pay a penalty for the lack of attention they pay to the two market failure incentives.

********** Figure 2 about here **********

Table 3 reports the results of the performance analyses. All six models provide reasonable statistical fit, based on the R-square statistic.

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

**Performance: Dynamic capabilities**

We start with columns 1a and 1b of Table 3, which report the results for a firm’s ability to change and for the effectiveness of its internal development. These performance variables derive from the dynamic capabilities literature. We find similar results in both columns. Two internal failures influence performance, both in the expected direction: conformance with the capability gap and internal reconfiguration skills incentives leads to superior performance. Conformance with social conflict, meanwhile, has no performance impact.

Among the market failures in columns 1a and 1b, two failures also affect performance, although only one takes the expected direction. Conformance with the lack of markets has a positive impact on performance, with significance for internal development effectiveness (column 1b). Thus, even though relatively few firms adhere to this incentive, those that do often receive at least a moderate benefit. Conformance with the internal development incentive created by weak external governance skills, meanwhile, has a seemingly odd influence on performance,
in that firms that source internally because they lack external governance skills have poorer capability development performance, rather than better performance.

The unexpected negative performance impact of conformance with external governance skills makes sense, once one considers the underlying causal processes. Firms that emphasize this incentive are essentially adopting a second best development strategy – they are developing capabilities internally that would have suited external exchange, had they possessed better skills in managing external exchange.

On a personal level, the second best sourcing strategy is analogous to settling for a relationship with a person who you do not want because you cannot gain a relationship with the person who you do want. Not surprisingly, settling for second best often simply does not work. In the personal relationship analogy, one is likely to be better off living alone or seeking a more suited partner. In the capability development case, the firm is likely to be better off either undertaking no change or, better still, putting effort into developing its external governance skills so that it could pursue the more appropriate external exchange. Thus, despite the immortal sentiments of Mick Jagger and Keith Richards, it may be difficult to “get what you need” when faced with the reality that “you can’t always get what you want”. The fact that relatively few firms resort to internal development because they lack external governance skills, as Figure 2 shows, suggests that most firms realize the problems that can arise from following such second best strategies. Nonetheless, a significant number of firms encountered the problems.

The core conclusion concerning the dynamic capability results in columns 1a and 1b is that heeding a firm’s level of internal skills strongly influences sourcing performance. In contrast, external factors have less influence, other than imposing a penalty on firms that follow a second best strategy and attempt to undertake inappropriate internal development.

**Performance: Business dynamics**

We now turn to columns 2a to 2c, which report the performance results for protection, coordination, and creation ability. These performance dimensions derive from business dynamics theory. We find both similarities and differences within the basic dynamics capabilities results.

Among the internal failures, conformance with capability gaps again has a strong positive effect on performance. Indeed, capability gap conformance influences all performance dimensions in the analysis. Firms commonly struggled when they attempted to develop capabilities internally if they faced a large gap between their existing and targeted capabilities.
We now find, however, that social conflict has a positive impact on protection and coordination abilities (columns 2a and 2b) but, in contrast, an insignificant negative impact on creation ability (column 2c). The difference between the protection and coordination results on the one hand, and the creation results on the other, may explain the lack of significance of social conflict in columns 1a and 1b. This contrast suggests that adhering to the conflict incentive helps with more immediate needs for coordinating and protecting the use of current capabilities, but at least weakly interferes with the ability to stretch and create new capabilities. We will return to the discussion of the bi-modal impact of social conflict later in the paper.

Internal reconfiguration skill conformance, meanwhile, has no significant impact in the business dynamics performance dimensions. For protection ability, this might arise because problems concerning internal reconfiguration skills have less impact on the ability of a firm to keep others from appropriating value. For coordination and creation, the null result could arise because the culture, incentives, and integration items that make up the internal reconfiguration skill variable might have greater impact on broad abilities to change and on internal development effectiveness than on the more focal business dynamics measures.

Among the market failure incentives, the business dynamics results are similar to the dynamics capabilities outcomes, though now with a stronger influence of protection needs and somewhat mixed impact of lack of markets and weak external governance skills. Conformance with protection needs improves a firm’s ability to coordinate and create capabilities, as well as to protect the value of the capabilities. This multi-faceted impact is likely to arise because the firm is more willing to engage in active coordination and creation efforts when it believes that the protection regime will allow it to garner the benefits of the efforts. Conformance with the lack of market incentives leads to substantially greater protection ability, most likely because firms do not put themselves at risk by attempting to force market exchanges that the external environment will not support. Conformance with the external governance skills incentive, meanwhile, has the same effect for protection and coordination as it did for the dynamic capabilities outcomes, but does not influence creation ability.

Initially, the differing impact of external governance skills conformity on “ability to change” (column 1a) and “creation ability” (column 2c) appears to be incongruent. Why would a firm pay a penalty in its ability to undertake ongoing change, but no penalty in its ability to create new capabilities? Examining the items that underlie the “ability to change” variable offers a potential answer. The variable assesses the degree to which a firm has become more
entrepreneurial and has increased the speed of its change efforts. It is possible that firms that ignore weak external governance skills find that they can proceed only slowly, while also harming their protection and coordination abilities (columns 2a and 2b), but may still be able to achieve at least a moderate degree of capability creation over time (column 2c).

**Performance: Capability competitive advantage**

Finally, column 3 turns to the firms’ success in developing stronger capabilities than those of their competitors. Where the first sets of performance measures focus on the success or failure of their internal development efforts, the capability competitive advantage variable measures how conformance with the institutional failures incentives affects the composite success of all a firm’s capability sourcing choices, including internal and external sourcing.

All three internal failures strongly influence capability competitive advantage. Alignments with both capability gaps and internal reconfiguration skills substantially improve a firm’s competitive position. In contrast, though, alignment with social conflict incentives harms the competitive position. This pattern suggests that firms that emphasize projects that engender little conflict tend to gain the least competitive advantage.

The negative impact of avoiding social conflict has implications for change efforts. We developed the social conflict argument on the premise, first, that firms would avoid internal development when new capabilities would engender social conflict and, second, that firms that undertook such efforts in the face of conflict would suffer. The first expectation bears out. As Table 2 and Figure 2 show, firms tend to avoid internal sourcing when they would face conflict. However, the second expectation does not emerge. Instead, the minority of firms that undertake internal development, despite facing conflict, often gain substantial competitive advantage. Drilling down into the conflict literature helps explain this result.

As we noted earlier, 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; Szulanski, 1996). Jehn (1997), for instance, finds that groups that accept task conflict are particularly effective. Thus, conflict can be a useful tool for business development. It appears plausible that managed conflict can create opportunities to identify advances that would otherwise not emerge.

Moreover, the fact the performance benefits of accepting social conflict emerge most strongly for competitive advantage (column 3) and, to a lesser extent, capability creation (column 2c) than for the other performance measures, is intriguing. 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 more immediate needs. This difference is most likely to 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.

Among the market failures in column 3, conformance with protection needs has the strongest influence on capability competitive advantage. Again, it appears necessary to pay close attention to protecting the value of the capabilities that a firm develops if it wishes to gain ground on its competitors.

**Performance summary**

Overall, we find that conformance with the institutional failure incentives influences a firm’s ability to obtain targeted capabilities. About two-thirds of the combinations of institutional failure incentives and performance outcomes in Table 3 were statistically significant (23/36). Two forms of conformance are particularly important, including one internal failure and one market failure. Internally, capability gaps affect all six dimensions of performance. Externally, conformance with protection needs affects four types of performance, including all three governance dimensions from business dynamics theory and the measure of overall capability competitive advantage.

Two other forms of conformance have a more moderate impact, again including one internal and one market failure. Attention to internal reconfiguration skills improves three aspects of performance, including the two dynamic capabilities variables and capability competitive advantage. Attention to lack of markets also affects three aspects of performance, with its strongest impact on protection ability.

The other two types of institutional failure influences – social conflict and external governance skills – have mixed or unexpected results, as we discussed earlier. Adherence to social conflict affects three aspects of performance, with capability competitive advantage being negative rather than positive. Reaction to weak external governance skills, meanwhile, affects four performance dimensions, with such second best choices harming performance in each case.

**Control variables**

The control variables have limited impact on sourcing performance. Firms that turn to internal development as their first choice of sourcing mode (about 75% of the firms in the sample) reported slightly more effective internal development (column 1b), perhaps because of
greater experience. Larger firms commonly reported lesser performance, most likely because of difficulties in undertaking changes that spanned more extensive organizations.

There are some differences across countries. U.S. firms reported somewhat greater creation ability (column 2c), which is consistent with the common view that American firms tend to be more entrepreneurial than many foreign competitors. Alternatively, the U.S. home country result could arise if American managers simply are more optimistic about their skills, but the lack of significance of the U.S. variable for the other five types of performance makes this interpretation unlikely. Firms based in France report greater difficulty in protecting capabilities, possibly because of the high cross-border competition that had emerged in continental Europe during the 1990s, and the consequent potential for leakage to expanding competitors in this dynamic environment. Finally, firms based in the U.K. report greater difficulty in coordination ability, possibly because of their middle-ground position in having extensive activity with both the U.S. and continental Europe.

*Sensitivity analyses and post-study business survival*

We conducted extensive sensitivity analyses of the results. We selectively dropped variables to ensure that correlations were not driving the results, and found no material changes. We added other control variables for firm age, whether the respondent worked within an SBU rather than at the corporate level, change need (R&D, IT, entrepreneurship, or marketing capabilities versus other skills), legal restrictions, competitive imitation, and time pressure. The additional variables usually were insignificant, and the focal results did not change materially when we retained any of the few significant influences. In addition, the results were not sensitive to dropping two cases in which the firms were less than three years old.

We also took advantage of the time that has passed since we conducted the survey and determined whether the firms in the study continued to operate successfully in early 2004, or whether they had undergone substantial restructuring or exited the industry. Our goal was to determine how firms’ activities at the time of the survey associated with their current success. 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 U.S.). We defined these 35 cases as “troubled firms”, after checking that the acquisitions involved firms that had encountered financial problems. We used this information in two ways.
First, we assessed the reliability of the respondents’ survey answers by correlating a 0-1 troubled firm variable with the respondents’ answers to a survey question in which we asked for their firms’ profitability (ROE) at the time of the survey. We found a highly significant negative correlation (p < 0.01) between high ROE in 2000-2001 and troubled firm status in early 2004. This result helped provide confidence in the survey instrument.

Second, we estimated a logistic regression equation in which we regressed the troubled firm variable on the measures of institutional failure conformance. We were concerned about whether this approach involved appropriate levels of analysis, because it requires strong assumptions to believe that conformance with capability development incentives in 2000-2001 would produce exit or major financial trouble by 2004. Indeed, the logistic regression results were relatively weak. Nonetheless, we found that alignment on all three of the market failure conformance variables – including external protection needs, lack of markets, and external governance skills – had significant impact (p < 0.10) in the troubled firm analysis that were consistent with the most common results in the survey-based performance analysis. In contrast, conformance with the internal failures incentives either had no effect (capability gaps, social conflict) or a weak, unexpected positive association (internal reconfiguration skills) with troubled firm status. Recall that conformance with internal reconfiguration skills incentives had no effect on the three business dynamics governance dimensions (protection, coordination, and creation), suggesting that this choice may provide less benefit than others in helping firms develop specific change capabilities that they can use to overcome industry turmoil. Moreover, it is possible that firms that overestimate their ability to undertake internal development are less likely to acquire external capabilities that they require during periods of industry upheaval, such as the telecommunications industry has gone through during the past three to four years.

We believe that the troubled firm analysis helps provide external validation of the survey information. The results highlight the importance of paying heed to market failures and external sourcing opportunities. At the same time, the results also point to the potential for falling into a competence trap if firms overestimate their ability to manage internal change.

DISCUSSION

This paper argues that a joint set of institutional failures, including both market failures and internal failures, affects firms’ sourcing choices and, in turn, the performance of their capability development activities. We identify three types of internal failures, including capability gaps, social conflict, and weak internal reconfiguration skills. We identify three types
of market failures, stemming from lack of available markets, protection needs, and weak external governance skills. We show that the institutional failures influence firms’ use of internal sourcing, especially protection needs and the three internal failures. We then find that conformance to the sourcing incentives that the institutional failures create influences capability development performance on multiple dimensions. At the same time, exploratory analysis of post-survey business survival points to caution about becoming over-dependent on internal change during times of industry upheaval.

Theories of the firm often overestimate either inertia or adaptability. Clearly, firms face strong inertial forces that limit their abilities to change. At the same time, though, firms face strong competitive pressures to undertake ongoing changes. We need theories that address the intersection between inertial and dynamic pressures.

The results help advance the emerging discussion of how firms change in the face of constraints to change. Whether firms conform to several sources of internal failure and market failure affects their ability to create processes that allow them to undertake ongoing change, which is a central issue in current discussions of dynamic capabilities. Moreover, the institutional failure influences have substantial influences on the specific dimensions of governance success that business dynamics theory highlights, including protection, coordination, and creation. Finally, whether the firms pay heed to institutional failures has a major impact on their ability to create stronger capabilities than their competitors. The core point is that institutional failures create barriers to some forms of change, while also pointing firms in directions in which they may be able to undertake successful changes.

In advancing the discussion of how firms change, this study provides an empirical example of business dynamics theory. The assumptions of business dynamics theory underlie key elements of the paper. First, the assumption of firm-specific foresight motivates investigation of attempts to seek new capabilities in response to environmental change. Second, the theory emphasizes routines and capabilities as units of analysis. Third, describing firms as governance structures motivates emphasis on institutional mechanisms that guide protection, coordination, and creation of capabilities within and among firms.

The results also add to the ongoing debate between the “opportunism” and “knowledge management” schools in the theory of the firm. Opportunism theorists argue that the primary driver of firm boundaries – and the primary reason for the existence of the firm – stems from the desire to guard against the value of a firm’s specialized capabilities being appropriated by others.
Consistent with this view, we find that firms do indeed pay close attention to protection needs and incur penalties if their attention drifts.

In contrast, knowledge theorists argue that firms exist in order to coordinate the use of existing routines and create new routines. In this perspective, specialized capabilities do not cause the firm but, instead, arise as a result of the firm’s activities. The results lend strong support for key elements of this view, particularly in the attention that firms pay to their internal reconfiguration skills and the presence of social conflict and, in turn, the impact of that attention to the success or failure of capability development efforts.

Thus, as we noted earlier, both concerns about opportunism and the need to manage the use of firm-specific knowledge underlie boundary choices and capability development activities. Moreover, we find that several choices that contribute to improved protection ability also lead to improved coordination and creation abilities, demonstrating the inter-relationship of the opportunism and knowledge-management issues. Quite simply, a robust theory of the firm needs to encompass both perspectives. A theory of why firms exist and how they change cannot simply focus on a single form of institution and institutional failure, but must address a broader set of institutional influences.

Comments during our field studies highlight both opportunism and knowledge issues. Discussing contractual hazards, one executive noted “In order to bring voice competencies into the data world, if you do not control the entity where you bring the know-how into, you weaken yourself -- because we will give up our core competencies and make our partner stronger.” Indeed, senior executives throughout this project reported that they were highly aware of cases in which other parties had “taken advantage” of them, no matter what the focus of the projects. Quotes from three other executives highlight issues concerning knowledge management needs. One noted “We need to … understand the technology – we need to have the data business in-house, so that we can develop our own products.” A second stated “internally developed know-how is more likely to be integrated within our organization and used as a platform for future development.” A third told us “We [need to control] the intangible aspects of the technology exchange [in order to manage the development of needed capabilities].”

The interviews also reflected the widespread impact of capability gaps and social conflict on firms’ sourcing decisions and performance that emerged in this analysis. In discussing capability gaps, one executive noted “We went for a long time for internal R&D, but we did not have these competencies. Then we tried to bring these competencies in 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.”

A second executive addressed social conflict: “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 allocation toward data technologies have been postponed or limited due to this internal competition, while others [source externally] to avoid political problems.”

As we discussed earlier, we also found that firms that undertake internal sourcing, despite a potential for social conflict, do not pay a penalty. Instead, the minority of firms that is willing to undertake internal change in the face of conflict gain benefits for developing capability competitive advantage. Several interviews suggested that the reason is that some firms have learned how to manage conflict beneficially. That is, as well as having a potential for disruption, conflict creates the potential for taking new views of problems and generating new insights for future 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. This result speaks to the need to take a balanced view on business constraints, recognizing that a factor that may constrain change in some firms may facilitate change in others.

Many open issues remain. There are opportunities to refine and develop the measures of institutional failures. Other institutional factors, such as broader social trends in the external environment and leadership skills within the firm, may join the analysis. It would be useful to examine how the influences of internal failures and market failures might interact. It would also be useful to examine how the influences of the institutional failures interact with the nature of capabilities being changed, such as comparisons of relatively physical capabilities (e.g., IT systems) and more organizational capabilities (e.g., marketing skills). 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 our understanding of how businesses attempt to change.

At the most general level, this study identifies factors that lead to a deeper understanding of business change. Theories that emphasize either external or internal factors and ignore the other dimension miss key influences on how firms behave. Instead, we require a richer conceptual perspective that combines issues of institutions and governance. This study goes part way to developing such an integrated perspective by demonstrating how a set of external and
internal institutions influences firms’ choices and performance. The central implication of the study is that institutional strengths and failures that affect firms’ choices and performance stem from both external and internal venues, acting together both to constrain behavior and to create opportunities to overcome constraints.

ENDNOTES

1 By high-powered incentives, Williamson (1985) refers to residual claimant status whereby an agent, either by agreement or under the prevailing definition of property rights, appropriates a net revenue stream in cases when the economic agent’s efforts influence the gross receipts and/or costs of the revenue stream.
REFERENCES


Cuervo-Cazurra, A. 1999. Resource development through the co-evolution of resources and scope. PhD dissertation, MIT.


paper, University of Chicago & Stanford University.


Figure 1. Internal Sourcing Incentives: Theoretical Drivers

- Capability gaps
- Social conflict
- Weak internal reconfiguration skills

Problems using internal institutions

Internal vs. external sourcing

Problems using market institutions

- Lack of markets
- Protection needs
- Weak external governance skills

Conformance with institutional failure sourcing incentives

Capability development performance
Figure 2. Firms' Sourcing Conformance with Institutional Failure Incentives

Conformance with market failures
- Weak external governance skills
- Lack of markets
- Protection needs

Conformance with internal failures
- Weak internal governance skills
- Social conflict
- Capability gaps

Mean conformance (1 = disagree, 4 = neutral, 7 = agree) *

* All conformance values differ significantly from “Neutral” (4.0)
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**Summary statistics**

Mean              5.16  4.70  4.52  5.08  3.36  3.60  0.75  3.41  0.20  0.11  0.08  4.80  4.91  4.89  4.91  4.88  5.10
Standard Deviation 1.1  1.32  1.18  1.5  1.57  1.34  0.43  1.6  0.4  0.32  0.28  1.31  1.15  1.41  1.2  1.13  0.83
Minimum            1  1  1  1  1  1  0  1  0  0  0  1  1  1  1  1  1  1
Maximum             7  7  7  7  7  7  1  5  1  1  1  7  7  7  7  7  7  7
Table 3. Least Square Estimates of Effects of Conformance with Institutional Failures on Firms’ Ability to Obtain Targeted Capabilities

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<td>4.04 ***</td>
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<td>0.32</td>
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<td>0.26</td>
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</tbody>
</table>

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

A. Independent variables: Conformance with market failures arguments

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 internal development rather than external modes when:*

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

**INTERNAL FAILURE CONFORMANCE**

**Capability gap conformance**

- Our existing technical capabilities were close to the needed technical capabilities.
- We had a very strong competitive position in the technical area.
- We already knew the customers in the targeted capability area.
- We already had market credibility in the targeted capability area.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>na</th>
</tr>
</thead>
</table>

**Social conflict conformance**

- Developing the needed capabilities triggered little or no internal competition.
- Developing the needed capabilities created little or no internal resistance.

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<thead>
<tr>
<th>1</th>
<th>2</th>
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<th>5</th>
<th>6</th>
<th>7</th>
<th>na</th>
</tr>
</thead>
</table>

**Internal reconfiguration skills conformance**

- The needed capabilities fitted our system of incentives and culture.
- Our system of incentives suited hiring the needed people.
- We had systems in place to integrate newly hired people.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>na</th>
</tr>
</thead>
</table>

**MARKET FAILURE CONFORMANCE**

**Protection needs conformance**

- We wanted to develop different products and services than those of our competitors.
- We wanted to protect our differentiation and unique capabilities.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>na</th>
</tr>
</thead>
</table>

**Lack of markets conformance**

- There was no active external capability/technology/knowledge market.
- There was no active alliance market.
- There was no active M&A market.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>na</th>
</tr>
</thead>
</table>

**External governance skills conformance**

- We were not attractive to external partners who owned the needed capabilities.
- We lacked skills to manage external modes of capability acquisition.
- We lacked skills to learn and import the needed capabilities from external partners.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<th>7</th>
<th>na</th>
</tr>
</thead>
</table>
B. Dependent variables: Capability development success and ability to change

B1. Effectiveness of internal development

Overall, in the past 3 to 5 years, has your firm been 

**satisfied with the effectiveness of internal development**?

**In the past 3 to 5 years, internal development has been effective in terms of:**

- Overall, internal development has been effective in acquiring the needed capabilities.
  
- Protection of the value of the capabilities created by internal development (protection from imitation, protection of our unique capabilities).
  
- Smooth coordination/integration of the capabilities created by internal development with our existing capabilities.
  
- Creating a platform for future developments.
  
- Diffusing the capabilities developed internally throughout our whole organization.

B2. Ability to change

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**?

**In the past 3 to 5 years, internal development has led to:**

- Becoming more entrepreneurial and responsive to market changes.
  
- Speeding up our learning and change process.
B3. Capability advantage

In the past 3 to 5 years, how would you assess the overall effectiveness of your firm in creating new capabilities compared to that of your main competitors?

Compared to our competitors, we stand in terms of:

- R&D capabilities.
- IT capabilities (IT staff, IT applications, billing system).
- Manufacturing/engineering know-how.
- Marketing expertise (customer knowledge, branding, pricing).
- Sales and distribution relationships.
- International presence/new market access.
- Supplier relationships.
- Managerial skills.
- Entrepreneurial talent.
- Project management skills.
- Network management skills.
- Regulatory experience/expertise.

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<th>Behind</th>
<th>Equal</th>
<th>Ahead</th>
<th>N/A</th>
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<td>3 4</td>
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<tr>
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<td>3 4</td>
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<td>7</td>
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<tr>
<td>Manufacturing/engineering</td>
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<td>3 4</td>
<td>5 6</td>
<td>7</td>
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<tr>
<td>Marketing expertise</td>
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<td>3 4</td>
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<tr>
<td>Sales and distribution</td>
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<td>3 4</td>
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<tr>
<td>International presence/new market access</td>
<td>1 2</td>
<td>3 4</td>
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<tr>
<td>Supplier relationships</td>
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<tr>
<td>Managerial skills</td>
<td>1 2</td>
<td>3 4</td>
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<tr>
<td>Entrepreneurial talent</td>
<td>1 2</td>
<td>3 4</td>
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<tr>
<td>Project management skills</td>
<td>1 2</td>
<td>3 4</td>
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</tr>
<tr>
<td>Network management skills</td>
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<tr>
<td>Regulatory experience/expertise</td>
<td>1 2</td>
<td>3 4</td>
<td>5 6</td>
<td>7</td>
</tr>
</tbody>
</table>

C. Control variables

C1. Internal development bias

Overall, in the past 3 to 5 years, in which order has your firm considered each mode?

Please rank order from 1 to 4 where:

1 = mode that you were the most likely to consider first.
4 = mode that you were the most likely to consider last.

If you considered several modes simultaneously, please give them the same rank.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>Internal development</th>
<th>Purchase contracts</th>
<th>Alliances/JVs</th>
<th>M&amp;As</th>
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<td></td>
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</table>

C2. Firm size

What is your entire firm’s:

Number of employees: <200 200-500 501-1000 1001-5,000 >5,000
Appendix 2. Examples of Respondent Firms (these firms agreed to be listed as participants)

<table>
<thead>
<tr>
<th>FIRM NAME</th>
<th>Country</th>
<th>FIRM NAME</th>
<th>Country</th>
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