DOES BUSINESS GROUP AFFILIATION ENABLE OR CONSTRAIN FIRM ADAPTATION TO INSTITUTIONAL TRANSITIONS?

SATHYAJIT GUBBI
Fellows Program
Indian Institute of Management Calcutta
Kolkata, INDIA
satgubi@gmail.com

PREET S. AULAKH
Professor and Pierre Lassonde Chair in International Business
Schulich School of Business
York University
Toronto, CANADA M3J 1P3
paulakh@schulich.yorku.ca

SOUGATA RAY
Professor of Strategy and Dean
Indian Institute of Management Calcutta
Kolkata, INDIA
sougata@iimcal.ac.in

PLEASE DO NOT CITE

July 2010

Financial support for this project was provided by the Social Science and Humanities Research Council of Canada (Grant #: 864-2007-0263). A preliminary version of this paper was published in the Academy of Management Best Paper Proceedings 2009. We thank Christine Oliver, Moshe Farjoun, MB Sarkar, Anoop Madhok, Raveendra Chittoor, Indrajit Mukherji, Apalak Khatua, Anubhashekhar Sinha, and seminar participants at the Copenhagen Business School and the University of Groningen for their constructive comments on various versions of this paper.
Does Business Group Affiliation Enable or Constrain Firm Adaptation to Institutional Transitions?

Abstract

This article reveals unexamined effects of business group affiliation on member firms’ adaptive response to institutional transitions. Analyses of data on a panel of firms from the Indian pharmaceutical industry during the period 1992–2007 support the inertia arguments identified in the organizational adaptation literature. Given their founding conditions, embeddedness in the institutional environment, and intragroup network, business group affiliated firms are on average less likely than stand-alone firms to explore new geographical markets as an adaptive response. However, we find that the business group related inertia is tempered by the scope of institutional transitions and within-group dynamics. First, the inertial effects of business group affiliation are observed only when institutional changes are specific to the affiliates’ industry, and not when institutional changes are broad in scope and impacting the business group as a whole. Second, among affiliated firms, those occupying a prominent position within the group or in the industry are able to bargain for and receive the enabling attention and support from the business group for exploratory search. Our findings have implications for research on the role of business groups in a changing institutional context and for organizational adaptation of firms embedded in complex interorganizational networks.
Business groups, consisting of legally independent firms “bound together by a constellation of formal and informal ties” (Khanna and Rivkin, 2001: 47–48), are an important part of the organizational landscape in many developing economies. Existing research attributes the genesis of business groups to various institutional conditions such as social and cultural heritage, imperfections in factor markets or institutional voids, foreign trade and investment asymmetries, and the role of the state in economic development (e.g., Amsden, 1989; Granovetter, 1995; Guillen, 2000; Khanna and Palepu, 2000). As developing economies initiate market reforms under increasing pressures of globalization, the relevance of business groups in a changed institutional context—as well as their ability to adapt to disruptive institutional transitions—remains unclear (Khanna and Yafeh, 2007; Carney, 2008; Economist, 2009). Lack of clarity on the future of business groups can be attributed to scant research on the adaptability of affiliated firms, especially when the external environment is in a state of flux. Moreover, related literature provides contrasting possibilities about the effect of business group affiliation on member firms’ adaptation to discontinuous institutional changes.

On one hand, research promoting the benefits of business group affiliation to the member firms suggests that these firms leverage the group’s reputation, political and economic capital, scale and scope, and preferential access to scarce resources (Khanna and Rivkin, 2001; Kock and Guillen, 2001). In this regard, the presence of persistent interorganizational ties (Granovetter, 1995) can help promote group-wide diffusion of adaptive practices and facilitate cross-sharing of resources, products, risks, and information with other affiliates (Kraatz, 1998; Chang and Hong, 2000; Mahmood and Mitchell, 2004). It is likely that these firms are better prepared—and perhaps even better positioned—to anticipate, influence, and respond to changes in the external
environment (Chen, 1996). An implication of this viewpoint is that group affiliation may enable member firms’ adaptive response.

On the other hand, well-documented research on organizational adaptation, anchored in organizational ecology and institutional theories (Hannan and Freeman, 1977, 1984; Greenwood and Hinings, 1988, 1996), suggests that close coupling of an organization with a given context constrains the organizations’s ability to adapt to environmental discontinuities, especially if adaptation necessitates an exploratory search of “alternate routines, technologies, and purposes” from those that existed in the past (Sorenson, 2002: 76). It is plausible that the intricacies of the business group organizational form—such as conforming pressures of the controlling entity (Burt, 1983; Kostova and Zaheer, 1999; Yiu et al., 2007); coordination demands of operating within a network (Cuervo-Cazurra, 2006; Kim, Oh, and Swaminathan, 2006); and the continuous search for reproducibility and legitimacy of context-specific routines (Hannan and Freeman, 1984)—create high structural inertia among affiliated firms. That is, unlike stand-alone or independent firms, affiliated firms have limited latitude in terms of strategic and operational decision making, bounded on one extreme by parental conformance pressures and on the other by high embeddedness to the business group network and institutional environment. Thus, under conditions of radical or discontinuous environmental changes, business group affiliation constrains member firms’ adaptive search behavior, as these firms confront a combination of inertial forces that emanate from (1) their own organizational characteristics (Boeker, 1989; Amburgey, Kelly, and Barnett, 1993; Miller and Chen, 1994); and (2) being part of an interorganizational network (Kim, Oh, and Swaminathan, 2006).

In this article, we probe these contrasting theoretical possibilities by examining the adaptive responses of business group affiliated firms to exogenous changes in the external
environment. We theorize that a key mechanism that explains the relative manifestation of inertial or nurturing forces on member firms’ adaptive response is the degree of misalignment (or alignment) between the outlook of the group’s controlling body and that of affiliate management with regard to institutional transitions. A misaligned outlook magnifies the constraining inertial forces related to the structural configuration of business groups and their contextual efficacy, while a greater alignment tempers the inherent inertial forces and/or triggers the enabling aspects of business group affiliation. The model we build identifies the conditions that have a bearing on the degree of (mis)alignment between the group owners’ and affiliate management’s outlook regarding institutional transitions.

We propose that one source of misalignment in adaptive outlook at the group and affiliate level is the scope of institutional changes. Certain institutional changes are targeted towards one or few of the industries; we call these industry-specific changes narrow-scope institutional transitions. Other institutional changes are more fundamental and impact all or most of the country’s industrial sectors; these are broad-scope institutional transitions. Given the business group characteristic of spanning numerous unrelated industries (Ghemawat and Khanna, 1998; Kock and Guillen, 2001), while each affiliate firm operates in a single industry (Vissa, Greve, and Chen, 2010), we suggest that the scope of institutional changes is an important parameter that may differentially impact adaptive response of business group affiliates. We anticipate that the inertial pressures of business group affiliation that resist adaptation will be more pronounced during narrow-scope institutional transitions, where the divergence of response outlook to institutional change at the group and affiliate level is higher, than under broad-scope transitions.

Second, as legally independent firms, different affiliates within a business group vary in terms of their relative importance to the group. The firms’ relative importance, in turn, influences
interest alignment with the core entity. It is likely that the relative importance to a group can be leveraged by some affiliates to mitigate, and perhaps even circumvent, group affiliation constraints in order to pursue exploratory search and adapt successfully relative to other group firms. Theories of intraorganizational power (Blau, 1964; Pfeffer and Salancik, 1978; Astley and Sachdeva, 1984) suggest that the extent of leverage is a function of power, defined as the capacity of social actors to influence or overcome resistance on the part of other social actors in order to achieve desired objectives or results (Dahl, 1957). Drawing from these theories, we suggest that affiliates’ resource position (internal stock of financial and nonfinancial resources) and structural position (within-group centrality and market power in its industry) confer greater leverage and intragroup bargaining power to either overcome business group related inertial pressures (i.e., constraining aspects) or receive the necessary attention and support from the core entity (i.e., enabling aspects) to facilitate exploratory search as an adaptive response to institutional changes.

These arguments are developed in greater detail in the next section, and the specific hypotheses tested on a panel of firms in the Indian pharmaceutical industry during the period 1992–2007. We focus on one type of search behavior, exploration of international markets, which is contextually important. A growing body of literature suggests that in developing economies, exogenous shocks or institutional transitions require changes in indigenous firms’ core values, templates, and archetypes (Newman, 2000), which are facilitated by distant search in knowledge bases, product markets, and organizational practices from sources distinct from those that existed in the past (Rosenkopf and Nerkar, 2001; Katila and Ahuja, 2002; Kriauciuunas and Kale, 2006). Accordingly, internationalization is considered an important mechanism for second-order learning for firms in developing economies, as international markets serve as
modes for accessing diverse ideas and knowledge, unavailable domestically, that are essential for survival and growth in a changed institutional context (Doz, Santos, and Williamson 2001; Nelson, 2005; Luo and Tung, 2007). Given the primary domestic focus of firms in these economies during the preliberalization era, internationalization after institutional changes is an important exploratory search activity (Guillen, 2000) and is thus appropriate for the empirical testing of our hypotheses.

**BUSINESS GROUPS, INSTITUTIONAL CHANGES, AND ORGANIZATIONAL ADAPTATION**

Organizational adaptation to environmental changes has been extensively studied by organizational ecology and institutional theory scholars (e.g., Hannan and Freeman, 1977, 1984; Greenwood and Hinings, 1988, 1996). A fundamental assumption of these approaches is that structural inertia impacts an organization’s ability to change (Haveman, 1992). According to Hannan and Freeman (1984: 151), “structures of organizations have high inertia when the speed of reorganization is much lower than the rate at which environmental conditions change.” These inertial forces may stem from the “proliferation of rules, routines and internal organizational arrangements” (Guillen, 2002: 511) that reinforce an organization’s given course of action (Hannan and Freeman, 1984; Ranger-Moore, 1997). Additionally, conforming to existing external or internal rules or norms is rewarding when organizational arrangements are highly institutionalized, as it gives firms legitimacy and/or increased access to resources (Greenwood and Hinings, 1988; Baum and Oliver, 1991; Scott, 1995).

A number of empirical studies have identified a variety of organizational characteristics that are sources of structural inertia. For instance, firm age has been found to be a source of inertia. Older firms are less likely to engage in change, because existing arrangements reinforce an adopted course of action over time (Hannan and Freeman, 1984; Kelly and Amburgey, 1991).
Firm size is another source of structural inertia, as larger firms become more formalized and bureaucratized, thus making their behavior more predictable and inflexible (Kelly and Amburgey, 1991; Haveman, 1993). Large firms may also feel protected from environmental changes, including threat of competition, because of “advantageous institutional contacts” (Miller and Chen, 1994: 7). Similarly, a firm’s founding characteristics can imprint its initial strategy (Boeker, 1989), which persists over time and circumscribes subsequent strategic change. Corporate culture is another organizational feature that persists over time. The performance implications of corporate culture are moderated by the nature of the external environment (Sorenson, 2002). Firms with strong corporate cultures have reliable performance in stable environments, where they can make incremental changes to exploit their established competencies. However, strong corporate culture advantages dissipate when there is greater environmental volatility that necessitates radical change through exploratory activities (Sorenson, 2002). Whereas these studies focused on the intraorganizational features that lead to inertia, more recent research focuses on interorganizational inertial pressures inherent in network ties. According to Kim, Oh, and Swaminathan (2006: 707), network inertia develops as a by-product of successfully managed networks in which “participating organizations develop relation-specific assets, such as institutionalized routines and human assets, over time.” In other words, network inertia develops as a result of embeddedness and self-reinforcing characteristics of interorganizational ties such as duration, size, and multiplexity.

Anchoring our arguments in the above literature stream, we highlight a few distinctive features of business group member firms that, under conditions of environment upheaval, tend to generate inertia over and above those experienced by stand-alone firms. There is a body of research that identifies the conditions that give rise to business groups as a distinct organizational
One theoretical approach emphasizes the genesis of business groups as a response to strategic factor market imperfections in developing economies (Leff, 1978; Khanna and Palepu, 2000; Khanna and Rivkin, 2001). In the absence of institutional intermediaries, business groups fill the void by generating their own internal markets for financial capital and managerial talent. Another set of studies use the political-economic approach and view business groups as “a device of the state to achieve both political and economic policy objectives” (Yiu et. al., 2007: 1557). These could include economic development objectives, whereby certain firms are provided with resources and incentives to enter industries considered strategic to the country (Kim, Hoskisson, Tihanyi, and Hong, 2004), or political objectives to secure the support of key entrepreneurs¹ by granting them rent-seeking opportunities (Evans, 1979). A third approach takes a socioeconomic perspective and identifies social institutions—comprising such factors as symbolism, legitimacy, prestige and power—that shape economic exchange by influencing the general pattern of trust and cooperation between organizations in a society (Whitley, 1991; Granovetter, 1995). According to these scholars, the efficacy of business groups resides in their ability to forge and legitimize certain persistent ties—usually embedded in pre-existing social structures such as family, kinship, and ethnicity—among member firms, which minimize transaction costs and facilitate information and resource sharing across these firms (Chang, Chung, and Mahmood, 2006).

The above literature, despite its diverse theoretical underpinnings, converges on the idea that the business group as an organizational form emerges as a result of certain institutional

¹ Using a resource-based view, Guillen (2000) and Kock and Guillen (2001) extended this argument by positing that firms and entrepreneurs create business groups when they acquire and possess resources and capabilities to enter new industries quickly and in a cost-effective manner. However, this capability will be inimitable only under conditions of asymmetric foreign trade and investment that limit this capability to a select few firms.
conditions prevalent in different countries. The contextual contingencies not only shape the nature and form of the business group but also influence its internal functioning and structure (Yiu et al., 2007). Research suggests that firms embedded in past institutional frameworks are less likely and slower to undertake transformations when faced with environmental changes (Greenwood and Hinings, 1996; Newman 2000; Hoskisson et al., 2004; Kriauciuunas and Kale, 2006). Within the context of institutional transitions in developing economies, market reforms and economic liberalization constitute discontinuous changes, since they alter the formal and informal rules of the game and fundamentally change the competitive landscape (Peng, 2003). Therefore, relative to stand-alone firms, business groups’ entrenchment and intricate nexus with prevailing institutions make them more resistant to external environmental changes and less inclined to pursue exploratory search as a response to environmental discontinuities (Hoskisson et al., 2005; Yiu et al., 2007).

A second distinctive feature of business groups is the presence of an apex body, also referred to as the core entity, which not only is empowered with financial or administrative control over the member firms, but also serves to coordinate managerial actions across firms (Strachen, 1976; Leff, 1978; Khanna and Rivkin, 2001). Such an empowerment may be formalized by means of direct shareholding in the concerned affiliate, or orchestrated via indirect ownership facilitated by cross-holding(s) or a pyramidal holding structure (La Porta, Lopez-de-Silanes, and Shleifer, 1999). This central apex body, which may be a single individual, family group, group of professionals, or state-owned enterprise, provides the social solidarity and structure that binds the component firms together (Granovetter, 1995; Yiu et al., 2007).

While each of the affiliated firms bears close resemblance to and has independent legal status similar to that of independent firms, presence of a centrally coordinating core implies that
over and above the inertial pressures of each affiliate’s culture and founding imprints, such firms are also subjected to inertial pressures of the core entity’s culture and founding imprints (Rosenzweig and Singh, 1991). In other words, each affiliate is required to balance between maintaining its own organizational culture and founding imprint, which sets it apart from other firms, and retaining necessary features of the core entity’s culture and founding imprints, which helps the affiliate to identify with the business group to which it belongs. Any explicit effort by an affiliate to change its organizational identity—which resides in its routines, procedures, information filters, capabilities, knowledge base, and beliefs—is problematic and difficult (Tripsas, 2009).

A third feature that differentiates business group affiliated firms from independent firms is the presence of persistent operational and personal ties across legally independent firms, which often operate in multiple strategically unrelated activities (Khanna and Rivkin, 2001; Cuervo-Cazurra, 2006; Yiu et al., 2007). Accordingly, along with the previous feature, business group affiliated firms may be better visualized as a centrally coordinated close network of firms operating in unrelated businesses and yet interconnected to one other in one or more than one of the following ways: consensual transactions of products (services) and resources, cross-shareholding, interlocking directorates, and social ties (Cuervo-Cazurra, 2006; Yiu et al., 2007).

Persistent interorganizational ties and multiplicity of interactions among the affiliated firms promote development of relation-specific assets such as institutionalized routines and human assets over time, and any attempt to adapt by reconfiguring the existing linkages is likely to generate inertia (Kim et al., 2006). Beyond a threshold, embeddedness of interorganizational ties and routinized interactions can also insulate networked firms from external market

---

2 Legally independent does not imply greater autonomy as compared to individual units of multidivisional firms, nor does it mean that affiliated firms can be easily acquired or sold on mere financial grounds, which is more likely in the case of subsidiaries of a parent conglomerate (Granovetter, 2005).
opportunities and information, making them less sensitive to market imperatives (Uzzi, 1996). Also, operational ties with firms residing in multiple sectors of the economy create an internal market for transactions within the group, which can buffer affiliated firms from external environmental changes (Hoskisson et al., 2004). Therefore, business group affiliated firms’ response to environmental discontinuities is likely to be slower relative to stand-alone firms.

Given the above set of arguments related to embeddedness in external institutions, conformance pressures of a central resource allocating and controlling entity, and the constraints of the networked nature of the intragroup environment, one would anticipate that business group affiliated firms will exhibit greater inertial forces (beyond those arising from firm-level factors such as size and age) than independent firms. Accordingly, our baseline hypothesis is related to the constraining effects of business group affiliation arising from inertial forces:

**Hypothesis 1a:** Business group affiliated firms are less likely than independent firms to pursue exploratory search as an adaptive response to discontinuous institutional changes.

**Scope of Institutional Changes and Business Group Inertia**

Past research on organizational adaptation distinguishes between incremental and radical environmental changes and suggests that organizations possessing high inertia are more likely to adapt to incremental environmental changes but are constrained when changes are more discontinuous (Newman, 2000; Sorensen, 2002). The focus of these studies is primarily on the pace or extent of environmental change and its impact on a firm’s speed or extent of response. Another feature of institutional change—overlooked in past research—that can have a bearing on a firm’s adaptation is the scope of change. In particular, it is plausible that institutional transitions related to market reforms and economic liberalization differentially impact various sectors of the economy, thus making the imperative for strategic change heterogeneous across industries. This was also alluded to by Greenwood and Hinings (1996: 1023), who suggested that
“incidence of radical change, and the pace by which such change occurs, will vary across institutional sectors, in particular in the extents to which sectors are tightly coupled and insulated from ideas practiced in other sectors.” We propose that certain institutional changes in developing economies are broad in scope, impacting all or most of the industries, while certain others are narrow in scope and impact few sectors, or impact specific sectors more heavily than others. For instance, China’s economic reforms of 1978 and India’s in 1991 are examples of broad-based institutional transitions. On the other hand, environmental protection practices and policies adopted in the US in the 70s and 80s specifically impacted the chemical industry more consequentially than they did other industries (Hoffman, 1999) and were therefore narrow-scope institutional changes. Thus, institutional transitions can vary along a continuum, from being broad in scope (i.e., influencing a number of industries) at one end, to narrow in scope (i.e., industry specific) at the other end.

In the case of independent firms operating within a single industry, broad-scope and narrow-scope institutional changes are likely to have a similar bearing on firms’ adaptive response. However, as argued below in the case of business group affiliates, we anticipate a variation in affiliates’ response according to whether the institutional changes are broad or narrow in scope, for three reasons.

First, as noted earlier, business groups comprise several firms operating independently in different sectors of economic activity, held together and strategically controlled by a central authority known as the core entity or the group. As long as the environmental change is broad in scope and impacts the business group as a whole, the need to respond and search for solutions is likely to be aligned between the core entity and individual affiliate management. However, when the environmental change is narrow in scope and impacts one or few of the affiliates, there can
be misalignment between the core entity’s outlook and the outlook of the affiliate concerned. In other words, there can be cognitive, strategic, and operational dissonance between the group owners and the affiliate managers due to divergence of interest at the two levels. In the case of adaptive response to narrow-scope institutional changes, the dissonance between the affiliate management and the group owners can lead to additional inertial effects.

Second, even while designing and executing its adaptive response to narrow-scope institutional change, an affiliate firm remains interconnected with other group firms and has to continue to conform to group norms. That is, the affiliate is required to transform while still bound by operational and strategic ties with other group member firms who are not necessarily faced with survival issues. Therefore, the divergence in the sense of urgency of response at the affiliate and group level causes the inertial pressures of business group affiliation to escalate. Even if the group does feel the need to support the concerned affiliate firm, it can do so only by momentarily increasing the interconnectedness or operational ties among group firms and by actively intervening in affiliate decision making. In the short run, this increased involvement of the group in the affiliate’s activities can further exacerbate the inertial effects of group affiliation. Thus, the inertial pressures of interconnectedness with other group firms and the need to conform to group norms and routines amplify when a particular affiliate attempts to transform faster than the rest.

Third, the widespread and sweeping overhaul required—in terms of ongoing activities, resource configuration, business templates, routines, and business outlook—in order to undertake

---

3 For example, Tata business group in India has affiliates in the information technology and software services industry and in the steel, automobile ancillary, automotive, and chemical industries, among many others; whereas Tata Steel, an affiliate of Tata group, operates only in the steel industry. While Tata group as a whole is wary of broad-scope changes that impact all or most sectors of the economy, Tata Steel is primarily concerned with issues relevant to the steel industry in particular. Therefore, if there is an exogenous change impacting the steel industry alone, its implications are more salient for Tata Steel rather than Tata group as a whole.
exploratory search can set the afflicted affiliate firm apart from other group members. While the rest of the group firms continue to operate in their previously defined developmental path, the impacted affiliate firm’s attempt to redefine and break free from the previous state can further escalate the inertial effects of group affiliation. Previously we have argued that having to conform to the group’s identity and culture, in addition to its own, and also being networked with other group firms, imposes constraints on an affiliate’s ability to respond freely to exogenous environmental changes. We extend the argument further to propose that when exogenous change is discontinuous and localized—impacting one affiliate’s industry alone—the inertial pressures of group membership escalate and further constrain the affiliate’s ability to adapt to institutional changes.4 Accordingly, we test the following hypothesis:

Hypothesis 1b: The negative impact of business group affiliation on affiliates’ exploratory search is more pronounced under narrow-scope (specific to affiliate’s industry) than under broad-scope (spanning multiple industries) institutional changes.

Within Business Group Dynamics and Heterogeneity in Affiliates’ Strategic Adaptation

Earlier theorization suggests that, in certain situations, there can be a divergence in the strategic change imperative between the core entity and the organizational units that comprise a business group. Moreover, this divergence can amplify group affiliation inertia and restrict scope for affiliates’ exploratory search and adaptation. Given that business groups comprise legally independent firms, there is no a priori reason to believe that group affiliation constraints extend uniformly to all the member firms. Not only can the group affiliation impact member firms differently, but also not all member firms are expected to respond in a similar manner. Therefore, we should anticipate a variation in adaptive responses of affiliated firms of a business group.

---

4 The converse is also possible. That is, when institutional changes are broad based and thus impact the business group as a whole, including the focal affiliate, there is convergence in the interests of the controlling business group entity and the affiliate. Such a convergence may temper inertial forces; this possibility is tested in the empirical analysis. More detailed arguments about convergence or superimposition of affiliate interests on the business group as a whole are discussed in the following section.
While some affiliates may experience greater group-related inertial pressures, others may be able to resist constraining pressures and/or activate enabling features of business group membership to adapt successfully. The next part of our model focuses on the within business group dynamics and on those attributes of the affiliate that help resist or overcome group affiliation constraints.

According to Hannan and Freeman (1984: 151), “when members of an organization have diverse interests, organizational outcomes depend heavily on internal politics, on the balance of power among the constituencies.” Similarly, Greenwood and Hinings (1996) posited that organizational change to environmental contingencies varies within sectors because of unique internal organizational dynamics. In particular, “organizationally defined groups vary in their ability to influence organizational change because they have differential power. Some groups or individuals are listened to more keenly than others. Some have more potential or less potential for enabling or resisting change” (Greenwood and Hinings, 1996: 1038). Even within the social exchange perspective (e.g., Emerson, 1962; Blau, 1964) and the resource dependence perspective (e.g., Pfeffer and Salancik, 1978), the extent of leverage is a function of power, which is defined as the capacity of social actors to influence or overcome resistance on the part of other social actors in order to achieve desired objectives or results (Dahl, 1957). In the context of headquarter–subsidiary relationships of multinational enterprises, Bouquet and Birkinshaw (2008: 580) argued that “an MNE is a value maximizing entity that functions according to the criteria of proven strategic significance. The positive attention a subsidiary receives is therefore based on its weight in the global ordering of power.” Extending these insights to the context of within business group dynamics, we identify affiliates’ resource and structural positions as factors that may account for differential business group related inertial pressure.
Affiliates’ resource position. According to Astley and Sachdeva (1984: 106), “organizational subunits supply resources to others in exchange for a return of resources upon which they are dependent; and asymmetry in the dependencies that underlie such exchanges explains asymmetry in power between the actors involved.” One important structural source of power is the control of resources (financial and nonfinancial) by a subunit. Within the business group context, if an affiliate has a stock of its own resources, its dependency on the business group core is reduced, thus allowing the firm greater autonomy in decision making and ability to engage in more experimentation, risk taking, and exploration of new opportunities (Cyert and March, 1963; Kim, Kim, and Lee, 2008). Moreover, operational and strategic ties with other group members and multiplicity of such ties (Kim, Oh, and Swaminathan, 2006) permit the more endowed firm to exert its influence across several interconnected firms and to negotiate favorably to support its strategic initiative. In this situation, a risk-averse business group core also may not constrain the particular affiliate’s exploratory search, given that the costs of such a search are borne by the affiliate and that the exploratory search does not have resource implications for the rest of the system. There is emerging evidence that resource independence of organizational subunits increases the subunits’ bargaining power and thus their ability to achieve decision-making independence. For instance, Mudambi and Navarra (2004) examined relationships between multinational corporations and their national subsidiaries and find that the greater the extent of knowledge resources possessed by a subsidiary, the greater its relative bargaining power and thus its rent-seeking ability vis-à-vis corporate headquarters. Similarly, Andersson, Forsgren, and Holm (2007) suggested that a subunit’s slack in its budget enables it to circumvent the controls imposed by the higher coordinating authority. Drawing support from these considerations, we suggest that the resource position of an affiliate will positively influence
strategic adaptation through exploratory search when faced with environmental discontinuities. Accordingly,

**Hypothesis 2**: Among business group affiliated firms, the stock of resources possessed by an affiliate positively impacts the affiliate’s exploratory search as an adaptive response to institutional changes.

**Affiliates’ structural position.** While ownership of key resources confers greater bargaining power within the business group, thus enabling an affiliate to undertake autonomous decisions, the affiliate may have a favored status within the group for other reasons as well, allowing it to garner necessary support for its strategic initiatives. In this regard, we suggest that an affiliate’s structural position within the business group or in its industry may permit affiliates to circumvent inertial pressures of group affiliation and/or obtain the necessary group support for exploratory search in response to institutional changes.

The first component of the structural position is the affiliate’s centrality within the business group. Power emanates not only from control of resources but also from the firm’s position in a network, and therefore network centrality is an important source of power (Astley and Sachdeva, 1984). Affiliates that make a significant contribution to the business group in terms of revenues, reputation, leverage, and legitimacy are more central to the group and thus more likely to persuade the dominant coalition to support their initiatives. Moreover, high status of an affiliate lends prominence and visibility within the group network, which in turn gives greater access to critical resources such as information and financial and human capital (Kim, Oh, and Swaminathan, 2006). In other words, central position of an affiliate within the group hierarchy is self-reinforcing and over time confers increasing bargaining power to pursue strategic initiatives. In the business group context, Kim, Hoskisson, and Wan (2004) found that among *Kieretsu* member firms in Japan, more powerful members are allowed to pursue risky
exploratory activities such as product and geographical diversification, while less powerful members are required to focus on activities that are less risky and to maintain the short-term profitability objectives. Therefore, when such key affiliates face discontinuous institutional transitions, on account of stronger structural position within the business group, they are more likely to get the attention and support to explore new growth opportunities. Accordingly, we propose the following:

**Hypothesis 3a:** Among business group affiliated firms, the centrality of an affiliate within the business group positively impacts its exploratory search as an adaptive response to institutional changes.

Another aspect of the structural position of an affiliate is its prominence within its industry. We expected that an affiliate’s existing market position vis-à-vis other local firms would facilitate its adaptive response in the form of exploratory search behavior, for three reasons. First, a dominant market position allows the affiliate to undertake risk-taking activities such as exploring foreign markets for growth. In the context of developing economies, dominant domestic firms have more to lose from institutional changes such as those brought about by economic liberalization and dismantling of barriers to entry for global competitors (Dawar and Frost, 1999). In order to circumvent direct competition with more endowed rivals, these firms can leverage their existing market position to explore new markets for growth. Second, from the perspective of intragroup dynamics, a dominant affiliate in its market is likely to receive greater support from the business group because of its strategic significance of the affiliate to the group (Bouquet and Birkinshaw, 2008). A third, and related, reason is the contribution to the legitimacy and reputation of the business group as a whole. An affiliate that is a leader in an industry brings a lot of visibility and reputation to the business group. When such an affiliate faces environmental threats and is unable to make adaptations to ensure the dominant market position,
it has the potential to have negative reputation spillovers for the business group as a whole. In this respect, Gopalan, Nanda, and Seru (2007), in their study of financial support provided by business groups to their affiliates in India, found that an important reason for intragroup loans to affiliates is to avoid default by group members and thus to minimize negative spillovers resulting from defaults. The preceding arguments suggest that an affiliate’s position within its industry provides greater leverage within the group to initiate appropriate strategic actions when faced with disruptive environmental changes. Accordingly, we hypothesize that:

**Hypothesis 3b:** Among business group affiliated firms, the strength of an affiliate’s market position within the industry positively impacts the affiliate’s exploratory search as an adaptive response to institutional changes.

**METHOD**

**Industry Context**

The empirical context of our study is the Indian pharmaceutical industry during the period 1992–2007. The industry context and time period are appropriate for testing our hypotheses for a number of reasons. First, this period saw institutional changes emanating from broad economic reforms impacting most of the industry sectors, as well as specific changes related to the pharmaceutical industry. In 1991, the Indian government initiated major economic liberalization measures to establish stronger linkages with the global economy, which included opening of foreign investment, capital market transformation, deregulation, and reduction of trade barriers (Alamgir, 2008). The broad measures also impacted the pharmaceutical industry in terms of significant delicensing and liberalization of imports and foreign investments. These economy-wide reforms are generally considered to have heralded a new phase in the Indian economy and a key trigger for accelerated economic growth over the last two decades.
Besides the impact of these broad economic reforms of 1991, in 1995 the pharmaceutical industry also faced specific institutional changes related to intellectual property protection. Before 1995, the pharmaceutical industry was governed by the Indian Patent Act of 1970, which allowed patenting based on manufacturing processes rather than end products. This regulation enabled Indian pharmaceutical firms to reverse engineer and produce drugs that were product patented in other countries, at a fraction of the cost incurred by other multinational corporations. In 1995, however, as part of the World Trade Organization (WTO) initiative, India consented to enforce product patents and to provide legal protection to Trade-Related Intellectual Property Rights (TRIPS). Recognition of product patents has been the most critical regulatory reform in the Indian pharmaceutical industry. Adoption of the product patent regime provided the protection sought by international pharmaceutical firms and also marked a dramatic change for Indian pharmaceutical firms, which had traditionally survived through manufacturing and selling knockoffs of patented drugs in India by exploiting the prevailing process patent regime. The Wall Street Journal (2005) hailed the implementation of the new patent regime in India as “finally putting a stop to decades of simply copying someone else’s pharmaceutical breakthrough.”

As a result of these changes, Indian pharmaceutical firms faced steeper competition from well-entrenched foreign competitors in their domestic market, as well as the loss of their traditional core advantage in reverse engineering and manufacturing. Thus the context permitted us to identify clear watershed events, or exogenous shocks, in the form of comprehensive institutional reforms (market liberalization impacting most industries) and intellectual property reforms (which were industry specific) to test our arguments about how the scope of institutional changes conditions business group effects on affiliates’ strategic initiatives.
Second, the Indian pharmaceutical industry consists of both independent and business group affiliated firms, so we were able to empirically examine how and when business groups constrain or facilitate affiliates’ response to institutional changes relative to independent firms. Third, industry-level data indicates that a key strategic response to institutional changes has been to shift from a primarily domestic focus to having substantial sales coming from a diversity of international markets (Chittoor et al., 2009). For instance, average international sales as a percentage of total sales increased from 10 percent in 1992 to 21 percent in 2007. Furthermore, whereas in 1992 foreign sales were largely confined to other developing economies, the market focus shifted in 2007, with more than two thirds of sales in developed markets. Given new market exploration as a major strategic response to institutional changes in the industry and a wide variance in the extent of internationalization across firms, the Indian pharmaceutical industry provided an appropriate context in which to isolate the business group effects and within business group dynamics proposed in this study.

Data

In order to assess the strategic responses of firms to institutional changes, we collected longitudinal data on all registered firms in the Indian pharmaceutical industry (at the four-digit level) from 1992 to 2007. This period is justified, as it covers two distinct periods. The first, 1992 to 1997, corresponds to the economy-wide changes brought about by the economic liberalization policies of the Indian Government; the period thereafter reflects the impact of WTO-recommended practices for intellectual property rights on the Indian pharmaceutical industry in particular. The main source of data is the Prowess database maintained by the Center for Monitoring Indian Economy (CMIE), a database that is increasingly being used by strategic management researchers (e.g., Khanna and Rivkin, 2001; Chacar and Vissa, 2005; Chittoor et al.,
The Prowess database maintains records of annual financial data for both private and public Indian firms starting from 1989, with data on public firms being more comprehensive to comply with the prevalent disclosure norms (Gopalan, Nanda, and Seru, 2007). In addition, we referred to the database maintained by the Ministry of Corporate Affairs on firms registered in India, and firm-level data made available by the Bombay Stock Exchange, to ascertain the year of incorporation, name change, ownership details, and so on. As of 1 January 2008, there were 600 registered pharmaceutical firms, including subsidiaries of foreign companies in India, as reflected in the Prowess database. After rejecting firm-years with no data, the resulting near population sample comprised an unbalanced panel containing 537 different firms with minimum 1 to maximum 16 years of data, a total of 4035 firm-year observations.

The number of firms in a year for which key variable data were available varied from 127 (1992) to 228 (2007), with year 2004 recording the highest number of operational firms (320) in any given year. While the number of business group affiliated firms over the entire period hovered around the 50 mark, in the case of the other firms in the sample there was a sharp rise in numbers between the years 1992–1996, a steady increase between 1997–2004, and a rapid fall thereafter. This variation takes into account startups, perished firms, and merged or amalgamated firms. The initial increase in number of nonaffiliated firms, followed by a decline in the later years, suggests that immediately after the economic liberalization, many entrepreneurs rushed to start new firms, recognizing ample business opportunities in the ensuing market-wide upheaval. The subsequent industry-specific impact of WTO-mandated product patent regulation, applicable post-2005, differentiated serious operators, who were willing to adapt and stay in business, from arbitrageurs, eventually leading to a modest industry consolidation in the later years.
To differentiate the serious operators from arbitrageurs or fly-by-night operators and yet minimize the loss of valuable data pertaining to startups, we adopted the following conservative filtering procedure. First, in order to eliminate the peripheral firms, we filtered out those with sales less than 200,000 USD\(^5\) from pure operations alone. As a consequence, 595 firm-year observations were rejected from the near population sample. Second, we eliminated firms having fewer than 5 observations over the period, consecutively or otherwise. This reduced the sample size by another 378 observations. Third, we purged outliers with disproportionate values on key variables, leading to a further loss of 18 observations. As a consequence of this filtering process, the sample comprised 3044 useful firm-year observations.\(^6\) Finally, given that our study focuses on strategic response of indigenous firms to contextual changes, we eliminated all foreign-owned subsidiaries from the final sample, leading to a testable sample size of 2729 firm-year observations belonging to 298 different firms.

**Operational Measures**

**Dependent variable.** Our main dependent variable capturing exploratory search as an adaptive response of a firm to institutional changes was measured in terms of the degree of internationalization of a firm. We measured internationalization by ratio of export sales to total sales,\(^7\) a common measure widely reported in the literature (e.g., Capar and Kotabe, 2003; Chittoor et al., 2009). Although this measure is unidimensional and supposedly inadequate to capture the breadth or depth of internationalization (Hitt et al., 2006), in the context of this study such a measure is justified for two reasons. First, internationalization in the context of our study is an important type of exploratory search, given that domestic markets have historically been the

---

\(^5\) One current USD ~ INR 45.
\(^6\) We applied the two-stage Heckman (1979) sample-selection bias rectification procedure as reported subsequently.
\(^7\) As a cross-verification, we also used internationalization growth (increase in export intensity over the three-year average), instead of internationalization, as a dependent variable.
focus of firms from developing economies. Second, the nature of our data (longitudinal and large sample), and the limited information available in the public domain on foreign subsidiaries of Indian firms and their geographical product-market sales, ruled out construction of an alternate measure. In a similar context, past studies indicated that export intensity, or the ratio of export sales to total sales, is significantly correlated with alternate measures of internationalization such as the count measure of diversity (Chittoor et. al., 2009).

**Independent variables.** *Business group affiliation* was operationalized by a dummy variable taking a value of 1 if the firm belonged to a business group (as reflected in the Prowess database) and 0 otherwise. A dichotomous variable to capture group affiliation is a standard practice in the literature on business groups (e.g., Guillen, 2002; Vissa, Greve, and Chen, 2010) and is justified since no firm usually belongs to two different business groups at the same time (Guillen, 2002). The Prowess database reports ownership details for each firm under the following categories: private (Indian), central government, state government, private (foreign) or foreign subsidiary (parent), and Indian business group. All firms in the sample falling under the Indian business group category were identified as being affiliated to business groups.

The scope of institutional transitions was operationalized through a dummy variable, *industry-specific institutional changes*$_{(1998-07)}$, taking a value of 0 for the period 1992–1997 (capturing broad-scope institutional change), and 1 for the subsequent period of the study (capturing narrow-scope institutional change). We arrived at this classification of time period on the basis of two considerations: 1) In 1995 India became a signatory to the WTO-mandated product patent regulation, which was subsequently enforced by the Indian parliament via a series of ordinances and bill amendments between 1995 and 1999. (Source: Government of India); and 2) This regulation specifically impacted all the firms in the pharmaceutical industry in India.
We conservatively estimated these regulatory changes becoming effective around 1997–1998 so as to ensure complete compliance by the time the changes were regularized into law.\(^8\)

Stock of resources possessed by a firm differs according to the nature of the resource itself: tangible or intangible, general purpose or specialized, financial or nonfinancial, and so on. Literature on organizational slack identifies firm resources according to flexibility of usage: low-or high-discretion, available (unabsorbed) or fungible, absorbed or recoverable, and potential resources (e.g., see Bourgeois, 1981; Bourgeois and Singh, 1983; George, 2005; Sapienza et al., 2006). Given the wide variation in classification or identification of firm resources, in the context of this study we considered two broad categories of firm-level resources that matter to internationalization: financial and nonfinancial resources (Hitt et al., 2006; Sapienza et al., 2006). The fundamental difference between these two kinds of resources is that financial resources, particularly the more liquid ones, are “general asset[s] easily redeployed to varied uses,” while nonfinancial resources are firm specific and path dependent and hence more “sticky” for redeployment to alternate use (Mishina, Pollock, and Porac, 2004). We operationalized firm financial resources as liquid assets possessed by a firm in the form of cash, bank balances, and marketable securities normalized with respect to total sales.\(^9\) This is relevant in the context of our study, since we are interested in those firm resources that lend themselves readily and easily to alternate strategic use such as exploration of new geographical markets.

Firm nonfinancial resources were operationalized as the ratio of selling, general, and administrative (SGA) expenses (minus R&D expense, which is explicitly controlled in all the

\(^8\) As an alternative, we also divided the entire period of study into three sub-periods of five, five, and six years respectively, and carried out the same analysis. There was no qualitative difference observed in the latter two periods; however, the result for the first five years was substantially different from those of the other two periods, justifying our assumption.

\(^9\) This measure differs slightly from current ratio, which is commonly employed in organizational slack literature as a measure of available or highly fungible resource (Bromiley, 1991), by taking into consideration only those components of current assets with immediate usability and availability and is, therefore, disjoint from the immediate demand for such resources (George, 2005).
models) to total sales. The underlying logic stems from SGA being a measure of overhead costs related to marketing, sales, distribution, and managerial and administrative activities, which are largely attributable to day-to-day operations. To minimize causal ambiguity and accounting manipulation, if any, we calculated and used a three-year average (i.e., focal year and the preceding two years’ values) for the financial and nonfinancial resource variables.

A firm’s standing in its industry is a consequence of consistent firm performance or realized effective managerial action leading to enhanced credibility, market power, brand image, and reputation. We operationalized this as $\text{market position}_{t-1}$, calculated as firm’s previous relative market share, that is, one-year lag of firm’s market share relative to the industry leader (the firm’s total sales divided by that of the industry leader). Thus, the industry leader gets a value of 1, with each of the other firms taking values ranging from 0 to less than 1, unless there is more than one industry leader with identical sales figures. Such a measure has been used in the past to estimate the relative market share of a firm in the domestic market (Ito, 1997). In a highly competitive industry, such as the Indian pharmaceutical industry, with many players in the market, relative market share position is highly sensitive to changes, and therefore a firm’s ability to hold its relative market share or increase it consistently over time represents its competitiveness as well as its growth potential.

Finally, firm’s position within the business group was assessed in terms of the firm’s relative impact on the business group’s total revenue streams from all its affiliates. We termed this variable the within business group centrality and measured it in terms of ratio of change in the affiliate firm’s sales to that of the overall change in the business group’s sales over the preceding year when both the numerator and the denominator have the same signs.10 In other

---

10 We also use the ratio of affiliate sales to business group’s sales as an alternative, as reported later in the paper under Additional Analysis.
words, this variable took values only when both affiliate sales and business group sales increased or decreased simultaneously. This measure captures both the upside as well as downside importance of the affiliate to the business group’s revenue streams. In addition, it eliminates the dominant effect of affiliate firm size, which can substantially influence the results in cases where the affiliate happens to be the single biggest affiliate among all the business group firms.

**Control variables.** We incorporated a number of control variables that could be sources of organizational inertia and thus influence search behavior (Hannan and Freeman, 1984; Kelly and Amburgey, 1991; Sorensen and Stuart, 2000; Guillen, 2001), as well as other control variables that have been explicitly linked to our dependent variable in past research. We controlled for *firm size*, operationalized as the natural logarithm of total assets owned by the firm. *Firm age* was computed as the difference in number of years between the calendar year and the year of incorporation of the firm. The internationalization literature has found that better performing and innovative firms undertake risky exploratory search activities such as entering new product markets (Helpman, Melitz, and Yeaple, 2004; Hitt et. al., 2006). We controlled for these by incorporating firm R&D intensity and profitability in the analyses. *R&D intensity* was operationalized as the three-year average (current and previous two years) ratio of investments in R&D to total sales. *Firm performance* was calculated as the three-year average of the profit before tax to total sales ratio. We also controlled for prior internationalization by incorporating *internationalization*$_{t-1}$, measured as one-year lagged ratio of foreign sales to total sales. Wherever indicated, we used three-year averages to reduce causal ambiguity and accounting manipulations. However, prior international market experience was more difficult to manipulate, as most foreign exchange transactions related to business in India are mandatorily routed through the government-controlled Reserve Bank of India. Therefore, prior international market
experience was represented in terms of one-year lagged values.\textsuperscript{11} In addition, we also controlled for time-period effects by incorporating calendar year dummies (\textit{Year dummies}) in the model.

\textbf{RESULTS}

We tested our model employing time series panel data generalized least square (GLS) regressions with Huber-White sandwich estimates to account for autocorrelation and issues related to heteroskedasticity. For testing hypotheses H1 and H2, we used random effects, since our key explanatory variable, \textit{business group affiliation}, is time invariant. For the other hypotheses related to the business group affiliated subsample, Hausman specification test favored use of fixed-effects regression.

Table 1 contains the descriptive statistics and correlations table for the variables in our models. A few notable observations are worth elaboration. Mean value of 17 percent for the sampled firms’ internationalization suggests that the Indian pharmaceutical industry is fairly active in foreign markets. We also looked at cross-sections of the data (not reported) to assess if there was any significant difference in the extent of internationalization between business group affiliated firms and other firms in the sample. The two subsamples have similar features in terms of mean values and pattern of internationalization over the period. Thirty-one percent of sample data pertains to business group affiliated firms; mean firm size in the sample is under 30 million USD (the total value of assets of the largest firm being close to 1.6 billion USD). The implications are that the industry is not overly dominated by business group affiliated firms, and that Indian pharmaceutical firms are small relative to the major global players in this industry.

\textit{Insert Table 1 about here}

\footnote{\textsuperscript{11} We reconfirm using a three-year average value as well.}
Where applicable, we tested for multicollinearity by carrying out an ordinary least square (OLS) regression to determine the variance inflation factors (VIF), since GLS does not permit such a calculation. In all the reported models, highest VIF value is under 9, and taken along with the modest correlations reported in Table 1, it can be assumed that multicollinearity is unlikely to be an issue (Hitt et al., 2006). We corrected for any sample bias by carrying out the two-stage Heckman (1979) procedure, as the final sample for testing our hypotheses excludes observations pertaining to insignificant or peripheral players. First, we calculated the probability of an observation being included in the final sample by running a probit regression of select/not-select dichotomous dummy variable on domestic market share (calculated as the ratio of domestic sales by total industry sales for the year). The accompanying rationale was that firms with insignificant domestic sales were most likely to be filtered out. Here, we also controlled for one-year lagged value of the dependent variable (dichotomous select/not-select), because nonselection of an observation for a firm increases the probability of nonselection in the subsequent year. The estimated probabilities of selection, thus obtained from the first step, were inserted as a control (inverse Mill’s ratio) in the second step, where internationalization was regressed on the explanatory and other control variables with the final filtered sample. The result of the panel data random-effects regression with the final sample, incorporating the inverse Mill’s ratio, is reported in Table 2.

Model 1, which is the base model, comprised only the explicit control variables, with internationalization as the dependent variable. Although we hypothesized the effect of variables firm financial and nonfinancial resources and market position_{t–1} specifically for the business group affiliated sample, we included them as controls here to avoid omitted variable bias. As expected, prior internationalization (internationalization_{t–1}) had a positive impact on the
subsequent internationalization of Indian pharmaceutical firms (p < 0.01) in the model. The results also show that more innovative firms (prior R&D intensity) had a greater propensity to internationalize. Interestingly, for the full sample, we did not find significant effects for either firm age or firm size on internationalization, although both have been linked to inertia in the organizational ecology literature.

*Insert Table 2 about here*

In Model 2, we introduced the hypothesized variable for business group affiliation along with the calculated inverse Mills ratio to control for sample selection bias. Our first hypothesis, H1a, predicted a negative relationship between business group affiliation and firm’s extent of internationalization. Regression results show that the coefficient is negative and significant (b = –0.01, p < 0.05), supporting H1a; that is, business group affiliated firms face greater inertia than independent firms in exploratory market search behavior in response to institutional changes.

H1b is related to the conditional effect of the scope of institutional changes on the relationship between business group affiliation and internationalization. To test H1b we introduced the variable *industry-specific institutional changes*(1998-07) and its interaction with *business group affiliation* in Model 3. Significant and negative coefficient of the interaction term (b = -.023, p < .05) indicates that indeed the negative effect of business group affiliation is more pronounced in the later period (i.e., 1998–2007) than in the previous period, supporting H1b.

To explore this relationship further, we carried out a split sample analysis of the data as reported in Models 4a, 4b, 5a, and 5b in Table 2. As before, Model 4a comprised only the control variables, and in Model 4b we introduced the hypothesized explanatory variable, *business group affiliation*, for the period 1992–1997 (representing broad economy-wide institutional changes). We found that the coefficient of the hypothesized business group affiliation variable is positive,
but statistically not significant ($b = 0.007, p > .10$). However, for the later period, 1998–2007, representing industry-specific institutional changes (Models 5a and 5b), the coefficient for the business group affiliation variable is negative and significant ($b = -0.016, p < 0.01$). Taken together, the analyses confirm that business group affiliation has a strong negative impact on internationalization when institutional changes are specific to the affiliate’s industry, but an indifferent impact when external changes are broad in scope and impact multiple industries. Although in principle both hypotheses H1a and H1b are supported, the results suggest that business group related inertial forces impinge on affiliates’ exploratory behavior only when institutional changes are localized to the affiliates’ industry.\(^\text{12}\)

The next hypotheses (H2, H3) were related to differences among business group affiliated firms. In particular, we proposed that the resource and structural positions of the affiliates may allow affiliates to temper/circumvent the business group related inertia and engage in exploratory search as a response to institutional changes. To test these hypotheses, we used the sample of business group affiliated firms to assess the factors that explain heterogeneity in their internationalization, the results of which are provided in Table 3. We first introduced the control variables (Model 1); subsequent Models 2–5 assessed the individual impact of the hypothesized variables. In Model 6 we included all the variables in the fully specified model. We have posited that affiliate firms possessing higher stock of resources are likely to overcome the negative impact of business group on firms’ internationalization (H2). While the coefficient for firm nonfinancial resources is positive, it is not statistically significant ($b = .075, p > .10$). The coefficient for firm financial resources, however, is negative and marginally significant ($b = -0.070, p < .10$).

\(^{12}\) To further validate our findings regarding exploratory search, instead of using degree of internationalization as the dependent variable, we repeated the analysis for H1a and H1b using growth in internationalization as the dependent variable. The results are qualitatively similar to those reported in Table 2.
In order to reconfirm these findings, we first replaced the three-year average values for both the resource variables with their corresponding one-year lag values. The results did not change much, although the negative impact of firm financial resources became significant at $p < 0.01$. Next, in Model 6, we retained the original three-year average of firm nonfinancial resources and replaced firm financial resources with a three-year average of current ratio (ratio of current assets to current liabilities) in the overall model. The coefficient continued to be negative but was not significant. The fact that *firm financial and nonfinancial resources* have opposite signs in terms of their impact on affiliate firms’ internationalization justifies their segregation in the model. However, overall, H2 is not supported. The weak negative significance of *firm financial resources* appears to suggest that presence of excess liquid finances in the affiliate firm hampers its internationalization. We expound on this result in the next section.

In H3a and H3b, we proposed that the structural positions of the affiliate within the group and in the industry may allow the affiliate to circumvent the negative business group inertia in responding to institutional changes. Both these hypotheses are supported. As shown in Model 6 of Table 4, the coefficients for *market position* ($b = 0.251, p < 0.01$) and *within business group centrality* ($b = 0.015, p < 0.05$) are positive and significant. To further validate our results, we tried out several alternate specifications for the key variables. First, instead of using relative market share measure, we used one-year lag of relative domestic market share measure (we assessed the domestic market sales for the firm relative to the domestic markets sales of the industry leader) in the full model. The results were the same as before. Second, instead of using ratio of change in sales (flow measure) for the *within business group centrality* measure, we used the ratio of total sales of the affiliate to business group sales (stock measure). The corresponding coefficient after carrying out the regression was also positive and significant. Finally, since the
previous international market experience variable (used as a control) had a dominant effect on the model, instead of taking a one-year lag of export intensity for this variable, we used a three-year average value. Even after this change, the model continued to hold as before. We concluded that our model is robust to alternate specifications and that H3a and H3b find strong support.

*Insert Table 3 about here*

**Additional Analyses**

The preceding results show variance across business group affiliated firms arising from affiliates’ resource and structural positions, thus supporting our arguments that certain affiliates are able to bargain for and receive the necessary business group attention and support for new strategic initiatives. However, it is plausible that these effects are not specific to business group affiliation, as resource and structural positions of any firm (independent or affiliated) may have similar impact on the firm’s internationalization behavior in response to institutional changes. To assess this, we examined the impact of firm financial and nonfinancial resources and market position on internationalization for independent firms in our sample. The *within business group centrality* variable was excluded, since this is specific to business group affiliated firms. We ran regression models for independent firms similar to those reported in Table 4 for the affiliated firms. For the sake of clarity and contrast, we graphically report these results by comparing them with the earlier obtained results (Figures 1a–1c). In each case, we took mean ±1 standard deviation value of the X-axis variable and calculated the corresponding dependent variable value from regression estimates.

*Insert Figure 1 about here*

As shown in Figure 1, *firm financial resources* negatively impact the internationalization of business group affiliated firms but have a positive effect on the internationalization of
nonaffiliated or independent firms. Firm nonfinancial resources, on the other hand, have almost no effect on the internationalization of affiliated firms, but positively influence internationalization of independent firms (Figure 2). Finally, the market position variable has a strong positive impact on the internationalization of business group affiliated firms and a negative effect on independent firms (Figure 3). Clearly, the three relevant variables in our model, equally extendable to both affiliated and independent firms, appear to have dissimilar impacts on internationalization in the two subgroups. The distinct contrast observed in the nature of their impact supports the contention that the identified factors have a unique influence depending on whether a firm is affiliated to a business group or is independent.

**DISCUSSION AND CONCLUSIONS**

Business groups in developing economies emerged to contend with the idiosyncrasies of the institutional context, which is shaped by the social milieu and characterized by market imperfections, closed economies, and a high degree of state control on economic exchanges. Natural questions arise about the relevance of business groups when the institutional context changes. The changed context of open economies and a deregulated competitive environment necessitates, as well as provides opportunities for, exploratory search behavior as an adaptive response for indigenous firms. The broad research question we addressed in this paper was whether the business group, with its central feature of an interconnected network of independent firms coordinated through a core entity, has an enabling or constraining impact on member firms’ search behavior during periods of institutional changes. We addressed this question through the empirical context of the Indian pharmaceutical industry, which encompasses both business group affiliated and independent firms, and which faced a variety of institutional changes during the period of our study, 1992–2007.
Our key findings are as follows: First, after controlling for firm-specific factors that have been identified in prior research as sources of inertia—such as firm age, size and past performance—we found inertial effects of business group affiliation on search behavior of these firms. That is, all else being equal, business group affiliated firms exhibit a lower degree of internationalization than independent or stand-alone firms. This finding is consistent with some of the recent related work that suggests that group affiliation undermines firms’ efforts to change their product-market focus during discontinuous environmental changes (Chittoor et al., 2009) and stifles their entrepreneurial activities (Mahmood and Mitchell, 2004).

Second, we found that business group related inertia is impacted by the scope of institutional changes. Results show that inertial constraints of business group affiliation amplify when the institutional change is narrow scope as compared to broad scope. A more fine-grained analysis of the data in fact shows that inertial pressures of the business group are activated only when there is a possibility of cognitive, strategic, and operational dissonance at the group and affiliate level—in this case, when institutional changes are narrow in scope and localized to the affiliate’s industry. When institutional changes are broad in scope, we found no difference in internationalization between business group affiliated and independent firms. This result provides a preliminary answer to the broader question of whether business group features make affiliated firms inherently less adaptive to environmental changes. It confirms our theorization that an affiliate’s exploratory search behavior in response to external discontinuities suffers only when there is a misalignment with the group’s outlook.

Third, the importance of alignment of interests in explaining affiliates’ search behavior was further confirmed in our next set of results, where we focused on heterogeneity among group affiliated firms. We identified a set of affiliated firm features that are likely to influence the
bargaining power of affiliates and to help exercise some kind of autonomy to undertake exploratory search and/or get explicit support from the group members. Our results showed that the strength of an affiliate’s structural position within the group (centrality) or in its industry (market position) positively influences its internationalization. While we cannot isolate whether structural position of the affiliate confers on it greater bargaining power to override the group related inertial constraints, or more support to pursue exploratory search, we believe that both group centrality and market position lead to greater alignment of objectives between the affiliate and the group, thus increasing the possibility of triggering enabling elements of group affiliation. This alignment allows for greater attention from the group (Bouquet and Birkinshaw, 2008), and the affiliate can tap into the group support and associated resources in the network to pursue exploratory search as an adaptive response to institutional changes.

Fourth, we did not find support for the hypothesized relationship to the resource position of the affiliates. Moreover, the impact of financial resources on search behavior is contrary to our expectation. Our results (Figure 1a) show that unlike stand-alone firms, where financial resources positively impact exploratory search behavior in line with past findings (Tseng et al., 2007), in the case of group affiliated firms the relationship is negative. One possible explanation for this contradiction is that while business group affiliates with excess cash flows become the internal lenders to financially constrained group members, there is a strong ownership directive to withhold, rather than use up, large portions of financial resources (Scharfstein and Stein, 2000). The fungible nature of financial resources makes them attractive for alternate deployment by the business group rather than for expenditure on risky exploratory activities. Therefore, affiliates with a higher stock of financial resources are less likely to internationalize. From a theoretical viewpoint, an important implication of this finding is that the bargaining power
arguments underpinning this hypothesis are not supported. Control of resources as a bargaining tool for obtaining decision-making autonomy has been extensively theorized in the literature (Astley and Sachdeva, 1984) and supported in specific contexts such as headquarter–subsidiary relationships (Mudambi and Navarra, 2004). Our results in the context of business groups refute these findings. These results, along with lack of a significant relationship between nonfinancial resources and internationalization, suggest that bargaining power reasoning is less applicable in business group firms. This is an intriguing finding and one that warrants further investigation. There is potential to evaluate theoretical conjectures on how business groups are different from other multi-unit firms or conglomerates (Granovetter, 1995).

Overall, our study contributes to both the business group and organizational adaptation literatures. There has been extensive interest in the study of business groups as an organizational form, as they play a salient role in organizing economic exchanges in a large number of countries. Much of the past research has focused attention on their origins, internal characteristics, and performance effects against the backdrop of institutional voids and market imperfections. A few recent studies have attempted to examine how institutional changes in different national contexts impact business group restructuring and refocusing in their domestic markets (Ghemawat and Khanna, 1998; Hoskisson et al., 2004; Hoskisson et al., 2005; Chung and Luo, 2008). While these studies provide some evidence of business group adaptation to exogenous shifts through “fine tuning the existing orientation” or “convergent change” (Greenwood and Hinings, 1996: 1024), our understanding of how firms affiliated to business groups adapt through radical change or exploratory search behavior is limited. Furthermore, much of the literature assumes that group influence is all pervasive and uniform across all member firms. By theorizing and testing exploratory search behavior of affiliated firms as well
as accounting for within-group dynamics in the backdrop of discontinuous institutional changes, our study fills an important gap and paves the way for anticipating the future of business groups with slightly more clarity.

Our study contributes to the organizational adaptation literature first by examining how inertia-related arguments that influence adaptive behavior apply to firms embedded in certain networks. Second, we provided some empirical evidence to the theoretical conjectures in both organizational ecology and institutional theories about how intraorganizational dynamics condition inertial forces. Third, we have advanced the notion of environmental contingencies and adaptive behavior by specifically recognizing how scope of external discontinuities is another parameter (along with the pace or speed of change) of importance. This becomes particularly relevant in the present context of global competition, in which more and more firms are opting to network with other firms and often such networks can straddle industries and nation states. Our findings related to one type of network, namely business groups, as well the nuanced impact of scope of institutional changes, provide important insights and open a new frontier for research. For instance, it would be interesting to understand the implications of disruptive change in one country on a network of interdependent firms spread over several countries. Furthermore, there is recent theorization about network inertia in the context of interorganizational alliances, whereby inertial forces limit a change in the composition of the network (Kim, Oh, and Swaminathan, 2006). These theoretical insights, in conjunction with our findings about how network effects influence strategic adaptation in the form of geographical search activities, have the potential to advance research on the formation, adaptation, and dissolution of different kinds of networks.

Although our findings are promising, we acknowledge our study’s limitations. The first limitation is related to the contextual scope of our study. While focusing on a single industry in a
given national context has its advantages, as one can observe the hypothesized effects without worrying about industry/country level confounds, there can be questions about the generalization of our findings. Second, we focused on one type of exploratory search behavior, internationalization through exports. There are other types of search activities related to geographical scope, such as through acquisitions or interorganizational alliances. The business group related effects may well be very different in such search activities, given different resource requirements. Third, while we differentiated between bargaining and attention-based arguments to theorize about within-group heterogeneity and inertia, we could not isolate these empirically. Given that these differences are theoretically important in explaining adaptation of business group firms, future research can explore these differences in greater detail. A fourth, and related, limitation is that we do not incorporate governance/ownership aspects into our theoretical and empirical model. Recent research shows that market reforms in developing economies have led to plurality of shareholders in indigenous firms, including those affiliated with business groups (Chung and Luo, 2008). Given that these shareholders influence firms’ strategic decisions, including postreform restructuring, refocusing, and product-market scope, inclusion of governance issues could provide further insights into the functioning of business groups.

In conclusion, our study provides new insights into whether affiliation to business groups constrains or enables member firms’ adaptation to institutional changes. There has been a proclivity in past research to assume a certain equifinality concerning the future of business groups (Yiu et al., 2007; Carney, 2008). A prime reason for such a consideration resides in the assumption that business groups are a specific design of the context, and that when the context changes, salience of business groups will decline. Moreover, the influence of business groups on affiliates has been assumed to be all pervasive and uniform across all affiliates. By identifying
the boundary conditions related to the enabling and constraining aspects of business groups, our research provides a more nuanced understanding. We are hopeful that future research can build upon our findings about the adaptability of business groups to institutional changes and answer the broader questions related to the future of this organizational form.
REFERENCES

Alamgir, J.

Amburgey, T. L., D. Kelly, and W. P. Barnett

Amsden, A.

Andersson, U., M. Forsgren, and U. Holm

Astley, W. G., and P. S. Sachdeva

Baum, J.A.C., and C. Oliver

Blau, P. M.

Boeker, W.

Bouquet, C., and J. Birkinshaw

Bourgeois, L. J., III

Bourgeois L. J., III, and J. Singh

Bromiley, P.

Burt, R. S.

Capar, N., and M. Kotabe

Carney, M.

Chacar, A., and B. Vissa

Chang, S., C. Chung, and I. P. Mahmood

Chang, S. J., and J. Hong

Chen, M-J.

Chittoor, R., M. B. Sarkar, S. Rau, and P. S. Aulakh

Chung, C-N., and X. Luo

Cuervo-Cazurra, A.

Cyert, R. M., and J. G. March
Dahl, R. A.  

Dawar, N., and T. Frost, T.  

Doz, Y., J. Santos, and P. Williamson  

Economist.  

Emerson, R. M.  

Evans, D.  

George, G.  

Ghemawat, P., and T. Khanna  

Gopalan, R., V. Nanda, and A. Seru  

Granovetter, M.  


Greenwood, R., and C. R. Hinings  


Guillen, M. F.

Hannan, M. T., and J. Freeman

Haveman, H. A.

Heckman, J.

Helpman, E., M. J. Melitz, and S. R. Yeaple

Hitt, M. A., L. Bierman, K. Uhlenbruck, and K. Shimizu

Hoffman, A. J.

Hoskisson, R. E., A. A. Cannella, L. Tihanyi, and R. Faraci

Hoskisson, R. E., R. A. Johnson, L. Tihanyi, and R. E. White

Ito, K.

Katila, R., and G. Ahuja

Kelly, D., and T. L. Amburgey

Khanna, T., and K. Palepu

Khanna, T., and J. Rivkin

Khanna, T., and Y. Yafeh

Kim, H., R. E. Hoskisson, L. Tihanyi, and J. Hong

Kim, H., R. E. Hoskisson, and W. P. Wan

Kim, H., H. Kim, and P. M. Lee

Kim, T-Y., H. Oh, and A. Swaminathan.

Kock, C. J., and M. F. Guillen

Kostova, T., and S. Zaheer

Kraatz, M. S.

Kriauciunas, A., and P. Kale

La Porta, R., F. Lopez-de-Silanes, and A. Shleifer

Leff, N.

Luo, Y., and R. L. Tung

Mahmood, I. P., and W. Mitchell

Miller, D., and M. Chen

Mishina, Y., T. G. Pollock, and J. F. Porac

Mudambi, R., and P. Navarra

Nelson, R. R.

Newman, K.

Peng, M. W.

Pfeffer, J., and G. R. Salancik

Ranger-Moore, J.

Rosenkopf, L., and A. Nerkar

Rosenzweig, P. M., and J. V. Singh

Sapienza, H. J., E. Autio, G. George, and S. A. Zahra

Scharfstein, D. S., and J. C. Stein

Scott, W. R.

Sorensen, J. B.

Sorensen, J. B., and T. Stuart

Strachen, H.

Tripsas, M.

Tseng, C-H., P. Tansuhaj, W. Hallagan, and J. McCullough

Uzzi, B.

Vissa, B., H. R. Greve, and W. Chen

Wall Street Journal
2005 “India’s crackdown on fakes.” March 24.

Whitley, R. D.

Yiu, D. W., Y. Lu, G. D. Bruton, and R. E. Hoskisson
<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internationalization</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internationalization_{t-1}</td>
<td>0.9</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm age</td>
<td>-0.05</td>
<td>-0.06</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm size(^b)</td>
<td>0.31</td>
<td>0.31</td>
<td>0.3</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm performance(^c)</td>
<td>0.07</td>
<td>0.05</td>
<td>0.02</td>
<td>0.07</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm R&amp;D intensity(^c)</td>
<td>0.28</td>
<td>0.27</td>
<td>0.1</td>
<td>0.49</td>
<td>0.07</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business Group affiliation</td>
<td>0.02</td>
<td>0.01</td>
<td>0.18</td>
<td>0.41</td>
<td>-0.04</td>
<td>0.22</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm financial resources(^c)</td>
<td>0.05</td>
<td>0.05</td>
<td>0.03</td>
<td>0.13</td>
<td>0.02</td>
<td>0.18</td>
<td>0.02</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm nonfinancial resources(^c)</td>
<td>-0.09</td>
<td>-0.09</td>
<td>0.22</td>
<td>0.02</td>
<td>-0.24</td>
<td>0.13</td>
<td>0.02</td>
<td>0.05</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Market position_{t-1}</td>
<td>0.19</td>
<td>0.18</td>
<td>0.27</td>
<td>0.66</td>
<td>0.1</td>
<td>0.43</td>
<td>0.42</td>
<td>0.07</td>
<td>0.07</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Within business group centrality</td>
<td>0.14</td>
<td>0.09</td>
<td>0.02</td>
<td>0.18</td>
<td>0.02</td>
<td>0.23</td>
<td>0.05</td>
<td>0.19</td>
<td>0.11</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Observations 2729 2291 2729 2729 1898 1898 2729 1898 1898 2291 630
Mean 0.17 0.17 22.27 29.05 -0.04 0.01 0.31 0.07 0.14 0.06 0.69
Std. Dev. 0.23 0.23 16.85 87.50 0.57 0.02 0.10 0.09 0.11 1.01
Min 0.00 0.00 1.00 0.09 -12.15 0.00 0.00 0.00 0.00 0.00 0.00
Max 1.00 1.00 107.00 1592.82 0.65 0.25 1.00 1.19 0.59 1.00 20.34

\(^a\) Correlations greater than 0.04 in magnitude are significant at 5%.
\(^b\) Descriptive statistics figures in million USD (1 current USD ~ INR 45).
\(^c\) Three-year average.
Table 2
Results of Panel Data Random-Effects Regression
Dependent Variable = Internationalization

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model 1</td>
<td>Model 2</td>
<td>Model 3</td>
</tr>
<tr>
<td>Internationalization(t-1)</td>
<td>0.891**</td>
<td>0.888**</td>
<td>0.887**</td>
</tr>
<tr>
<td></td>
<td>(0.02)</td>
<td>(0.02)</td>
<td>(0.02)</td>
</tr>
<tr>
<td>Firm age</td>
<td>–0.000</td>
<td>–0.000</td>
<td>–0.000</td>
</tr>
<tr>
<td></td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
</tr>
<tr>
<td>Firm size</td>
<td>0.003</td>
<td>0.004</td>
<td>0.004</td>
</tr>
<tr>
<td></td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
</tr>
<tr>
<td>Firm performanceb</td>
<td>0.006</td>
<td>0.005</td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td>(0.00)</td>
<td>(0.01)</td>
<td>(0.01)</td>
</tr>
<tr>
<td>Firm R&amp;D intensityb</td>
<td>0.272*</td>
<td>0.285*</td>
<td>0.304*</td>
</tr>
<tr>
<td></td>
<td>(0.12)</td>
<td>(0.13)</td>
<td>(0.13)</td>
</tr>
<tr>
<td>Firm financial resourcesb</td>
<td>0.005</td>
<td>0.005</td>
<td>0.004</td>
</tr>
<tr>
<td></td>
<td>(0.02)</td>
<td>(0.02)</td>
<td>(0.02)</td>
</tr>
<tr>
<td>Firm nonfinancial resourcesb</td>
<td>–0.047+</td>
<td>–0.047+</td>
<td>–0.049+</td>
</tr>
<tr>
<td></td>
<td>(0.03)</td>
<td>(0.03)</td>
<td>(0.03)</td>
</tr>
<tr>
<td>Market position(t-1)</td>
<td>0.026</td>
<td>0.035</td>
<td>0.033</td>
</tr>
<tr>
<td></td>
<td>(0.02)</td>
<td>(0.02)</td>
<td>(0.02)</td>
</tr>
<tr>
<td>Inverse Mills Ratio</td>
<td>0.025</td>
<td>0.015</td>
<td>0.255</td>
</tr>
<tr>
<td></td>
<td>(0.15)</td>
<td>(0.15)</td>
<td>(0.36)</td>
</tr>
<tr>
<td>Business Group affiliation(H1a)</td>
<td>–0.010*</td>
<td>0.008</td>
<td>0.007</td>
</tr>
<tr>
<td></td>
<td>(0.00)</td>
<td>(0.01)</td>
<td>(0.01)</td>
</tr>
<tr>
<td>Industry-specific institutional change(1998-07)</td>
<td></td>
<td>0.019</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.01)</td>
<td>(0.01)</td>
<td></td>
</tr>
<tr>
<td>Business Group affiliation X</td>
<td>–0.023*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industry specific change(H1b)</td>
<td></td>
<td>(0.01)</td>
<td></td>
</tr>
<tr>
<td>Year dummies</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
</tr>
<tr>
<td>Constant</td>
<td>0.020*</td>
<td>0.024</td>
<td>0.013</td>
</tr>
<tr>
<td></td>
<td>(0.01)</td>
<td>(0.02)</td>
<td>(0.02)</td>
</tr>
<tr>
<td>Wald Chi-square</td>
<td>7144.82**</td>
<td>7339.41**</td>
<td>7613.04**</td>
</tr>
<tr>
<td>N</td>
<td>1898</td>
<td>1898</td>
<td>1898</td>
</tr>
<tr>
<td>VIF range</td>
<td>1.06–3.53</td>
<td>1.10–6.16</td>
<td>1.10–8.28</td>
</tr>
</tbody>
</table>

*p < .10, *p < .05, **p < .01 (significance levels based on two-tailed test).

*a Values within parentheses are standard error values.

*b Three-year average.
Table 3
Results of Panel Data Fixed-effects GLS Regression for Business Group Affiliated Firms
Dependent Variable = Internationalization

<table>
<thead>
<tr>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
<th>Model 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internationalization_{t-1}</td>
<td>0.555**</td>
<td>0.552**</td>
<td>0.553**</td>
<td>0.531**</td>
<td>0.493**</td>
</tr>
<tr>
<td>(0.08)</td>
<td>(0.08)</td>
<td>(0.08)</td>
<td>(0.08)</td>
<td>(0.09)</td>
<td>(0.09)</td>
</tr>
<tr>
<td>Firm age</td>
<td>-0.004*</td>
<td>-0.004*</td>
<td>-0.004*</td>
<td>-0.002</td>
<td>-0.005*</td>
</tr>
<tr>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
</tr>
<tr>
<td>Firm size</td>
<td>0.030**</td>
<td>0.034**</td>
<td>0.030**</td>
<td>0.017+</td>
<td>0.039**</td>
</tr>
<tr>
<td>(0.01)</td>
<td>(0.01)</td>
<td>(0.01)</td>
<td>(0.01)</td>
<td>(0.01)</td>
<td>(0.01)</td>
</tr>
<tr>
<td>Firm performance$^b$</td>
<td>0.015*</td>
<td>0.015*</td>
<td>0.017*</td>
<td>0.015*</td>
<td>0.015*</td>
</tr>
<tr>
<td>(0.01)</td>
<td>(0.01)</td>
<td>(0.01)</td>
<td>(0.01)</td>
<td>(0.01)</td>
<td>(0.01)</td>
</tr>
<tr>
<td>Firm R&amp;D intensity$^b$</td>
<td>0.484*</td>
<td>0.496*</td>
<td>0.448*</td>
<td>0.461*</td>
<td>0.633*</td>
</tr>
<tr>
<td>(0.20)</td>
<td>(0.20)</td>
<td>(0.21)</td>
<td>(0.19)</td>
<td>(0.26)</td>
<td>(0.27)</td>
</tr>
<tr>
<td>Year dummies Included</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
</tr>
<tr>
<td>Firm financial resources$^b$ (H2)</td>
<td>-0.072*</td>
<td>-0.070+</td>
<td>0.060</td>
<td>0.060</td>
<td>0.075</td>
</tr>
<tr>
<td>(0.04)</td>
<td>(0.04)</td>
<td>(0.06)</td>
<td>(0.06)</td>
<td>(0.10)</td>
<td>(0.10)</td>
</tr>
<tr>
<td>Firm nonfinancial resources$^b$ (H2)</td>
<td>0.197**</td>
<td>0.197**</td>
<td>0.197**</td>
<td>0.197**</td>
<td>0.251**</td>
</tr>
<tr>
<td>(0.07)</td>
<td>(0.07)</td>
<td>(0.07)</td>
<td>(0.07)</td>
<td>(0.08)</td>
<td>(0.08)</td>
</tr>
<tr>
<td>Market position_{t-1} (H3b)</td>
<td>0.014*</td>
<td>0.015*</td>
<td>0.014*</td>
<td>0.014*</td>
<td>0.015*</td>
</tr>
<tr>
<td>(0.01)</td>
<td>(0.01)</td>
<td>(0.01)</td>
<td>(0.01)</td>
<td>(0.01)</td>
<td>(0.01)</td>
</tr>
<tr>
<td>Within business group centrality (H3a)</td>
<td>0.049</td>
<td>0.042</td>
<td>0.043</td>
<td>0.036</td>
<td>0.034</td>
</tr>
<tr>
<td>(0.04)</td>
<td>(0.04)</td>
<td>(0.04)</td>
<td>(0.04)</td>
<td>(0.04)</td>
<td>(0.04)</td>
</tr>
<tr>
<td>F</td>
<td>24.87**</td>
<td>23.98**</td>
<td>23.54**</td>
<td>27.54**</td>
<td>23.07**</td>
</tr>
<tr>
<td>N</td>
<td>655</td>
<td>655</td>
<td>655</td>
<td>655</td>
<td>535</td>
</tr>
<tr>
<td>VIF range</td>
<td>1.04–2.48</td>
<td>1.04–2.48</td>
<td>1.17–2.48</td>
<td>1.05–2.55</td>
<td>1.05–2.53</td>
</tr>
</tbody>
</table>

$^a$ p < .10, $^* p < .05, **p < .01$ (significance levels based on two-tailed test).
$^b$ Values within parentheses are standard error values.
$^H$ Three-year average.
Figure 1a
Subgroup Analysis: Impact of Firm Financial Resources on Internationalization

Figure 1b
Subgroup Analysis: Impact of Firm Nonfinancial Resources on Internationalization

Figure 1c
Subgroup Analysis: Impact of Market Position on Internationalization