

## **The Scope of Business Groups: A Penrosian Analysis**

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### ABSTRACT

Organizations face trade-offs when designing growth strategies. With limited resources, managers have to decide in which type of business they want to deploy their resources. We integrate the Penrosian theory of the growth of the firm with institutional perspectives to analyze when business groups expand in different product areas, and when they expand abroad.

The empirical results support our propositions concerning the resource to growth relationships. Business groups with institutionally embedded resources, such as managerial ties to government, tend to pursue domestic product diversification. On the other hand, business groups with non-location bound resources have higher degrees of internationalization.

(98 words)

**Keywords:** internationalization, product diversification, firm growth, Penrosian theory, institutional theory, business groups.

## INTRODUCTION

One of the fundamental questions in the strategy field is “What determines the scope of the firm?” (Rumelt, Schendel and Teece, 1994). The same question applies to the predominant organizational form for businesses in Asia, business groups (BG). Yet it has rarely been addressed in the scholarly literature.

The scope of BG is shaped by growth processes that redeploy resources to new rent-generating activities. The literature on the scope of firms and conglomerates focuses on product diversification and international expansion. Although often analyzed separately, the two dimensions of firm scope may be strategically interdependent (Bowen and Wiersema, 2005; 2007; Meyer, 2006). Several studies found that the relationship between product diversification and corporate performance is moderated by the geographical scope of the firm, suggesting that a firm’s expansion in one direction may influence its growth in another direction (Delios and Beamish, 1999; Hitt, Hoskisson and Ireland, 1994; Hitt, Hoskisson and Kim, 1997). Yet few scholars analyze both directions simultaneously. We also lack understanding of why firms choose one direction of growth over the other (Peng and Delios, 2006).

The question regarding the scope of BG is further complicated by the context in which a firm is embedded. Recent research suggests that imperfect institutional frameworks in many emerging economies have led businesses to grow in the form of BG, and to pursue product diversification (e.g., Khanna and Palepu, 2000; Chung, 2001). The literature also indicates that such diversification is persistent over time (Guillén, 2000), and positively related to performance, at least in some countries (Khanna and Rivkin, 2001; Nachum, 2004). Yet, we don’t know why BG facing similar institutional contexts pursue different patterns of product diversification, or when these BG expand internationally. As prior studies on business groups have been primarily

done at the member firm level, there is also a lack of understanding of the growth directions of overall BG at the group level.

We analyze the scope of BG by integrating two lines of theorizing. First, *'The Theory of the Growth of the Firm'* [henceforth *'Theory'*] by Penrose (1959) suggests that unused firm-specific resources drive corporate growth. Resources thus may drive expansion into new product areas (Teece, 1982) or new countries (Johansen and Vahlne, 1990), yet BG have to prioritize where they can grow most beneficially within their managerial constraints. The redeployability of resources to other industries or countries thus influences the type of growth that BG pursue (Kor and Mahoney, 2000; Rugman and Verbeke, 2002; Mahoney, 2005; Meyer, 2006). In other words, the Penrosian growth theory leads us to predict that *a business group's decisions regarding product diversification versus internationalization are influenced by the redeployability of its resources and capabilities across locations and industries.*

Second, the institutional perspective of business strategy (Oliver, 1997; Ingram and Silverman, 2002; Meyer, 2001; Peng, 2003) investigates a type of resource that is largely neglected in conventional diversification studies — institutionally embedded resources. Such resources are of paramount importance in emerging economies, where market-supporting institutions are incomplete, and they allow BG to gain competitive advantage and legitimacy by informally connecting with dominant institutions (Peng, Lee and Wang, 2005). They may be shared across member firms, but they are bound to the local context (Peng, et al., 2005).

In combining the two lines of research, we argue that because institutionally embedded resources are location bound, they serve as a driver for domestic product diversification — but normally not for internationalization. In contrast, geographically fungible resources such as international experience can be exploited in international markets, and thus support international

expansion (Dunning, 1993; Rugman and Verbeke, 2002). In other words, *decisions regarding domestic product diversification or by internationalization are driven by the institutional embeddedness of the business group's domestic resources.*

The appropriate context for testing these arguments is an emerging economy where where BG are a common organizational form, and institutionally embedded resources are important. Taiwan provides such a context. BG are a prevailing organizational form in Taiwan as their sales have exceeded a half of GNP since 1998. The Taiwan government has also exerted substantial influence on the institutional context facing businesses (Amsden and Chu, 2003; Berger and Lester, 2005; Hung and Whittington, 1997). In addition, data on Taiwanese BG are available in rare detail allowing for group level analysis (Luo and Chung, 2005).

We contribute to the international business literature in multiple ways. First, we enhance the understanding of the growth strategies of BG by simultaneously analyzing the determinants of their variation in domestic product diversification and internationalization. More specifically, we show empirically how the characteristics of their resource endowment, especially managerial resources, influence their scope. Second, the literature has largely overlooked strategic resources that create little value in developed economies yet can be a valuable driver of growth where institutional frameworks are incomplete. Our study fills this gap by integrating institutional theory as put forth by Peng et al. (2005) on institutional relatedness and Penrosian theory as interpreted by Meyer (2006). Third, we present a theoretical framework that explains the choice between the two primary dimensions of scope, and provide empirical evidence for this framework. Fourth, we provide a theoretical rationale to explain why earlier studies have found patterns of diversification to vary across countries (Khanna and Rivkin, 2001; Mayer and Whittington, 2004; Peng and Delios, 2006).

## BUSINESS GROUPS

What are and why do we study business groups? In emerging economies, businesses are often organized as groups of interdependent firms (Chung, 2001; Khanna and Palepu 2000; Peng and Delios, 2006, Khanna and Yefeh, 2007), in contrast to western firms that typically employ more hierarchical multi-divisional structures to manage diversified businesses. This distinction is captured by the following definition of BG by Khanna and Rivkin (2001:47):

*“A business group is a set of firms which, though legally independent, are bound together by a constellation of formal and informal ties and are accustomed to taking coordinated action”.*

Business groups typically internalize certain markets, especially those for capital and for managerial resources, and they share resources, especially intangibles like reputation, knowledge and networks (Khanna and Rivkin, 2001, Luo and Chung, 2005). BG are thus similar to conglomerates for instance in the USA; yet conglomerates tend to have more centralized ownership control (Chang, 2006a; Khanna and Yafeh, 2007). In many countries around the world, BG are an important organizational form for business, especially in Asia, Latin American and Eastern Europe (Khanna and Rivkin, 2001; Nachum 2004; Khanna and Yafeh, 2007; Yiu, Lu, Bruton and Hoskisson, 2007). Notable exceptions are Anglo-American countries, where BG are rare. This is generally attributed to legal and informal pressures for firms to adopt transparent structures and to protect the interests of minority shareholders. Khanna and Yefeh (2007) moreover follow Morck (2005) to attribute it to specific legislation implemented in by Roosevelt in the 1930 regarding the taxation of intra-firm profit flows.

Elsewhere, BG have proven to be very persistent (Guillén, 2000), though some long-term studies point to a gradual decline (Khanna and Yafeh, 2007). In particular, the diversification

premium appears to be declining, at least in some countries (Khanna and Palepu, 2000), which would make BG less attractive as an organizational form. Yet other studies point to the persistence of BG even in contexts of radical environmental change and direct governmental interventions aiming to dissolve BG, as in post war Japan when Zaibatsus reinvented themselves as Keiretsu networks, and following the Korean crisis of 1997 (Chang, 2006a/b).

Several studies suggest that BG are more common in countries with weak institutional frameworks, where they provide an avenue to overcome ‘institutional voids’ (Khanna and Palepu, 2000). This provides a basis for recent theorizing proposing a shift of corporate strategies as countries develop their institutional framework towards more market-based coordination (Peng et al., 2005; Hoskisson, Johnson, Tihanyi and Wight, 2005).

Most large sample empirical studies on BG focus on member firms as a unit of analysis (e.g. Khanna and Rivkin 2001; Khanna and Palepu, 2000; Nachum, 2004). Moreover, they use listed member firms only, which however is only a subset of all member firms. This focus on member firms has advantages in terms of sample size and data availability, yet it limits generalizability and provides a partial image of BG (Khanna and Yafeh, 2007). Empirical evidence on BG as such comes mainly from case studies and historical analysis (Chang, 2006b; Delios and Peng, 2006). We overcome these limitations by analyzing strategies of BG *at the group level*, using data from the directory of Taiwanese BG, which contains details of over 200 groups and all their member firms (Luo and Chung, 2005).

## **A THEORY OF THE GROWTH OF BUSINESS GROUPS**

In her *Theory*, Edith Penrose (1959) analyzes firms as economic rather than legal entities, and describes them as collections of productive resources. They rely more on conscious planning

than on market forces to allocate resources, and thus have some form of administrative framework governing inter-unit coordination, but not necessarily centralized control of operations (Penrose, 1959:15-16). BG vary substantially in the degree of coordination, as some almost resemble a multidivisional firm, while others employ highly decentralized mechanisms of coordination (Yiu et al., 2007). Yet, crucial for our analysis, they share resources and this resource sharing is governed by mechanisms other than markets. Thus, Penrose's *Theory* provides an appropriate angle to analyze the evolution of BG, and the scope they grow into. In particular, it is more suitable than theories that (implicitly) assume a centralized rational decision making process as would be appropriate for more hierarchical organizations.

Penrose's *Theory* explains firm growth as arising from the internal processes of resource accumulation and redeployment, with managerial resources being particularly eminent. She suggests that as long as firms have resources that are yet to be fully utilized, they will have incentives to utilize these resources more fully (Mahoney, 2005). There are at least two reasons why not-fully-utilized resources exist within firms. First, new knowledge and skills are continuously developed in daily operations. They are often firm-specific, and will thus be retained within firms where they drive internal growth. Second, some resources, such reputation or networks, can be used simultaneously for different activities. Because their use is non-rivalrous – the application on one activity does not diminish their availability for other activities (Adler and Kwon, 2002) – there would always be opportunities for firms to utilize them more.

The deployment of these resources to new uses can increase the scope of a firm in terms of industries (product diversification) and countries (international expansion) (Teece, 1982). The nature of these productive resources shapes the search for entrepreneurial opportunities (Penrose, 1959), and thus influences the direction in which businesses expand their scope.

Resources can be of different kinds. For Penrose, the most important type of resources that exist in every firm is managerial resources. On the one hand, any expansion of a firm requires internally experienced managers to plan and to execute, because a firm is essentially an administrative organization. Thus, the capacities of existing managers set a limit to the scope of a firm's expansion (Tan and Mahoney, 2005). On the other hand, managers accumulate capabilities over time through on-the-job learning. These continuously increased managerial capabilities induce firm growth and shape the direction of the growth.

Two largely separate streams of research on product diversification and internationalization have both emphasized resources as the drivers. The strategic management literature focuses primarily on technological resources. It suggests that firms typically expand into businesses where their existing resources are readily deployable and where they can achieve economies of scope (Silverman, 1999; Teece, 1982). This process leads firms to diversify first into related industries in terms of technology (Chatterjee and Wernerfelt, 1991; Jacquemin and Berry, 1979) or human skills (Farjoun, 1994; Miller, 2004).

The international business literature also proposes resources as the driver for internationalization. It suggests that firms expand internationally if they possess some superior technological or organizational capability that enables them to overcome the natural competitive disadvantage of being foreign to a market (Dunning, 1993; Zaheer, 1995). The internationalization process model (Johanson and Vahlne, 1977; 1990), an early application of Penrose's ideas, analyzes this process as a result of an interactive process of incrementally increasing commitments to foreign markets and of building capabilities for these markets. As a consequence, firms typically start their international business in nearby countries with gradual expansion to more distant markets, and start with low commitments and gradually move to

wholly owned subsidiaries (Johanson and Vahlne, 1990).

Thus, the growth of firms in terms of internationalization and product diversification can be explained by the same theoretical arguments. In both dimensions, firm growth is the outcome of a process of resource accumulation and redeployment, be it domestically or internationally. This process does not require centralized decision making, as long as the organization shares resources across unit and has some form of internal coordination. It thus provides a suitable framework for the analysis of BG.

When do BG diversify and when do they internationalize? Since both product diversification and international expansion require internally experienced managers to plan and to execute, the limited capacities of these managers force BG to set priorities for their growth strategy. While a resource typically has multiple potential uses, its productivities in different applications can vary. Thus, BG would invest first where they expect the greatest benefits from redeploying their resources. If some resources are more useful for product diversification and others for internationalization, then the portfolio of a business group's resources should provide indications of its likely path of growth. The diversity of resources endowment thus explains the heterogeneity of strategies (Barney, 1986; Eisenhardt and Martin, 2000).

**\*\*\* *Figure 1 approximately here* \*\*\***

Figure 1 illustrates the bundle of resources of a business group in a 2x2 matrix. Resources are classified as 'bound' to a country or an industry if they add little value when employed outside the country or industry. This classification permits predictions of the growth direction in which firms redeploy their resources (Meyer, 2006). Some capabilities, such as knowledge of national institutional systems, are highly specific to a given country, but may be profitably deployed to other industries. Such "location-bound firm-specific advantages" (Rugman, 1996)

are more useful for domestic product diversification (quadrant I). For example, a well recognized national consumer brand may allow for ‘brand extension’ by expanding into other products. Other resources may be specific to an industry but can be exploited by redeployment to the same industry in other countries. They would support internationalization of the business group (quadrant IV). For example, businesses with technological capabilities in a particular industry may exploit them by selling their products in a variety of countries.

This theoretical argument suggests that, first, *BG whose resources are locally embedded tend to demonstrate a higher level of domestic product diversification (P)*; and second, *BG whose resources are non-location bound tend to demonstrate a higher level of international diversification (I)*. Algebraically, this argument can be expressed as

$$P = f(X, Y), \text{ with } dP/dY \leq 0, \text{ and } dP/dX > 0.$$

$$I = f(X, Y), \text{ with } dI/dX \leq 0, \text{ and } dI/dY > 0, \text{ and}$$

Where  $X$  is a vector of resources that are location-bound, and  $Y$  is a vector of resources that are not location-bound but transferable internationally.

If BG are resource constrained, as argued by Penrose, then the trade-off between different growth strategies induces them to grow in line with existing resources; at any point in time, their scope in terms of  $I$  and  $P$  is the outcome of their past growth processes. Thus, we can test for the determinants of growth by relating BG’ resource endowment to their scope.<sup>1</sup> Since businesses face trade-offs between  $I$  and  $P$  strategies (Bowen and Wiersema, 2007), we would expect that those with high degrees of  $I$  do not have simultaneously high degrees of  $P$ , and *vice versa*. In other words, for BG with equal amounts of resources, their scope in terms of  $I$  and  $P$  should be negatively correlated:

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<sup>1</sup> In other words, we do not assume ‘equilibrium’ as in neoclassical economics (and economics-inspired work in strategic management) where current state of  $I$  and  $P$  would be assumed to be results of an optimization, and thus on average the most efficient outcome.

*Hypothesis 1: Internationalization and domestic product diversification are negatively related, other things being equal.*

## **RESOURCES DRIVING GROWTH**

### **Resources Driving Domestic Product Diversification**

If BG are resource constrained, they will have to choose between two directions of growth – I and P – as postulated in Hypothesis 1; then the nature of their resources allows for the prediction of the direction. The pertinent question thus is: Which resources lead BG to grow in either direction?

Penrose emphasizes that excess resources, particularly new managerial resources accumulated through daily operations, are an essential driver for growth. Managers gain a major part of their new knowledge and skills through on-the-job learning (Penrose, 1959); and the challenges that they face on their job provide their training and learning ground (Zahra, Ireland and Hitt, 2000).

These challenges, however, vary across contexts. Developed economies are characterized by market-based competition in institutional frameworks that support impersonal exchange. The primary challenges are to develop competitive resources and capabilities emphasized in traditional strategy research (Peng, 2003). In contrast, emerging economies often lack institutions that support arm's length impersonal exchange, such as reliable intermediaries and a transparent and effective legal framework (Khanna and Palepu, 2000; Khanna and Rivkin, 2001). As a result, transactions are primarily based on interpersonal and inter-organizational relationships (Peng, 2003), and government officials typically have substantial discretionary power (Luo, 2003).

BG competing in emerging economies often respond to this institutional challenge by developing 'institutionally embedded resources,' defined as 'the informal linkages with

dominant institutions that confer resources and legitimacy' (Peng, et al., 2005:622). Such informal linkages may take the form of managers' personal networks or institutional affiliations.

For example, managers' personal relationships with local business associations may allow the BG to deal with certain aspects of institutional deficiencies (Luo, 2003). Weak contract enforcement in emerging economies encourages opportunistic behaviors and inhibits exchange between strangers. Managers' business networks can provide information on reliable trading partners, reducing transactional hazards. These managerial ties can also reduce uncertainty perceived by others (Burt, 1992), and thus allow the groups to attract business partners and customers (Xin and Pearce, 1996). In addition, the ties can permit access to various resources (such as inputs, technologies and talents) when the markets for these intermediate inputs are under-developed (Guillén, 2000).

Managerial ties with non-business communities could also be valuable. For instance, when financial markets lack adequate accounting and auditing standards or when intermediaries such as investment bankers, venture capitalists and financial analysts do not exist or do not function efficiently, local ties, business related or not, can provide information and resources that are not available in the market, such as investment opportunities with lower risk of debtor default (Guillén, 2000; Peng and Luo, 2000).

Given that institutionally embedded resources are useful for dealing with idiosyncratic institutional voids (Khanna and Palepu, 2000) and they are embedded within the institutional context, they rarely support international expansion. Knowledge useful to deal with institutional peculiarities cannot typically be applied under other institutional frameworks. Managerial ties with local actors work only in the presence of these actors. Thus institutionally embedded resources are normally location-specific and not helpful in building international operations.

On the other hand, institutionally embedded resources tend to be non-specific to industries (albeit their effectiveness in various industries may vary). For instance, managers' personal network can be shared across businesses (Kock and Guillén, 2001). The reputation of BG could attract business partners and customers in various industries (Guillén, 2000). They can thus yield scope economies from utilizing institutionally embedded resources in different product areas, even when these areas lack technological synergies, because the use of institutionally embedded resources may be non-rivalrous. In other words, (technologically) unrelated domestic product diversification may emerge as a consequence of the application of institutionally embedded resources. Thus we predict that,

*Hypothesis 2a: Business groups whose managers have close ties with the local business community are likely to demonstrate a **higher** level of **domestic product diversification** than business groups whose managers do not have such ties.*

*Hypothesis 2b: Business groups whose managers have close ties with the local business community are likely to demonstrate a **lower** level of **internationalization** than business groups whose managers do not have such ties.*

Another type of institutionally embedded resources useful in dealing with institutional voids is the ability to influence government policy and to deal with political actors (Chung, 2006; Shaffer and Hillman, 2000). The lack of transparent legal frameworks and the prevalence of red tape in emerging economies increase the discretionary power of government officials. Managers' personal relationships with political actors may help circumvent administrative barriers (Peng and Luo, 2000). These political ties may also provide access to information on administrative practices and forthcoming legal changes, thus reducing the uncertainty prevailing in emerging economies. They may even allow influence on decision-making processes in the parliament or government bureaucracies (Hillman, Zardkoohi, and Bierman, 1999).

Business groups' political ties can be institutional, i.e. based on a legally defined relationship between the government and the business group's member firm. In particular, government ownership represents political capital, which helps to secure the survival of the firm even if profitability is low (Cuervo-Cazurra, 2006). Firms with state ownership may also have access to governmental resources, such as financial reserves or human capital in the form of retired politicians.

Such political ties may be utilized across industries within the institutional context — for instance, by facilitating access to government purchase contracts or subsidized finance in a variety of industries. They may also help in gaining permits to enter regulated industries such as banking and telecommunication industries (Chung, 2006). Yet these political ties work only in the local context, where the political actors dictate the rules of game.<sup>2</sup> Thus, we expect that,

*Hypothesis 3a: Business groups with close ties with governmental entities are likely to have a **higher level of domestic product diversification** than business groups without such ties.*

*Hypothesis 3b: Business groups with close ties with governmental entities are likely to have a **lower level of internationalization** than business groups without such ties.*

### **Resources Driving International Growth**

Business groups in emerging economies may possess knowledge and relationships specific for their domestic environments; yet they may also possess capabilities whose values transcend national borders and hence motivate international expansion.

One type of such capabilities stems from the international experience that their managers accumulate during overseas education or work assignments. Managers' international experience can facilitate international expansion in two ways. First, it cultivates managers' global mind-sets,

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<sup>2</sup> If businesses have preferential access to their country's foreign ministry or overseas diplomats, this might help internationalization, but only if the country is politically influential in potential foreign markets. This is not the case for our empirical field, Taiwan.

broadens managers' cognitive horizon, and thus strengthens their ability to recognize and assess new business opportunities abroad (Carpenter and Fredrickson, 2001; Sambharya, 1996). Second, managers with international experience, within the same company or not, have developed capabilities and personal networks that support their ability to manage international growth (Athanassiou and Nigh, 1999; Holm, Eriksson and Johanson, 1996). Similar benefits can be expected for managers who had spent part of their education abroad, though the network effect is probably somewhat weaker.

In contrast, managers who have been educated or worked only in domestic contexts are likely to have developed capabilities that are useful mostly in the local business environment. This is particularly relevant in emerging economies where networks and relationships often compensate gaps in the institutional frameworks (Peng, 2003; Peng and Luo, 2000). Managers learn how to deal with local institutions and develop their own personal networks when working in local businesses. These skills and networks are specific to the context and thus would not motivate international expansion. Yet they can be shared across industries and thus stimulate BG to diversify into new product areas. Hence, we expect that:

*Hypothesis 4a: Business groups whose managers have international education and/or work experience are likely to have a **lower** level of **domestic product diversification** than business groups whose managers do not have international education or work experience.*

*Hypothesis 4b: Business groups whose managers have international education and/or work experience are likely to have a **higher** level of **internationalization** than business groups whose managers do not have international education or work experience.*

Emerging economies are progressing toward market liberalization and the establishment of market-oriented institutions (Hoskisson, Eden, Lau and Wright, 2000; Peng, 2003). Thus, BG, through interacting with increasing number of foreign competitors, may develop geographically

fungible, market-based capabilities; for instance, research and development (R&D) capabilities.

The creation of R&D capabilities typically involves high fixed costs, yet marginal costs of application in different contexts are low. Thus, firms have incentives to exploit R&D capabilities in a greater number of markets in order to raise the return from their investments. Because the transfer of R&D capabilities often incurs high transaction cost with arm's-length mechanisms and is better managed within firms, R&D capabilities drive a business group's internal growth.

The international business literature typically regards R&D capabilities as geographically fungible. R&D provides the basis for firm specific advantages that enable foreign investors to generate additional rents and to develop of new routines for further applications to new locations (Anand and Delios, 2002). In fact, the desire to exploit R&D capabilities within the same organization has long been suggested as a major *raison d'être* of multinational enterprises (Buckley and Casson, 1976; Hennart, 1982).

On the other hand, the number of product areas where a particular R&D capability can be applied at any point in time is likely to be limited. This is because different products may follow different technological trajectories and draw on different bases of scientific knowledge. High product diversification may also hurt the development of R&D capabilities. A highly diversified business group tends to maintain financial control, rather than strategic control, over its various businesses in order to reduce managerial complexity (Baysinger and Hoskisson, 1989). Such controls emphasize short-term financial results and may thus lower commitment to R&D investments (Hitt, Hoskisson, and Ireland, 1990). Moreover, BG diversifying into too many product areas may provide less managerial attention and financial resources for each product area to invest in developing core competencies. Hence we expect that:

*Hypothesis 5a: Business groups are likely to have a **lower** level of **domestic product diversification**, the higher their R&D intensity.*

*Hypothesis 5b: Business groups are likely to have a **higher** level of **internationalization**, the higher their R&D intensity.*

To sum up, our core argument is that different types of resources drive growth in different directions; therefore, the predicted effects of different types of resources on domestic product diversification and internationalization point in opposite directions.

## METHODOLOGY

### Context and Data

Business groups play an important role in most Asian economies (Peng and Delios, 2006; Khanna and Yafeh, 2007), where they are associated in particular with institutional voids and rapid economic growth (Khanna and Palepu, 2000). We focus on one such context where institutional peculiarities are prevalent, where BG are major players in the economy, and where their exposure to institutions is likely to vary across firms. We found this to be the case in Taiwan, where businesses grow by forming BG to accommodate institutional peculiarities (Chung, 2001), and where BG account for a substantial part of GNP. Taiwan was also included as an economy with strong BG presence in the major studies of Khanna and Rivkin (2001) and Khanna and Yafeh, 2007), though we benefit from a larger dataset and a more recent set of firms.

Despite economic growth and technical sophistication, in Taiwan many intermediaries that support market transactions are still under construction (Luo and Chung, 2005), and networking has been shown to play an important role in Taiwanese firms' behaviors (Chen and Chen, 1998; Chen, 2003). In addition, the government of Taiwan retains considerable direct and indirect influence on businesses (Amsden and Chu, 2003; Berger and Lester, 2005). Due to the

prevalence of institutional influences, this setting has attracted researchers to investigate the interaction between institutions and business strategies.<sup>3</sup>

Taiwanese BG also provides a suitable context to analyze group-level strategies. Compared with BG in some other Asian countries such as Korea and Japan, Taiwanese BG are relatively less vertically integrated (Hamilton and Biggart, 1998). Yet, they are typically founded and controlled by common investors or families (Amsden and Chu, 2003), whose personal relationships have great influence on the development of the BG (Numazaki, 1996). Feenstra, Huang and Hamilton (2003) suggests that resource sharing may be an important explanation for Taiwanese BG activities.

Our dataset provides rare group-level data of the population of business groups. This is a distinct advantage over earlier studies and enables us to investigate BG at the group level. In particular the database includes listed and unlisted member firms.<sup>4</sup> Our initial sample consists of all 231 Taiwanese BG featured in the 2004 edition of the directory *Business Groups in Taiwan* (BGT). This directory has been published since 1972 by the China Credit Information Service (CCIS), the oldest credit-checking agency in Taiwan and an affiliate of Standard & Poor's. Missing values reduce our final sample to 184 BG with on average 28 member firms.

We follow earlier research on BG in Taiwan (e.g., Chung, 2001; Khanna and Rivkin, 2001; Luo and Chung, 2005; Mahmood and Mitchell, 2004), and adopt the BGT operationalization of BG using multiple criteria to identify firms forming part of a business

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<sup>3</sup> For example, Chung (2006) investigates the impact of managerial ties to governmental authorities on diversification moves into the banking industry once it was deregulated. Filatotchev, Lien & Piesse (2005) investigate traditionally family-owned firms facing institutional changes in capital markets and ownership structures. Child and Tsai (2005) explore how institutional constraints influence firms' environmental strategies. Luo and Chung (2005) examine how network ties influence BG' performance during institutional transition. Mahmood and Mitchell (2004) show that the relationship between market share and innovation varies across different institutional environments.

<sup>4</sup> Khanna and collaborators could only include member firms that are listed, leading to an average number of member firms of 1.4, whereas the actual number according to our source is over 28.

group. A key criterion is that 50% of the shares of member firms are owned by the same firm(s) or the same individual(s), or that member firms own more than 33% of the ownership of other member firms. Moreover, 50% of the shareholders, directors, auditors and decision makers have to be the same for the member firms. These criteria ensure that member firms of the BG in our sample are directed by common decision-makers, who would oversee the allocation of resources across the group.

The BGT directories report data of two previous years. We use data for the year 2002 from the 2004 BGT directory to measure our dependent variables, and one year lagged values (i.e. 2001 data) for all explanatory and control variables. This approach reduces possible biases arising from reverse causality.

### Dependent Variables

**Domestic Product Diversification.** We use two measures of product diversification that have been widely used in the literature, namely a count of lines of business (Lubatkin, Merchant and Srinivasan, 1993; Khanna and Palepu, 2000; Kim, Robertson and Wan, 2004) and an entropy measure (Hoskisson, Hitt, Johnson and Moesel, 1993; Delios and Beamish, 1999). Since we are specifically interested in *domestic* product diversification, we included only domestic affiliates when constructing these two measures.<sup>5</sup> *Product diversification – count* is the number of 4-digit

SIC segments in which the domestic affiliates of a business group operate. *Product*

*diversification – entropy* is calculated as  $\sum_{i=1}^n P_i \ln\left(\frac{1}{P_i}\right)$ , where  $P_i$  is the share of the  $i$ th business in

the total sales of the business group, and  $n$  is the total number of 4-digit SIC businesses of the group. This entropy measure differs from the count measure in that it is not only influenced by

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<sup>5</sup> Some groups recorded lines of business abroad that they were not serving in their domestic market. In most cases these relate to subsidiaries registered as sales units (and thus services), while the corresponding subsidiaries at home engage and manufacture and sales and are registered as manufacturing units. This peculiarity of the SIC registration procedure may create spurious diversification. Our measure of *domestic* diversification avoids this effect.

the number (i.e.,  $n$ ) of businesses that a firm enters, but is also affected by the level of concentration of the sales in each business (i.e.,  $P_i$ ). As we are interested in how many industries a business group has entered, rather than in how *concentrated* a business group's main activities are, we base our main analysis on the count measure. We obtained sales data from the BGT directory. Three researchers coded 4-digit SIC codes published by the Taiwanese government on the basis of each member firms description of products in the BGT directory.

**Internationalization.** We follow Sullivan (1994) to construct the *degree of internationalization* (DOI). It is a linear combination of *foreign sales ratio*, *foreign employment ratio*, *foreign asset ratio*, and *foreign subsidiary ratio*.<sup>6</sup> These are measured as ratios at the group level (i.e., by dividing the sales/employment/assets/number of all foreign member firms by total group sales/employment/assets/subsidiaries).<sup>7</sup> This multi-item scale has advantages over conventional single-item measure in that it reduces measurement error (Sullivan, 1994). (Data source: the BGT directory).

Our dependent variables consist of count and continuous variables. For continuous dependent variables including *Product diversification – entropy* and DOI, we employ the OLS regression analysis. *Product diversification – count* is a count variable and takes on only non-negative integer values. The most common model for handling count data is the Poisson regression model (Wooldridge, 2002), which assumes equality of mean and variance. However, in applications the variance often exceeds the mean. This situation, called overdispersion, will cause underestimation of standard errors and an inflation of significance levels (Almeida and Phene, 2004). In this case, a negative binomial regression model corrects for overdispersion and is suitable for the analysis (Wooldridge, 2002). Because our data have the property of

<sup>6</sup> 'Foreign' here refers to any activity outside the economic entity of Taiwan, independent of its legal status.

<sup>7</sup> All four single-item measures are highly correlated as shown in Table 1. Factor analysis shows that a single factor comprises DOI. The scale's reliability, as represented by the *alpha* coefficient, is 0.85.

overdispersion, we employ the negative binomial regression model.

### **Explanatory Variables**

Several of our explanatory variables concern managerial resources (such as managerial local and political ties) that drive the growth of the *overall* business group. We thus identified managers with key roles affecting the entire business group. The BGT directory generates such a list by asking member firms to identify the core decision makers who have influence over each member firm within their group. This list is also commonly used by researchers who study managers of Taiwanese BG (e.g., Luo and Chung, 2005). Based on this list, we collect data for our explanatory variables regarding managerial characteristics.

**Managerial Ties.** Knoke and Kuklinski (1982) suggest two approaches to identify networks. One approach is based on managerial subjective perception; the other is based on the researchers' viewpoints. We adopt the latter approach, as our measures should capture historical personal relationships that have driven the growth pattern of BG.

We identify managerial local ties by tracking the organizations and clubs that a manager has associated with as of 2001 from a variety of sources, including the *BGT* directory, two different versions of *Who Is Who in Taiwan*,<sup>8</sup> and *Manager Directory in Taiwan*. Social capital theory suggests that social similarity, such as shared group affiliation, increases liking and influence (Belliveau, O'Reilly and Wade, 1996; Burt, 1992). Membership in clubs and societies, helps establishing personal ties because it 'allows managers to get to know others with similar social interests, political affiliations, educational backgrounds, and professional work experiences' (Carroll and Teo, 1996: 425).

Our measure of personal networks has to capture the institutional capabilities that a manager can mobilize. It has been found that strong ties, or relation-embedded managerial

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<sup>8</sup> One is published by the Central News Agency in Taiwan, the other by Fenyunluntan Ltd.

networks, are more relevant than weak ties in innovation or other entrepreneurial activities that are associated with high risk (Moran, 2005). Since membership alone does not indicate a strong relationship between a person and other people in the same club or society,<sup>9</sup> we employ a person's involvement as a leader or a manager to capture his or her institutional capabilities. The appointment as a leader or a manager in an association indicates that the person not only is known by other members, but also is trusted by and can exert influence on other members.

To be specific, we measure managerial local business ties and other local ties in three alternative ways. First, *managerial business/other association* is a dummy variable equal to one if at least one key manager in a group has served as a leader or manager in a local business association/local private association, such as a golf club or a charity, and zero otherwise. This measure captures the *existence* of strong local ties that could provide information and resources to enter a new local business. Second, *managerial association - breath* is the number of different local business/private associations that the key managers have been involved in as leaders or managers. This measure captures the *breath* of strong local ties. Third, we measure the ties by the percentage of key managers within a business group who meet the criterion.

**Political Ties.** We capture political ties at both manager and group levels. The dummy variable *managerial political network* takes the value of one if at least one of the key managers had worked for the government, for government-related agencies, or for state-owned enterprises, and zero otherwise. Managers with such work experience should have developed personal relationships with political actors. We also measure this political tie by the percentage of key managers meeting the criterion. We coded *government ownership* as one if at least one of the member firms in the BG was partially owned by the government, government-related agencies,

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<sup>9</sup> For instance, a membership in the Academy of International Business does not provide information about whom the member knows and knows well.

or state-owned enterprises. Such ownership stakes create a channel for interaction between the group and government authorities. The shareholder information of the member firms was obtained from the *Taiwan Economic Journal (TEJ)* database.

**Managerial Foreign Education and Work experience.** *Managerial foreign education* takes the value of one if at least one key manager in the business group received overseas education, and zero otherwise. *Managerial foreign experience* takes the value of one if at least one key manager had foreign work experience, and zero otherwise. Again, we also measure these two variables by the percentage of the key managers meeting the criterion.

**R&D Intensity.** A group's *R&D intensity* was measured by the sales-weighted average of R&D expenditures as percentage of sales of the member firms, as reported in the *TEJ* database.

**Control Variables.** We control for the *size* and *age* of the BG. Larger groups may have more resources to support domestic product diversification or internationalization, while older groups may have developed more extensive managerial networks that facilitate growth. We measure *group size* by the logarithm of total sales of the business group, and *group age* as the age of the oldest member firm established in the business group.

We include two industry-level control variables in the analysis. *Core industry growth* is the sales growth of the core industry of a business group. BG in fast-growing domestic markets may have low incentives to expand into new markets. Finally, *service oriented groups* is a dummy equal to one if the main industry of a business group belongs to a service industry. Some service sectors, such as banking and telecommunication, are subject to greater government scrutiny and have greater barriers in pursuing international expansion.

Table 1 reports summary statistics and correlations for the variables. Although some of the variables were subject to transformation in the estimation, we report means and standard

deviations based on raw data in the table to simplify interpretation. The two alternative measures for domestic product diversification are highly correlated ( $\rho = 0.70$ ). The largest variance inflation factors of our empirical models are between 1.57 and 1.58, suggesting that multicollinearity does not threaten the validity of our coefficient estimates (Neter, Kutner, Nachtsheim and Wasserman, 1999).

## RESULTS

To analyze hypothesis 1, we first consult the correlation table (Table 1), and note that, as predicted, each of the specific indicators of internationalization is negatively correlated with both of the product diversification measures. A more formal test is provided in Table 2. The first model uses *count* as the domestic product diversification measure and the other employs *entropy*. Domestic product diversification is significantly negatively associated with internationalization and this effect is robust to alternative measures for domestic product diversification.<sup>10</sup> This finding strongly supports a crucial aspect of our theoretical argument — that firms face trade-offs between pursuing growth by either internationalization or domestic product diversification. A similar result for US firms was recently detected by Bowen and Wiersema (2007). With this support for our core hypothesis, we proceed to analyze the factors that would lead firms to prioritize one direction of growth over the other.

Table 3 presents the results of the determinants of domestic product diversification and internationalization respectively, using the same set of explanatory variables. Models 1 and 4 report the main results. Models 2 and 5 replace *managerial association* with *managerial association – breath*. Models 3 and 6 replace these variables with the respective ratios.

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<sup>10</sup> We ran the same equations with each of the four specific measures of internationalization and found significant negative coefficients in each case.

The results show that managerial ties with local business associations are positively associated with domestic product diversification and negatively related with internationalization. Ties with other local associations are also positively associated with domestic product diversification, but do not appear to have a significant effect on international expansion. Thus, H2a is supported while H2b is partially supported.

Consistent with H3a, *managerial political network* is positively associated with domestic product diversification, but its relationship with internationalization is not significant. Links to government through ownership stakes on the other hand, is negatively associated with internationalization, but do not have a significant effect on domestic product diversification. Thus, we conclude that H3a/b is partially supported. It is interesting to note that the relationship between managerial political ties and product diversification becomes insignificant when we employ the percentage measure (Model 3 in Table 3). This suggests that it is the presence of political ties, rather than the number of the ties, that matters to the growth direction of BG. Overall, the results show that local political and business networks encourage domestic product diversification while discouraging internationalization.

Managerial foreign education and work experience are expected to encourage internationalization (H4b) but not domestic product diversification (H4a). As expected, we find *managerial foreign experience* to be negatively related to domestic product diversification and positively related to internationalization. Surprisingly, we find *managerial foreign education* to be negatively associated with internationalization and positively associated with domestic product diversification. We discuss this unexpected finding below. Consistent with H5a, the results indicate that *R&D intensity* is negatively related to domestic product diversification. However, R&D intensity is not significantly related to internationalization. A possible reason is

that some R&D intensive member firms of Taiwanese BG are less sensitive to increased domestic wage rates and serve international markets through exports. Thus these firms have lower international employment ratios, which lead to lower DOI. A high correlation coefficient between R&D and international sales ratios (0.20) and a low correlation coefficient between R&D and international employment ratio (0.04) seem to be consistent with the conjecture. The control variables show the expected patterns: larger BG tend to have higher levels of both domestic product diversification and internationalization, while older BG have a higher level of domestic product diversification. Service-oriented BG have lower level of internationalization.

## **DISCUSSION**

Business groups achieve growth in two ways – domestic product diversification and international expansion. Our empirical results show that, due to the Penrose constraint on managerial resources, they face trade-offs between these two alternative paths. In particular, highly product diversified BG are found to have lower levels of internationalization, while those with extensive international expansion are found to be less product diversified.

We have argued that different resource endowments lead to different growth paths and thus explain variations in the scope of the firm. This argument is supported by the fact that we find opposite signs for most of our explanatory variables for product diversification (Model 1 in Table 3) and internationalization (Model 4 in Table 3). In particular, the results show that BG have a higher level of domestic product diversification when they possess location-bound resources that can be shared among different businesses. We tested this argument with various institutionally embedded resources. In terms of managerial resources, our empirical results indicate that ties with local business associations and political actors indeed lead to extensive

domestic product diversification and lower levels of internationalization. For the group-level institutional resources, we find that government ownership discourages internationalization, suggesting that government-ownership provides resources that cannot be transferred across national borders, which limits the opportunities of these firms in international markets.

Our results also show that BG expand internationally if their managerial work experience transcends national boundaries. However, we unexpectedly find that BG with foreign educated managers have *higher* levels of domestic product diversification and *lower* levels of internationalization. A possible explanation is that these foreign educated managers are second-generation leaders of family businesses. They may have been sent abroad by their parents to be trained to take over the business (Greenhalgh, 1988). Upon return, they would continue to lead the business in the spirit of the founder, rather than breaking with tradition and restructuring the organization. Appointment of family members to the managerial positions may be a reaction to inefficient local managerial labor markets. In other words, the positive association of diversification with *managerial foreign education* may be caused by business group leaders being more likely to a) send their children abroad for education and b) appoint their children as successors. To test this possibility, we identified family BG in the sample<sup>11</sup> and re-ran the regression separately for family and non-family businesses. The results in Table 4 show that managerial foreign education is positively associated with domestic product diversification *only* for family BG, consistent with our conjecture. However, complementary recent research on the same population of firms that foreign educated owners are less likely to appoint family members to the group's leadership, suggesting a gradual decline of this pattern (Chung and Luo, 2007).

This study adds to the BG literature by examining their group-level growth strategies, as

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<sup>11</sup> *Family business* is a dummy variable equal to one if at least a half of the core decision makers in a business group belongs to the same family, and zero otherwise. The result remains robust when we define family business as having a family owner in the management (Graves and Thomas, 2006).

prior research mainly focuses on analyses at the member firm level. In addition, this study contributes to our understanding of corporate diversification by combining Penrosian and institutional perspectives. Research on diversification has focused on technological relatedness as key driving force of diversification (e.g., Chatterjee and Wernerfelt, 1991). This however contrasts with the prevalence of diversification without technological linkages in BG in many economies. We argue, and show empirically, that their growth strategies are driven by institutionally embedded resources. Such resources create little value in the presence of effective market-supporting institutions but can be important otherwise. We thus provide empirical support for the argument in the theoretical literature that highly diversified BG arise from their sharing of institutionally embedded resources (Peng 2003; Peng et al., 2005).

This study moreover expands upon Penrose's *Theory* by simultaneously investigating two alternative paths of growth – domestic product diversification and internationalization. Separate streams of research have investigated the two paths of growth, but it is not clear what makes firms to choose one path over the other. Our Penrosian perspective, inspired by Meyer's (2006) research on Danish firms, relates the types of resources with growth paths. We demonstrate empirically that geographically fungible resources facilitate international expansion, while location-bound resources such as institutionally embedded resources motivate domestic product diversification. This evidence suggests that the Penrosian approach is a useful tool to explain the scope of firms and BG, and their variation across different contexts.

This study, as any other, has limitations. First, some empirical results may be partly endogenous. For instance, BG with ambitious targets of international expansion may recruit top managers with international experience. Thus resources are intentionally built with sights set on aspired growth targets, rather than resources driving the process. For instance, BG may

restructure their corporate assets in view of aspired growth paths. We regard this argument as largely consistent with our base argument as it also relates resources to growth patterns.

Secondly, any research generates insight most relevant to the specific context; in fact the institutional view implies that all strategizing is subject to context specific influences. We believe that our basic arguments would apply primarily to emerging economies, or wherever institutions and networks are important. Future research may test similar arguments in other emerging economies to confirm this contention. We expect that multi-context comparative research on BG would push forward our understanding of their dynamics. Beyond this, it is interesting to see if similar effects also exist in developed economies, as some studies suggest (Meyer, 2006). We expect them to exist, but be smaller in size.

Finally, our findings suggest that institutionally embedded resources are location specific and lead to lower levels of internationalization. However, the ability to deal with institutional deficiency might also be useful in other similar institutional environments. Future studies may thus investigate the location choice of international expansion by BG.

For management practice, the Penrosian perspective advanced in this study suggests that firms' resources inherently have the potential to generate new business activities. Smart leadership would recognize these inherent opportunities and pursue growth strategies that redeploy existing resources to new purposes, rather than aim for positions based solely of the analysis of the external market environment, as suggested by traditional strategic management tools such as industry analysis.

## CONCLUSIONS

Business groups are pivotal players in Asian economies, yet their strategies at the group level have rarely been explored. We thus have examined the determinants of the scope of BG in terms of internationalization and domestic product diversification. We found an appropriate theoretical foundation in the combination of Penrose's *Theory* with institutional perspectives. This approach proves quite powerful in explaining the growth paths of BG. In particular, we find that Taiwanese BG with institutionally embedded resources, such as managerial ties to government, are more likely to diversify domestically. In contrast, those with non-location bound resources, such as managerial international experience, tend to expand into international markets.

This study establishes that the scope of BG is grounded in strategic resources which should be institutionally defined. Conventional diversification studies neglect resources that create little value where institutions guarantee the efficiency of impersonal, market-based exchange. Yet, such resources can be useful in the presence of institutional voids. Thus, diversification and internationalization in many emerging economies may be subject to antecedents that conventional related studies have not considered. Incorporating these antecedents may substantially moderate the strategy-performance relationship (Campa and Kedia, 2002). Thus, future research ought to study the institutional context in which firms build the resources that enable them to profit from their growth strategies.

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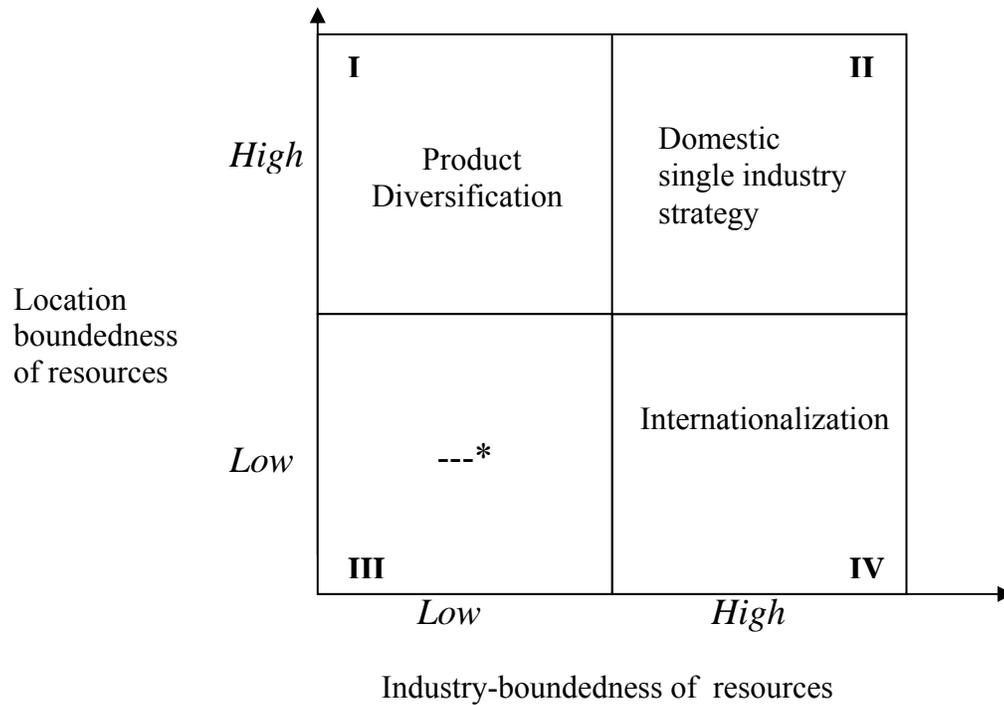
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**FIGURE 1**  
**The Nature of Resources and Firm Growth**



\* Business groups whose resources are neither country- nor industry- bound could theoretically grow in either direction. However, their opportunities for generating growth would be constrained by low barriers to entry — and thus fierce competition — in both its original and any future markets. These BG may strive to restructure by developing or acquiring new resources to escape this position.

**TABLE 1**  
**Mean, Standard Deviation, and Correlation Matrix**

	Mean	Std Dev.	1	2	3	4	5	6	7	8	9	10
1. Product diversification - Count	12.66	12.93										
2. Product diversification - Entropy	0.97	0.66	0.70*									
3. Degree of Internationalization	0.93	0.77	-0.24*	-0.14								
4. Foreign sales ratio	0.24	0.23	-0.17*	-0.05	0.90*							
5. Foreign employment ratio	0.13	0.25	-0.09	-0.02	0.73*	0.50*						
6. Foreign assets ratio	0.22	0.20	-0.22*	-0.14	0.92*	0.89*	0.53*					
7. Foreign subsidiary ratio	0.35	0.24	-0.32*	-0.26*	0.81*	0.65*	0.38*	0.69*				
8. Group size	46367.72	72414.18	0.60*	0.32*	0.11	0.11	-0.01	0.07	0.07			
9. Group age	30.05	15.26	0.19*	0.25*	0.13	0.00	0.15*	0.01*	0.03	-0.04		
10. Service oriented group	0.20	0.40	-0.08	-0.03	-0.31*	-0.32*	-0.18*	-0.30*	-0.21*	-0.09	-0.24*	
11. Core industry growth	19.41	46.15	-0.05	-0.05	-0.25*	-0.26*	-0.17*	-0.26*	-0.11	-0.06*	-0.08	0.32*
12. Managerial business association	0.07	0.26	0.24*	0.26*	-0.17*	-0.16*	-0.10	-0.16*	-0.16*	0.15*	-0.04	-0.03
13. Managerial business association – breath	0.56	1.79	0.43*	0.29*	-0.06	-0.08	0.04	-0.08	-0.10	0.14	0.06	-0.02
14. Managerial other association	0.18	0.38	0.42*	0.33*	-0.11	-0.14*	0.03	-0.14	-0.12	0.27*	0.09	0.15*
15. Managerial other association – breath	0.33	0.88	0.35*	0.26*	-0.14	-0.16*	-0.01	-0.15	-0.15*	0.33*	0.03	0.05
16. Managerial political network	0.15	0.35	0.30*	0.25*	-0.22*	-0.20*	-0.10	-0.22*	-0.21*	0.17*	0.00	0.21*
17. Government Ownership	0.46	0.50	0.16*	0.08	-0.09	-0.13	-0.07	-0.12	0.02	0.20*	-0.04	0.11
18. Managerial foreign education	0.44	0.50	0.30*	0.25*	-0.10	-0.09	-0.02	-0.10	-0.09	0.22*	0.15*	-0.01
19. Managerial foreign experience	0.56	0.50	0.00	0.00	0.53*	-0.00	0.39*	0.40*	0.51*	0.45*	-0.08	-0.02
20. R&D intensity	2.10	3.59	-0.08	-0.09	0.18*	0.20*	0.04	0.16*	0.23*	0.05	-0.10	-0.23*

**TABLE 1 (Continued)****Mean, Standard Deviation, and Correlation Matrix**

	11	12	13	14	15	16	17	18	19
12. Managerial business association	0.14*								
13. Managerial business association – breath	-0.06	0.45*							
14. Managerial other association	0.13	0.15*	0.50*						
15. Managerial other association – breath	0.06	0.21*	0.40*	0.80*					
16. Managerial political network	0.11	0.19*	0.19*	0.33*	0.18*				
17. Government Ownership	0.04	-0.04	0.09	0.11	0.07	0.20*			
18. Managerial foreign education	-0.02	0.05	0.08	0.07	0.12	0.13	0.21*		
19. Managerial foreign experience	-0.27*	-0.10	0.09	-0.07	-0.10	-0.13	0.19*	0.10	
20. R&D intensity	0.02	-0.10	-0.11	-0.09	-0.11	-0.02	0.14	0.08	0.22*

\* p&lt;0.05

**TABLE 2**  
**The Relationship between Domestic Product Diversification and Internationalization**

	Product diversification - count measure	Product diversification - entropy measure
	Negative binomial regression	OLS regression
Internationalization	-0.51 (0.06) ***	-0.20 (0.06) ***
Constant	-2.26 (0.42) ***	-2.06 (0.42) ***
Group size	0.45 (0.03) ***	0.25 (0.03) ***
Group age	0.20 (0.06) ***	0.25 (0.06) ***
Core industry growth	0.00 (0.00) **	0.00 (0.00) *
Service oriented group	-0.16 (0.13)	0.08 (0.12)
N	182	181
Chi-square for covariates	166.68 ***	
Chi-square test of overdispersion	292.12 ***	
F		15.1
Adjusted R-square		0.28

\* p<0.1 \*\*p<0.05 \*\*\*p<0.01. Numbers in parentheses are standard errors.

**TABLE 3**  
**Determinants of Domestic Production Diversification (Count Measure) and Internationalization (DOI)**

	Product Diversification						Internationalization					
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
<i>Control Variables:</i>												
Constant	-1.85	(0.47) ***	-1.94	(0.46) ***	-2.15	(0.47) ***	-0.10	(0.49)	-0.16	(0.48)	-0.31	(0.50)
Group size	0.36	(0.04) ***	0.36	(0.04) ***	0.40	(0.04) ***	0.07	(0.04) **	0.07	(0.04) **	0.09	(0.04) **
Group age	0.19	(0.06) ***	0.20	(0.06) ***	0.19	(0.07) ***	0.06	(0.07)	0.07	(0.07)	0.11	(0.08) *
Core industry growth	0.00	(0.00)	0.00	(0.00)	0.00	(0.00)	0.00	(0.00)	0.00	(0.00)	0.00	(0.00)
Service oriented groups	-0.14	(0.14)	-0.11	(0.13)	-0.12	(0.14)	-0.19	(0.14) *	-0.18	(0.14)	-0.26	(0.15) **
<i>Institutionally embedded resources:</i>												
Managerial business association <sup>12</sup> (H2)	0.38	(0.17) **			0.48	(0.27) **	-0.36	(0.20) **			-0.46	(0.29) *
Managerial business association - breath (H2)			0.08	(0.03) ***					-0.03	(0.03)		
Managerial other association <sup>a</sup> (H2)	0.35	(0.12) ***			0.37	(0.22) **	-0.02	(0.13)			-0.16	(0.23)
Managerial other association - breath (H2)			0.05	(0.06)					-0.04	(0.06)		
Managerial political network <sup>a</sup> (H3)	0.20	(0.13) *	0.25	(0.13) **	0.04	(0.22)	-0.18	(0.15)	-0.20	(0.14) *	-0.26	(0.23)
Government ownership (H3)	-0.02	(0.10)	-0.02	(0.10)	0.00	(0.10)	-0.23	(0.10) **	-0.21	(0.10) **	-0.12	(0.11)
<i>Non-location bound resources:</i>												
Managerial foreign education <sup>a</sup> (H4)	0.28	(0.09) ***	0.27	(0.09) ***	0.35	(0.14) ***	-0.20	(0.10) **	-0.20	(0.10) **	-0.28	(0.14) **
Managerial foreign experience <sup>a</sup> (H4)	-0.15	(0.10) *	-0.19	(0.10) **	-0.40	(0.13) ***	0.73	(0.10) ***	0.75	(0.11) ***	0.74	(0.14) ***
R&D intensity (H5)	-0.03	(0.01) **	-0.02	(0.01) **	-0.03	(0.01) **	0.01	(0.01)	0.01	(0.01)	0.01	(0.02)
Chi-square for covariates	150.25 ***		150.69 ***		141.28 ***							
Chi-square test of overdispersion	312.52 ***		267.69 ***		370.57 ***							
F							9.59 ***		9.36 ***		7.18 ***	
Adj R-squared							0.34		0.34		0.27	

N= 184 for Models 1-3; N=182 for Models 4-6. \*p<0.1 \*\*p<0.05 \*\*\*p<0.01. Numbers in parentheses are standard errors

<sup>12</sup> Managerial business and other association, managerial political network, and managerial foreign education and experience are measured by dummy variables in Models 1 and 4 and by ratios in Models 3 and 6. Please see the Methodology section for details.

**TABLE 4**  
**Effects of Managerial Foreign Education on Domestic Product Diversification**

	Domestic Product Diversification					
	Family Business			Non-Family Business		
<i>Control Variables:</i>						
Constant	-1.62	(0.68)	***	-1.86	(0.62)	***
Group size	0.37	(0.05)	***	0.37	(0.05)	***
Group age	0.15	(0.09)	*	0.12	(0.09)	*
Core industry growth	0.00	(0.00)		0.00	(0.00)	
Service oriented groups	-0.15	(0.20)		-0.09	(0.18)	
<i>Institutionally embedded resources:</i>						
Managerial business association	0.23	(0.22)		0.51	(0.26)	**
Managerial other association	0.12	(0.17)		0.31	(0.19)	*
Managerial political network	0.25	(0.18)	*	0.14	(0.20)	
Government ownership	0.22	(0.15)	*	-0.09	(0.13)	
<i>Non-location bound resources:</i>						
<b>Managerial foreign education (H4)</b>	<b>0.25</b>	<b>(0.14)</b>	<b>**</b>	<b>0.07</b>	<b>(0.14)</b>	
Managerial foreign experience	-0.22	(0.14)	*	-0.22	(0.13)	*
R&D intensity	-0.04	(0.02)	**	-0.01	(0.02)	
N	74			110		
Chi-square for covariates	77.16	***		63.41	***	
Chi-square test of overdispersion	140.97	***		106.74	***	

\* p<0.1 \*\*p<0.05 \*\*\*p<0.01. Numbers in parentheses are standard errors