

An study of diversification and business group performance

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Abstract

As one distinctive phenomenon in emerging countries, business groups gradually draw attention from practitioners and academics. Many studies have discussed the relationship between diversification and business group performance, but many of them focused on the relationship between diversification and a member firm's performance. The present study explored impacts of different diversifications on performance of a whole business group performance. The results showed that diversification is beneficial to a business group. Among the three types of diversification including related diversification, unrelated diversification and geographic diversification this study explored, all are positively related to business group performance. The finding indicated that a business group performs better when it diversifies internationally and into different industries.

Keywords: business group, diversification, performance

Introduction

Emerging markets has gradually drawn much attention from researchers and practitioners. Among emerging markets, business groups are common and play important roles, especially in developing countries (Leff, 1978). For example, chaebols in Korea accounted for 40% of Korea's total output and 14% of GNP in 1996 (Chang & Hong, 2002). In 2002, the business group accounted for 24.3%, 24.9%, 39.6%, and 56.2% on countries' stock exchanges of total market capitalization in Thailand, Malaysia, Singapore, and Taiwan, respectively (Chang, 2006). In Taiwan's economy, business groups contributed nearly 30% of GNP while accounting for only 5% of the number of firms in Taiwan. All of these indicated the significance of business groups in emerging countries.

A business group, as a network, is different from an independent firm which is an entity. Through coordination and cooperation, a business group could pool more resources together and use them synergetically than individual firms (Khanna & Rivkin, 2001). Business groups gather members of the network and have more resources and supports to operate under a group umbrella, such as multi-market power, related resources, informational imperfections, entrepreneurial scarcity and policy distortions (Ghemawat & Khanna, 1998).

Business groups fulfill many institutional voids in emerging markets (Khanna and Palepu, 1997). According to transaction cost view, firms choose to internalize transaction markets when external market cost is higher than internal market cost. Institutional voids in many emerging markets result in the emergence of business groups in emerging markets. Lack of many institutions such as capital market, labor market, product market, government regulation and contract enforcement forced many firms to internal these markets and eventually these firms transformed into business groups (Khanna and Palepu, 1997). In order to internalize the institutional markets, business groups have to diversify into several industries and diversification is thus considered as the hallmark of business groups. Consequently, diversification, no matter related or unrelated, is one defining characteristic of business groups (Cuervo-Cazurra, 2006)

Diversification has always been an important issue in strategic management. Many researches discussed the relationship between diversification strategy and firm performance. The issues include firm performance with "degree of diversification" (Geringer, Tallman & Olsen, 2000), "product diversification" (Mayer & Whittington, 2003; Qian 1997), "geographic (or international) diversification" (Delios & Beamish, 1999; Thomas, 2006; Qian and Li, 2002) and so on.

However, a business group has more resources than a firm does to take part in diversification activities. There may be something different between the impacts of business group and diversification strategy. As a result, many researchers have explored the relationship between business group diversification and member firms' performance (eg., Chang & Hong, 2000; Khanna & Palepu, 2000; Singh, Nejadmalayeri & Mathur, 2007).

Most of researches about business group diversification and performance focused on member firm's performance rather than the whole business group's performance. These studies took a member firm as unit of analysis (eg., Chang & Hong, 2000; Khanna & Palepu, 2000). Yet, a business group is an interorganizational network with a core entity (Murisitama, 2006) and the core entity emphasizes on the whole business group's performance rather than the single member firm's performance. The present study aims to explore the relationship between performance of the whole business group and diversification which means that our unit of analysis is business group. Through focusing on the performance of a whole business group, we not only want to make a theoretical contribution toward strategy theory by examining the relationship between the diversification strategy and the performance of business group, but also hope to practically provide some suggestions to the top management team of business groups core entity about the performance of the whole business group..

The research context of this study is high-tech business groups in Taiwan. There are two major reasons for us to take high-tech business groups in Taiwan as our research context. First, Business groups controlling abundant tangible and intangible assets influence Taiwan's economy to a great extent. In 2002, the business group accounted for 56.2% on countries' stock exchanges of total market capitalization in Taiwan (Chang, 2006). In Taiwan's economy, business groups contributed nearly 30% of GNP while accounting for only 5% of the number of firms. Among these business groups, two-fifth of them is involved in high-tech industry which has great impacts on Taiwan's economy and the whole world's 3C community.

Second, the diversification degree of business groups in Taiwan also disperses to a great extent. For example, acer is highly international diversified and Foxconn is highly industrial diversified while D-Link is a business group with low international diversification in our measurement. The broad range of diversification degree of Taiwan's business groups makes them a good sample when testing the relationship between diversification and business group. The broad range of diversification and the important position of high-tech business groups in Taiwan's economy are two main reasons that we use Taiwan's high-tech business groups as the research context.

Literature Review and Hypothesis Development

Business Groups

Many researchers have made several definitions for business groups. Granovetter (1994) noted that a business group is a collection of firms bound together in some formal and/or informal ways. Alternatively, it can be defined as a gathering of formally independent firms under the single common administrative and financial control of one family (Chang & Hong, 2000). According to Khanna and Rivkin (2001), a business group is a set of legally independent firms which are bound together by formal and informal ties and accustomed to taking coordinated actions. Business groups usually consist of individual firms that are associated by multiple links including cross-ownership, close market ties, and/or social relations through which they coordinate to achieve mutual objectives (Yiu, Lu, Bruton & Hoskisson, 2007). From these different definitions, we can conclude that business groups have two distinctive characteristics from the other business organizations (Yiu et al., 2007).

The first characteristic is that the member firms in a business group are legally independent but bounded together by various ties. The ties enable member firms to coordinate their actions (Khanna & Rivkin 2001). There are five key types of ties among member firms in a business group: cross-shareholding, interlocking directorates, loan dependence, transaction of intermediate goods and social relationships (Goto, 1982). These different ties are numerous and overlapping and they span the economic and the social, the formal and the informal (Khanna & Rivkin 2001). Among different ties, the social ties (or the informal ties) play a significant role in the business group. It is the potential reliance on social relations that differentiates a business group from other organizational forms such as a multinational corporation or a holding company. In the latter two organizations, economic ties are much more important than social tie. However, in a business group, social ties do matter much more than economic ones (Yiu et al., 2007).

The second characteristic of business group is the core entity or administrative center offering common administrative or financial control (Leff, 1978), or managerial coordination among member firms (Khanna & Rivkin, 2001). The core entity has high autonomy and control over resources and information, which makes it possible for the core entity to influence other member firms in the business group (Yiu et al., 2007). Business groups provide the function of cooperation and coordination. Among the business group, the one to direct the activities of cooperation and coordination is the core entity. The presence of the core entity differentiates a business group from a horizontal network in which no network member is subject to the

dominant control of other member firms in the network.

Combining the two characteristics, a business group is analogous to an organization where a powerful parent company is surrounded by offspring organizations, namely the group affiliates or member firms. The parent company has the authority or dominant ownership superior than the member firms (Yiu et al., 2007), which enables to direct and command the offspring organization achieve the goal of the business group through coordination and cooperation.

According to Caves (1989), business groups represent a response to market failures and associated transaction costs. In addition to the response to market imperfections, Leff (1978) argued that business groups serve three primary functions. First, business groups help to appropriate quasi rents. Second, when external markets are absent for risk and uncertainty, business group offers an alternative to portfolio diversification. Third, business groups decrease the problem of bilateral monopoly or oligopoly through the use of vertical integration. Business groups replace poorly performing or nonexistent economic institutions that are taken for granted in developed countries (Khanna & Palepu, 2000). That is also one of reasons that business groups mostly appeared in emerging or developing countries where economic institutions or external markets are not readily complete. This suggests that business groups offer an alternatively efficient form of governance under certain circumstances.

Business groups have some advantages or potential benefits that independent firm lacks. For example, business groups engender various benefits from interfirm cooperation such as access to complementary resources, access to distribution outlets, economies of scale and scope, shared costs and risks (Kim & Hoskisson ,1996). In addition, business groups provide a better mechanism to monitor managers when the markets for corporate control are not completely developed. Business groups also represent risk sharing mechanisms through distributing the risk to member firms (Chang & Hong, 2000). Once a member firm is in need of support, it can be assisted by other member firms.

Because the business group is a response to imperfect market or nonexistent market, it can facilitate the profitability of member firms by filling the voids left by the missing institutions that normally underpin the efficient functioning of products, capitals and labor markets (Khanna & Rivkin, 2001). The capital may flow from a less productive member firm to another outperforming member firm. Information may exchange among member firms by formal or informal channels.

Advantages of diversification for firms

There are several advantages for firms to diversify, whether industrial diversification or geographical diversification. Diversification can be driven by a number of perceived potential benefits associated with more efficient allocation of resources through internal capital markets, greater market power, utilization of excess resources or assets, reduced performance variability by the portfolio of imperfectly correlated set of businesses (Chakrabarti, Singh, & Mahmood, 2007)

The first advantage is internal market efficiencies. Gains from diversification often relate to market failure (Ghemawat & Khanna, 1998). When the firm focuses on a single industry, it would be difficult for the firm to leverage its resources and capabilities efficiently to other products/industries/countries (Palich, Cardinal & Miller, 2000). By diversifying, firms create internal markets that may be more effective than inefficient external markets (Ghemawat & Khanna, 1998). Internalization of markets offers some benefits to firms such as economies of scale, scope and learning (Caves, 1982) and sharing core competencies among different business segments and geographic markets (Hamel, 1991).

The diversified firm has more flexibility and opportunity in capital formation because it can alternatively choose external market or internally generated resources (Lang & Stulz, 1994). When a diversified firm wants to grow, it can not only attract external capital for expansion, but transfer the internal resources or capitals from its portfolio (Palich, Cardinal & Miller, 2000). Diversification makes it possible for the firm to generate efficiencies from internal market that are unavailable for the single-business firm.

The next is market power advantage. Diversified firms employ several mechanisms and opportunities to create and exploit market power advantages which might be unavailable to focused firms (Caves, 1981). One important benefit from market power advantage is predatory pricing which is generally defined as sustained price cutting designed to drive the existing competitor out of the markets or discourage potential rivals from future entry. Diversification makes it possible for firms to blunt the efforts of competitors via predatory pricing. While predatory pricing causes losses, the losses usually are offset with gains from future profits. In addition, diversified firm can cross subsidize the losses with the revenues from other product line to support another (Palich, Cardinal & Miller, 2000).

Beyond the advantage of market power and internal market efficiency, better allocation and maximized utility of the resources is another benefit of diversification. Due to superior access to information, diversified firm can optimize the allocation of the resources (Palich, Cardinal & Miller, 2000). For example, the management of the

diversified firm can direct capital away from slow-growing, cash-generating, operations to businesses that are expanding rapidly and have greater commercial and profit potential but need investment. Diversification may also permit a firm which has firm-specific resources that are difficult to be sold out due to transaction costs or other imperfections to exploit the resources that would be underutilized in other business (Markides, 1992). Focused firms do not have multiple businesses to enjoy scope economies. Diversified firms have the opportunities to exploit between-unit synergies or the portfolio effects that are not available for focused firms (Lubatkin & Chatterjee, 1994). Single-business firms suffer from limited economies of scope and other disadvantages.

From the viewpoint of risk spreading, diversified firm would be better than focused firm because of its portfolio of imperfectly correlated set of businesses. According to Lubatkin and Chatterjee (1994), focused firms bear greater risks since they did not spread the risks by diversifying into several less perfectly correlated businesses.

One of the reasons for conflicting results in previous studies about the relationship between group-level diversification and performance may be that few studies explored the impact of different diversification forms on the firm's performance. Here, we divided group-level diversification into three different forms: related diversification, unrelated diversification and geographic diversification.

Group-level related diversification and performance

One advantage of diversification is the economies of scope. According to Nayyar (1992), related diversifiers involved in several industries are able to tap a common pool of corporate resources. Since related diversifiers are related in certain areas, the business group is capable of sharing resources or competences by bundling products, enjoying the windfall from a positive brand reputation, and the like (Barney, 1997). By sophisticated designing portfolio of mutually reinforcing businesses, the operational synergies are generated by related diversifiers (Palich, Cardinal & Miller, 2000). As a result, related diversification may have superior advantage derived from economies of scope (Markides and Williamson, 1994). By the efforts as 'asset amortization' referred by Markides and Williamson (1994), a diversified firm is able to distribute the cost of an asset which is already capitalized by spreading its use across multiple operations.

In addition to the economies of scope, related diversifiers can convert underutilized assets by sharing resources and combining activities along the value chain. Just as the advantage of maximizing the utility of assets we have discussed

above, related diversification helps to utilize the intangible assets and knowledge by spreading them across other operations such as intra-firm product/process technology diffusion. Beyond the advantages that we mentioned above, related firms may also benefit from learning curve efficiencies and restricted access to factors of production that are necessary for operating in a specific industry (Barney, 1997).

All of these advantages may contribute to a better performance for the related diversifiers. In addition, based on financial performance, Doukas (2003) found that related diversification is value-increasing for firms. When a firm engages in core-related investment transactions, it achieves higher gains and significant positive abnormal returns and profit margin gains.

One important reason for related diversified business groups is that those related businesses may employ common or complementary resources such as technology, plants, brand names or distribution systems (Ghemawat and Khanna, 1998). Once these resources feature scale or scope of economies which cannot be effectively exploited through market transactions, it may be beneficial to business group to set up several different but related business or firms to make best use of these resources. As a result, a more related-diversified business group may perform better than less related-diversified one because of the better utility of scale or scope of economies.

Considering the features of business groups, namely, more efficient internal markets than external markets, as well as the network that is constituted by legally independent firms but cooperates with each other, business groups are more likely to achieve the benefit of related diversification. Through the internal markets between legally independent firms, business groups tend to achieve market efficiency and reduce organizational inertia. On the other hand, the legally independent firms belong to the same network which may reduce the transaction cost and opportunism.

Specifically, business groups usually exist in emerging countries where the external institutional environments are not complete or stable. Under these imperfect contexts, business groups are more likely to attain the internal market efficiency compared to independent firms. By diversifying through creation of related firms, a business group typically attempts to exploit inefficient or absent markets and institutions in emerging economies (Chakrabarti, Singh & Mahmood, 2007). Thus, we proposed the first hypothesis:

H1: Group-level related diversification is positively related to the performance of a business group.

Group-level unrelated diversification and performance

One advantage of related diversification is the sharing resources and competence among the divisions. While when it comes to unrelated diversification, due to the difficulty of sharing activities and transferring competences among different units, the costs of diversification seem to increase with unrelated diversification (Palich, Cardinal & Miller, 2000). Unrelated diversification may also interfere with the firm's core business operations and lead to significant operating inefficiencies resulting in negative synergies among the different business segments. As a result, firms diversifying outside of their core businesses or competences may increase costs that might outweigh the potential benefit of unrelated diversification. Compared to related diversification, unrelated diversification seems unable to exploit the advantages of economies of scope and internal market efficiencies.

Unrelated diversification reduces the corporate focus of the firm and its existing operating efficiency (Doukas, 2003). In addition, Doukas (2003) found that multi-segment firms and single-segment firms both experience significant shareholder value losses when pursuing non-core-related international investments. The result implied that a business diversifying outside its core business, namely the unrelated diversification, would reduce its existing operating efficiencies and corporate cohesion due to lack of good fit and coordination with the core business of the firm. According to the explanation of Doukas (2003), the decrease in corporate focus is an important determinant of the unrelated diversification loss. Also, the misallocation of management time and other resource across business segmentation which are less likely to occur in related diversifying firm is one impediment to the performance of unrelated diversification.

It is realized that unrelated diversification hampers a corporation's performance because the lack of efficiency, coordination, cohesion and focus. While a business group contains several legally independent firms which seem not to have the problem of inefficiency and less corporate focus. With multiple legally *independent* firms managed by each firm's own CEO or top management team, a business group enjoys the advantage of spreading risk by unrelated diversification without the problem of losing its operating efficiencies and corporate cohesion. Although the affiliated firms belong to the network of business group, they are independently operated and have their own operation plans and strategies which prevent them from the lack of focus of unrelated diversification.

One important feature of a business group is the core entity or administrative center offering common administrative or financial control (Leff, 1978), or managerial coordination among member firms (Khanna & Rivkin, 2001). The core entity has high autonomy and control over resources and information, which makes it

possible for the core entity to influence other member firms in the business group (Yiu et al., 2007). Even that the member firms in a business group is unrelated, they are partially coordinated by the core entity. Thus, even the business group is unrelated diversified, it can still achieve the goal of coordination. Thus, we proposed the second hypothesis:

H2: Group-level unrelated diversification is positively related to the performance of a business group.

It is worth noted that related diversification and unrelated diversification are not two poles of a spectrum in our concept. A firm with more related diversification may not be less unrelated diversified than a firm with less related diversification. Although related diversification and unrelated diversification may be negatively related, they are not perfectly related and we treated them as two different concepts. Thus, we tested these two diversification strategies separately.

Group-level international diversification and performance

International diversification can be defined as a firm's expansion across different national borders. From Chandler (1962)'s point of view, international diversification represents a growth strategy that may be beneficial to a firm's performance. Similar to the advantage of related diversification, international diversification also offers some potential benefits to firms. Through internalizing markets, international diversification has the advantages of economies of scale, scope and learning as well as sharing core competences among several areas. International diversification offers market opportunities which provide firms with the opportunity to grow (Buhner, 1987).

Internationally diversified firms with strong competences developed at home have the chances to utilize the competences in international markets. When a firm is more involved in international market, it has more opportunities to exploit its tangible and intangible resources which are expected to generate higher performance (Hymer, 1976, Thomas, 2006). Since foreign direct investment into new national markets increases a firm's ability to utilize its intangible assets, foreign direct investment projects enhance the performance of the firm when they are directed in new countries where the firm does not have operations (Doukas, 2003).

In addition, because foreign operations have greater growth opportunities than domestic operations, gains from foreign direct investment are larger when firms expand into new markets which implies that geographic diversification positively impacts on firm value (Doukas, 2003). Multinational firms have more opportunities to integrate their activities across borders by standardizing products, rationalizing

production, and allocating their resources more efficiently and effectively (Kobrin, 1991). By exploiting market imperfections, such as a less competitive environment, as well as cross-border transactions, multinational firms can gain additional competitive advantages.

If we perceive firm value as a firm's performance, several studies have concluded that international diversification increases the firm's performance. For example, Errunza and Senbet (1984) found support of a positive relationship between excess firm value and the firm's extent of international diversity. Morck and Yeung (1991) found a positive relationship between international diversification and firm value. For the shareholder value, Bodnar and Gebhardt (1999) found that shareholder value increases with global diversification. All of the studies above have shown that firm value is positively related to international diversification.

In a business group, the multiple ties among member firms enable them to take coordinated actions. Members of a business group may present a unified form to outside constituencies in different countries (Khanna & Rivkin, 2001). Similar to the concept of global strategic motivation (Kim & Hwang, 1992), we believe that business group with international diversification also have the same consideration. Global strategic motivation is defined as motivation which fulfills strategic aims set at the corporate level for the purpose of overall efficiency maximization (Kim & Hwang, 1992). In a business group where it is much easier to cooperate and coordinate than other independent firms, global strategic motivation may be more effectively achieved. According to Kim and Hwang (1992), to effectively achieve global strategic motivations, tight coordination across global business units is especially important.

A business group is more likely to achieve the global strategic motivation when the business group operates in more international markets. Higher amounts of international markets represent more repertoires for a business group to choose from and more possibility to achieve the global strategic motivation which results in higher performance.

In addition, an international diversified business group enjoys the benefit of multimarket power. Firms interacting in many different markets may be able to use those multiple interactions to support a less rivalrous interaction (Ghemawat & Khanna, 1998). As a result, we believe that the performance of a business group would increase with the number of the international markets it has operated in. Thus, we proposed the third hypothesis:

H3: Group-level international diversification is positively related to the performance of a business group.

Methodology

Data

We used the high-tech business groups in Taiwan as our sample. In Taiwan, the total revenue of the largest 250 business groups amounts to US\$558.323 billions which is 48.84% of the revenue of overall business sectors. Business groups play important roles in the economy of Taiwan. We believed that business groups in Taiwan would be a good sample set in the study. The data used were compiled from '*Business Groups in Taiwan 2007*' which is published by China Credit Information Service, Ltd. The information for more than 6,000 companies from nearly 300 groups was reported in the publication. The data available include a firm's name, address, telephone, fax, industry, total assets, net sales and financial indices, etc., China Credit Information Service, Ltd. has published the data since 1970 and several studies about business groups in Taiwan have used this source of information.

We defined a business group as a high-tech business group when the core entity or core firm of the business group is a high-tech related firm. Among 350 business groups in the database, there are 101 high-tech business groups as our sample set. We ruled out holding companies and investing companies in each business groups to clearly find out the effects of diversification, and after the process, there are a total of 2140 member firms in these 101 business groups. The characteristics of the sample are as follows: The mean numbers of member firms of the sample were 23.78, with a range from 2 member firms through to 188 member firms. The number of foreign countries ranged from 2 countries to 36 countries, with the average number for foreign countries being 7.42 countries.

Measurement

Performance of business group. The dependent variable of this study is the performance of a business group. Because each business group contains different firms and industries, it would be difficult to use market indices such as market share. We used a financial index to measure the performance of business group, namely the net value of each business group (Hendershott, 2004). Since the unit of analysis of this study is business group, it is difficult to get the overall performance of a business group. There are many small and medium sized firms in a business group and it is hard to get the financial data of these firms. Thus, due to data availability, we have no other choice but to use net value of each business group as the dependent variable. We recognize that net value is not the best index to measure the performance of a business group and it may be influenced by the business group size, therefore, we included the business group size as a control variable trying to minimize the impact of business

group size.

Group-level related diversification (RDF). We carried out the measurement based on four-digit SIC (Standard Industry Code) industry classification. We defined a line of business by the four-digit SIC code augmented by a procedure similar to the one used by Doukas (2003). We defined the industry of the core firm of a business group as the primary industry in the business group. If the four-digit SIC code of a member firm is identical to the primary industry, it was recorded as a related diversified member firm. We used a Herfindahl index to measure related diversification. We determined the Herfindahl index by calculating the sum of squares of the proportion of assets of related diversified member firms in total assets of all member firms in a business group.

Unrelated diversification (UDF). A similar Herfindahl index was used to measure unrelated diversification. We defined a member firm as an unrelated diversified member firm if the four-digit SIC code of the firm is different from the primary industry. The Herfindahl index was calculated for the sum of squares of the proportion of assets of unrelated diversified member firms in total assets of all member firms in a business group.

International diversification. We measured international diversification as two different concepts: the breadth and the depth of international diversification. The breadth of international diversification (BIDF) is measured as the number of foreign countries where the member firm is founded. We want to grasp the concept of breadth of international diversification for three reasons. The first is risk sharing. Through the portfolio of investments in different countries and economies, a business group has the ability to share the business risk, political risk or other risks in a country. The second reason is global strategic motivation. To achieve the motivation, a business group may want to establish member firms in different countries. The last reason is to explore and exploit the resources in different countries. In order to acquire the resources efficiently or cheaply, a business group may set up several member firms in different countries. Thus, we adopted the concept of breadth of international diversification in the study.

We measured the depth of international diversification (DIDF) as the number of foreign member firms divided by number of foreign countries. In order to realize the importance of certain foreign markets and the emphasis of a business group put on these foreign markets, we adopted the concept of depth of international diversification. Once the foreign market is perceived to have large potential for the business group, the core entity of the group may set up several member firms in the countries to

penetrate the market. Thus, we also adopted the concept of depth of international diversification in the study.

Control variables. We included two control variables, business group size and business group age, to examine the relationship between the independent and dependent variables. Business group size is based on total numbers of employees in a business group, controlled for size-related impacts on performance (Chakrabarti et al., 2007). Natural logarithmed value for business group size is used. We used business group age measuring resource availability and constraints for the business group (Chang & Hong, 2002) which may have impacts on the performance of the business group. We counted the number of years from the year core entity was established to 2008 as business group age.

Result

We used ordinary least square (OLS) regression analysis to test the study's hypothesis. Descriptive statistics of the variables along with correlation values are presented in Table 1. A review of the correlation table showed that all the correlation values among independent variables excluding DIDF and BG size are less than 0.5. In addition to correlation coefficients, all variance inflation factors (VIFs) had values lower than 2. Both of these values suggest that multicollinearity did not threaten parameter estimates.

From Table 1, it can be seen that Related DF is negatively correlated with Unrelated DF, Depth of IDF, Breadth of IDF, BG size and net value. This means that when a business group is more related diversified, it is less unrelated diversified, international diversified, smaller and the net sales is lower. Unrelated DF is positively correlated with Breadth of IDF. A business group's depth of international diversification is higher when it is more unrelated diversified. Depth of IDF is positively correlated with Breadth of IDF, BG size and net value. A business group with deeper international diversification is also broader in international diversification and higher net value. Breadth of IDF is positively correlated with BG size and net value which means a business group with broader international diversification has higher net value. BG size is correlated with net value indicating that larger business group has higher net value.

Overall, the significant correlation among net value and other variables including RDF, UDF, DIDF, BIDF, BG size and BG age implicitly indicated that net sales may have some relationships with these variables. This initially proved our hypothesis in this study.

Table 1 Means, standard deviations and correlations (n=101)

	Mean	Std. Dev.	1	2	3	4	5	6
1. Related DF	0.45	0.27	1					
2. Unrelated DF	0.023	0.05	-0.49**	1				
3. Depth of IDF	2.86	1.69	-0.41**	0.10	1			
4. Breadth of IDF	7.42	5.27	-0.42**	0.22*	0.30**	1		
5. BG size ^a	12.49	29.77	-0.30**	0.15	0.51**	0.45**	1	
6. BG age	21.69	7.28	-0.16	0.08	0.16	0.118	0.24*	1
7. Net value ^b	312.66	664.56	-0.11	0.18	0.43**	0.35**	0.51**	0.15

^amillion of NTD

^bbillions of NTD

* significant at the 0.05 level (2-tailed)

** significant at the 0.01 level (2-tailed)

Table 2 contains the results of the analysis. Both models presented in Table 2 are significant at $P < 0.001$. In model 1, out of our expectation, only BG size is positively related to net sales ($\beta = 0.50$, $P < 0.001$). The beta coefficient indicated that when a business group is larger, it has higher net sales. .

In model 2, BG size remains significant as in model 1. The result in model 2 indicated that Related DF is positively related to net value which supported the first hypothesis ($\beta = 0.45$, $P < 0.001$). A business group with higher related diversification has higher net sales. Regarding to the unrelated diversification, the second hypothesis suggesting that Unrelated DF is positively related to net value is supported ($\beta = 0.21$, $P < 0.01$). The third hypothesis is supported that both Depth of IDF and Breadth of IDF are positively related to net sales. A business group with either deeper or broader international diversification has higher net sales.

Table 2 Results of regression analysis ^a (n=101)

	Model 1	Model 2
Control variables		
BG age	0.02	0.02
BG size	0.50***	0.45***
Independent variables		
Related DF		0.45***
Unrelated DF		0.22**
Depth of IDF		0.30**
Breadth of IDF		0.20*
Adjusted R ²	0.26	0.38
Change of R ²		0.12
F value	16.15***	11.26***

*** $P < 0.001$, ** $P < 0.01$, * $P < 0.05$, † $P < 0.1$

^a Standardized coefficients are reported.

Although the results of Table 2 indicated that related diversification is positively related to net value, it is worth noticing that related diversification is negatively correlated with net sales in Table 1. One possible reason is that there may be a common cause influencing the relationship between related diversification and net sales. Multicollinearity is one possibility to the conflicting result. We conducted a robust test taking related diversification as a dependent variable and other variables as independent variables in a regression analysis to examine possible reasons. Table 3 presented the results of robust test. The results indicated that related diversification is positively related to all variables excluding BG age. This means that there may be some unstudied relationships among these variables and these relationships influence the conflicting results.

Table 3 Results of robust test ^a

Dependent variable	Related diversification	Net sales
Control variables		
BG age	0.036	0.02
BG size	-0.303**	0.30**
Independent variables		
RDF		0.18*
UDF	-0.363***	0.14†
DIDF	-0.173*	0.32***
BIDF	-0.148†	0.41***
Adjusted R ²	0.444	0.55
F value	16.990***	21.30***

***P<0.001, **P<0.01, *P<0.05, †<0.1

^a Standardized coefficients are reported.

Since the net value is not the best measurement in the literature, we ran another regression analysis to test the robustness of our hypothesis. We took a business group's net sales as the dependent variable in the robust test. Also, we acknowledged that net sales is not a best measurement to measure performance, we controlled the business group size as we ran the robust test. From Table 3, it can be seen that all the variables including BG size are positively related to the dependent variable, net sales. The results confirmed the robustness of our hypothesis.

Discussion and Conclusion

The objective of this study is to investigate the relationship between diversification of a business group and its performance. Business groups are an

important phenomenon in many emerging and Asian countries. With the rising significance of these emerging economies, it would be helpful for academics and practitioners to further explore business groups in these economies. Although many previous studies have discussed the relationship between diversification strategy and firm performance (for example, Palich, Cardinal & Miller, 2000; Palepu, 1985), most studies are based on firm level rather than on business group level. To our best knowledge, there are still no study investigating the relationship between diversification and performance of a business group which are worth examining to inform both scholars and practitioners.

As a network with one core entity to coordinate among member firms that are legally independent but bounded together, a business group is different from an independent firm in nature. Thus, we believe that the impacts of diversification strategy on performance of a firm are also different from those on performance of a business group. The results of past studies based on firm level may not be applied on business group level. From this consideration, the present study examined the relationship between diversification and performance of a business group and hoped to find out some differences.

We divided diversification into two types: industry diversification and international diversification. About the impacts of industry diversification, the results indicated that it is positively related to performance of a business group. Unlike independent firms, a business group not only has advantages of industry diversification that an independent firm has, but also avoids the drawbacks of industry diversification that an independent firm has. Therefore, a diversified business group either involved in related industries or unrelated industries has higher performance than a focused business group.

As for international diversification, the results showed that both depth and breadth of international diversification are positively related to performance of a business group. If we compared a business group with a multinational corporation, a business group has the ability to attain the goal of global strategic motivation like a multinational corporation, meanwhile, it has the advantage not to spare manager's attention too much to manage foreign markets that may sometimes decrease the performance of a multinational corporation. Thus, just like the effect of industry diversification on a business group's performance, a business group with higher international diversification would perform better than a business group with focused markets.

The findings offer some implications for managers of a business group. In a

world that more and more focused on expertise and core competence, many firms have found that they have to focus on their main business to get a better performance. While we found that this may not be applied to a business group, a business group performs better if it adopts a diversification strategy and diversifies into different industries and foreign market. The reason for this is a business group can gain the advantages but avoid the disadvantages that diversification strategy brings to a firm. Thus, to gain better performance for a business group, it would be a possible strategy to diversify either into different industries or international markets.

The study, as most research studies, is characterized by the inherent limitations of the research process. There are four primary constraints. First, as a cross sectional model, the study is unable to determine the causal relationship between diversification and performance of a business group. It is possible that a business group with better performance has more resources and capabilities to diversify than a business group with poor performance. It is the abundance of resources and capabilities that enhances the performance level of the diversification for a business group. Thus, we suggest that longitudinal study be conducted in the future to realize thoroughly the causal effects.

Second, the study proposed that a business group has advantages that an independent firm may not have when it diversifies and a diversified business group would perform better than a focused business group. We didn't examine the mechanism among diversification and performance and were unable to prove the accuracy of our rationale about this. It would need a further discussion to understand the mysterious process how business group diversification affects its performance. We suggest a qualitative study, such as case study to investigate the black box of a business group.

Thirdly, exclusive focus on business groups in Taiwan's high-tech industries limits the generalizability to those in other countries. We limited our sample set as business group in high-tech industries. There are great variances among different industries that influence the relationship between diversification and performance. In addition, business groups in different countries still have some dissimilarities and variations, no matter in structure or features. These may have some influence on the relationship as well. Thus, we suggest a broader sample set in future research to find out these possible effects.

Last, due to data availability, we were unable to have access to better measurement of performance of a whole business group. This constrained the explanation power of our result since we measured our dependent variable,

performance of business group, by net value of the business group which is not a common measurement in the literature. Although we have controlled for business size in our model, we need to keep this constraint in mind when explaining the result of this study.

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