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Influence of Technological Capabilities on Corporate Performances: The Case of Taiwan

Yi-Dan Huang* and Hsu-Wei Hsu**

The development of technological capabilities leads to fundamental changes of corporate strategies. Hence, an examination of technological capabilities of corporation is critical. Moreover, if corporations are member of business groups, the corporate strategies will be affected by business groups. Therefore, it must incorporate viewpoints of company and business group to explain clearly the relationship between structural characteristics of technological capabilities and overall competitiveness in the network. This study applied multilevel research to investigate the influence of technological capabilities on corporate performances, as well as the hierarchical moderating effects of technological diversification of business groups on technical/scale characteristics and performances of subsidiaries. This study analyzed 315 subsidiaries embedded in 60 business groups to examine hypotheses. The result supported the influence of technological capabilities over performances and the hierarchical moderating effect of technological diversification on technical/scale characteristics and performances of subsidiaries in business groups. The findings can makes up the insufficiency in existing literature addressing the hierarchical moderating effect in the context of network embeddedness for business groups.

Keywords: Technological Capabilities, Firm Size, The Hierarchical Moderating Effect, Technological Diversification of Business Groups, Performance

1. Introduction

The issues surrounding technological capabilities have attracted more and more attention. In Taiwan, the focus in the 1970s was on labor-intensive industries, and moved toward technology-orientations in the 1990s. When labor-intensive human capital is no longer a competitive advantage, it is critical to understand how technological capabilities affect operations. To understand the technological developments, an increasing number of studies resort to patents data, in addition to direct investigations into technologies. Studies indicate that patents can serve as a proxy variable for technological capabilities (Andersen 1998; Comanor & Scherer 1969; Kortum & Lerner 1999; Nordhaus 1969). Therefore, this paper intends to analyze patents as an indicator of technological capabilities to explore the relationship between technological capabilities and performances.

The organizational ability of business groups to respond to various types of market imperfections and policy inducement (Mahmood 1999) is via the resources acquired by subsidiaries at low transactional costs (Chung 2001; Granovetter 1995). In the past,

* Dr. Yi-Dan Huang, Post-Doctoral Research Fellow, Science & Technology Policy Research and Information Center, National Applied Research Laboratories, Taipei, Taiwan, Republic of China. Email: d95724003@ntu.edu.tw
** Corresponding author
Dr. Hsu-Wei Hsu, Adjunct Assistant Professor, Management Undergraduate Honors Program. National Taiwan University of Science and Technology. Taipei, Taiwan, Republic of China. Email: d96724009@ntu.edu.tw

the Taiwanese governments provided preferential treatments to business groups in strategic industries. Against this political-economic backdrop, they were granted priority access to domestic and overseas resources in order to integrate such resources (Guillén 2000). Therefore, the technological capabilities included knowledge in technologies and the ablity in organization and logistics. Business groups could establish new facilities and absorb foreign technologies (Amsden & Hikino 1994), as well as manufacture products for exports in a most efficient manner (Fields, 1995). As the development of technological capabilities of business groups was hence highly relevant to scale productions, this paper aims to validate the influence of technological diversification of business groups on their overall operations.

Past studies on business groups often argue that the competitiveness of business groups is embedded in their social networks (Granovetter 1995, 2005; Khanna & Rivkin 2001; Lam 2003). Therefore, studies on business groups should incorporate multilevel perspectives, macro and micro, in order to clearly explain the relationship between structural characteristics and overall competitiveness in the network (Chen 1996; Klein, Dansereau & Hall 1994). This study adopts the multilevel research approach to divide the hierarchy into company level and business-group level and proposes two research issues: (1) the relationship between technological capabilities and performances in the company level; (2) the influence of technological diversification of business groups on the technical/scale characteristics and performances of subsidiaries on the business-group level. The remainder of this paper is organized as follows: Section 2 presents literature review and hypotheses; Section 3 describes the method; Section 4 presents the interpretation of the empirical results; Section 5 provides the conclusions and suggestions for future research.

2. Literature Review and Hypotheses

There is a high relationship between technological capabilities and new product outputs. Technological capabilities are all the knowledge, products, procedures, tools, methods and systems to provide and renovate products and/or services (Betz 2007). Technological capabilities apply the knowledge acquired in scientific research to production; in other words, transforming technological knowledge into the manufacturing processes of physical products (Kim 2001). Meanwhile, technological capabilities are dynamic and accumulative as the absorption of new knowledge and updating of old knowledge is constant. Therefore, technological capabilities are an important source of new technologies, and also a key driver of technological innovations and future technologies (Figueiredo 2002). Technological capabilities are the competitive advantages of existing technologies, as well as the key determinants of technological developments. Therefore, there is a close relationship between technological capabilities and new product outputs (Conner & Prahalad 1996). This paper uses patents as technological capabilities because patents represent innovation output indicator of an organization, as well as internal R&D capabilities (Griliches 1990; Schmooker 1966). Moreover, patents can produce technologies overspill effect in an organization and increase correlation of internal R&D capabilities (Scherer, 1982). After patents have been obtained, the organization has technology capabilities, as well as advanced technologies and technology advantages in the specific industry (Kortum & Lerner 1999). Hence, it is proper to use the number of patents to represent technological capabilities of business groups and competitive knowledge in emerging markets.

Technological capabilities are relevant to the competitive position of corporations in their industries. The utilization of technological capabilities can generate competitive advantages, such as know-how and trade secrets that are difficult to competitors to imitate (Betz 2007; Kim 2001), as well as patent rights that are protected by laws. Choung, Hwang, Choi and Rim (2000) indicated that the improvement of technological capabilities in the semiconductor industry of South Korea transforms the industry from a technology user to a technology producer. The enhancement of technological capabilities broadens the opportunities to apply technologies, changes the competitive positions against new entrants and generates positive contributions to the growth of both top lines and bottom lines (Kortum & Lerner 1999; Schoenecker & Swanson 2002). In sum, technological capabilities are relevant to the outputs of new technologies and products, as well as to the betterment of competitiveness and performances. Hence, H1 is proposed as follows:

H1: There is a positive correlation between high technological capabilities and corporate performances.

Business groups are a social network formed with social connections such as blood relationship, friendship and transactions among a group of organizations (Khanna & Rivkin 2001). Companies in the same business group share the same values, and their common attitudes and convictions encourage interactions. There are usually a set of principles, guidelines and rules governing the interactions between group members (Chung 2001), and the rights and obligations associated with such interactions. Hence, there is a high level of group cohesion among subsidiaries (Reagans & McEvily 2003). The close-knit relationships eliminate the guard in knowledge sharing by knowledge givers against knowledge takers. It also facilitates the circulation of knowledge within the group at low transaction costs to provide a diversity of knowledge and technologies required for innovations of subsidiaries (Teece 1980). This benefits the movement of implicit knowledge among member companies (Uzzi 1999).

Although business groups as a whole and their subsidiaries have their own social networks, their respective performances are embedded in the networks of each other (Lam 2003). Therefore, the following description aims to explore the importance of the embeddeness effects on operational strategies and performances of subsidiaries in business groups. In its literature review of the moderating effects of network embeddeness, this paper investigates the spillover effects of technological capabilities on member companies before an examination of the relationship between business groups and diversification. Finally, this paper probes into the hierarchical moderating effects of technological diversification strategies of business groups on the technical/scale characteristics and performances of subsidiaries.

Technological capabilities have spillover effects in business groups. Technological capabilities have spillovers effects, such as the transfer of technologies or knowledge regarding a developed product to another new product under development in the process of innovations (Cardinal & Opler 1995). Klette (1996) examined whether R&D knowledge of a business organization can be effectively transferred to others, and found that there are indeed spillover effects. Spillover effects enhance corporate performances, as well as the performances of affiliated companies. An accumulation of sufficient technological capabilities means high uniqueness in technological caliber and a high inventory of knowledge, compared to competitors (Cantwell & Janne 1999; Kogut & Zander 1992, 2003). The internal networks of member companies make the tangible and intangible resources of technological capabilities accessible to other subsidiaries (Khanna & Yafeh 2007), and such access can contribute to the spontaneous progress of technologies.

Diversification of business groups can support R&D activities of subsidies in the same group. Subsidiaries in the same business group support each other to seek the overall maximum benefits and achieve synergies in production, marketing and technological cooperation. The subsidiaries with high technological capabilities usually invest heavily in R&D. Meanwhile, they attempt to expand markets in order to enhance the utilization of their intangible assets via diversification, as well as to spread out R&D expenses (Amit & Livnat 1988). The build of intangible assets, such as R&D and human capital, involves high risks compared to other activities such as production, marketing and finance (Christensen 1997; Scherer & Harhoff & Kukies 2000). The success in the establishment of technological capabilities is highly uncertain and therefore, the diversification strategy of business groups can also diversify risks (Eden, Levitas & Martinez 1997). For example, R&D alliances and investment portolios of innovation projects within the same business group can spread out certain operational costs associated with technological capabilities.

Business groups have potential for diversification. As a general rule, the formation of business groups is related to the political and economic environments because political and economic policies provide business groups easy access to and maintenance of resources (Chung 2001; Granovetter 1995; Guillén 2000; Khanna & Yafeh 2007). This advantage allows business groups to reach out for new industry opportunities and the accumulation of knowledge and technologies. Finally, they establish the logical capabilities in funding, manpower and organization in the process of setting up production lines. All these factors make it possible for business groups to achieve the maximum operational efficiencies with the lowest transaction costs. Meanwhile, the limited market size and constantly changing international markets force business groups to constantly develop new markets and inroad to new industries. This has made business groups well-trained in mobilizing and integrating their internal resources, as well as in the accumulation of technological and operational capabilities. The result is the formation of diversified business groups.

The adoption of high-tech diversification can help the subsidiaries with strong technological capabilities in technology-oriented production and performance improvement. High-tech diversification strategies aim to initiate the development of technological capabilities and the production of technological products in a large scale. Literature addressing spillover effects infers that the diversification of business groups augment the spillover effects of subsidiaries (Cardinal & Opler 1995; Klette 1996). Organization capabilities of business groups allow subsidiaries with strong technological capabilities to transfer such capabilities to other industries. Business groups encourage diversification across industries, rather than aiming to be an expert in a given industry or product line (Guillén 2000). Meanwhile, the technological capabilities with low exclusivity cannot avoid others from using the benefits of R&D assets. Therefore, subsidiaries will attempt to commercialize their own R&D knowledge, with the support of business groups, in order to quickly maximize the benefits. Subsidiaries of strong technological capabilities can move knowledge within the group with the minimum transaction values and make inroads into all kinds of chartered industries by mobilizing the resources under the same business group. Hence, the adoption of technological diversification can prove the performances of subsidiaries. To sum up, the spillover effects of technological capabilities can fully expand their scalability and increasing returns with a high level of group cohesion. Therefore, hypothesis 2 is proposed as follows:

H2: Technological diversification of business groups moderates the relationship between technological capabilities and performances, such that the relationship becomes more positive for higher technological diversification of business groups.

Pros and Cons of Size A large company has stronger market power (Porter 1980). Manufacturers with high market shares have stronger bargaining power against suppliers and customers. This allows them to expand profits and use such profits to establish resources. Economies of scale are manifested in management and financing activities. The number of managers does not have to increase at the same proportion as the expansion of scale; this also applies to management systems. Financing cost does not increase at the same pace as sale growth either (Panzar 1989). In the perspective of one single factory, a large factory can lower its fixed cost per unit, while the inventory does not have to increase at the same rate either, when unit sales grow. However, when an organization grows to a certain size, there will be an emphasis on roles and control systems and such an organization will lose flexibility (Quinn & Cameron 1983). Therefore, an organization of a certain size may have a lower probability of subsequent expansions and a high probability of focusing on core industries.

The adoption of low-tech diversification can help large-scale subsidiaries in the production gearing toward economies of scale and lessening the impacts on performances. Business groups pursuing low-tech diversification only focus on a small number of technological fields, possibly for two reasons. Firstly, these technologies are accumulative and have niche markets; hence, it is possible to strengthen the foothold on existing markets (Thomsen & Pedersen 2000). Secondly, the insufficiency of technological capabilities makes it impossible to compete in the market. There is also a limited scope for technological diversification (Cantwell & Janne 1999; Madhok 2002). However, a small number of spillover fields indicates that there is a large base of share technical language and hence higher communication efficiency. Meanwhile, economies of scale require efficiency not only in production but also sale. The adoption of low-technology diversification suggests low levels of difficulties in communicating technical knowledge among subsidiaries and easiness to reach consensus for product sale. The operations of subsidiaries in different locations can support the production and sale of large scales. It also facilitates an effective control of production materials and dominance in distribution channels to reach economies of scale under the adoption of low-tech diversification in business groups (Cohen & Klepper 1996; Cohen & Levinthal 1990; Griffin & Hauser 1996; Whittington Pettigrew, Simon, Fenton, & Conyon 1999). The cost impacts on subsidiaries are hence less likely to affect their performances. The low level of technological complexities indicates that less time is wasted on communication with large subsidiaries, and hence, it is easy to achieve the production efficiency with economies of scale. Large impacts on the performance of subsidiaries are thus mitigated. Therefore, hypothesis 3 is proposed as follows:

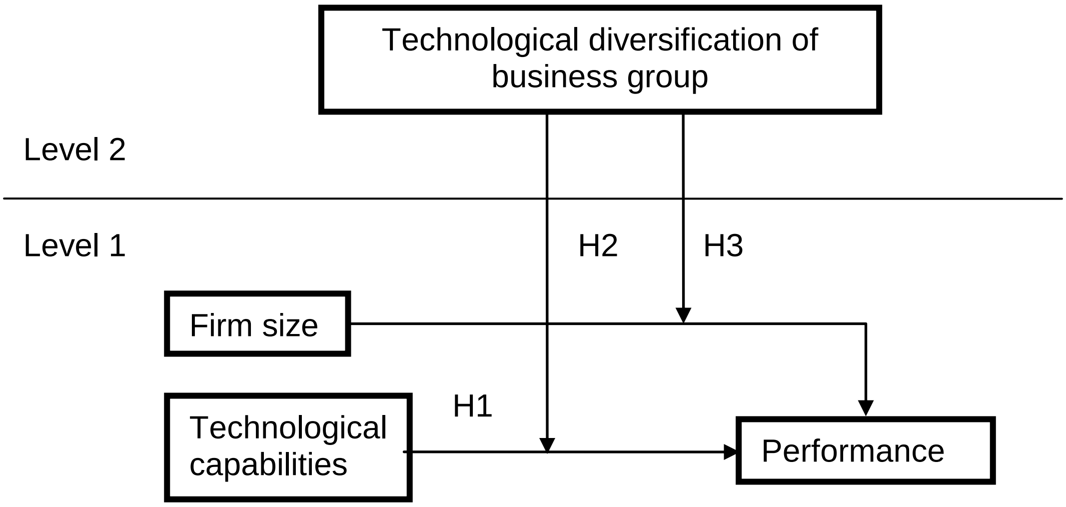
H3: Technological diversification of business groups moderates the relationship between firm size and performances, such that the relationship is less negative for lower technological diversification of business groups.

3. Method

This study developed a model containing two analytical levels, in order to explore the influence of technological capabilities and network embeddedness on corporate performances. Figure 1 illustrates the research framework of this paper. On Level 1, the company level, the relationship between technological capabilities and performances is examined. On Level 2, the business-group level, this study investigated how technological diversification strategies of business groups hierarchically moderate the relationship between technical/scale characteristics and performance of subsidiaries. It is hoped the research finding can establish an understanding of the general system and relevant issues of technological developments in business groups.

We first consider 3 models in our analysis. All 3 models composed of same set of independent variables but with different dependent variables.

Figure 1: Research Framework



3.1 Data Sources

This study analysed the number of patents output by the top 100 business groups in 2001-2009. A total of 85 business groups and 425 subsidiaries are examined. After the elimination of missing values in Level 1, there were a total of 315 subsidiaries. These subsidiaries were then grouped into Level 2, the business-group level, and 60 business groups were established. Based on the above literatures, this study inferred that patents capability, scales and performances of subsidiaries are embedded or nested to the business groups they belong to.

3.2 Measures

3.2.1 Level 1 Variables

Technological Capabilities

This study used the number of patents to measure the level of technological capabilities. Andersen (1998) indicated that patents serve as three meaningful indicators: (1) the accumulation of technological capabilities will generate renovations over time; (2) the growth in the inventory of technological capabilities will highlight technological opportunities; (3) they are a direct measurement of inventions. There are two advantages in the use of patents as a proxy variable for technological capabilities: (1) the process of acquiring patents reflects the model of technological changes; (2) the acquisition of critical patents indicates the acquisition of dominant technological opportunities. Compared to R&D spending, patents carry more validity as a measure of technological capabilities. Patents are also the technological foundation for new product developments (Griliches 1981; Scherer 1982). Therefore, this study used the number of patents as an indicator to the level of technological capabilities.

Firm Size

Large firms usually acquire funds in the capital market at lower costs and enjoy excessive profits with market monopoly or duopoly positions (Tallman & Li 1996). Meanwhile, large companies are usually advantageous in risk diversification as they operate in the market with lower costs. This study used the natural logarithm of total assets as an indicator of firm sizes.

Performance

Performances can be divided into financial performances and non-financial performances. Financial performances evaluate corporate operations objectively (Venkatraman & Ramanujam 1986). Return on assets (ROA) is often used as a corporate performance indicator as it eliminates the bias of large companies generating high incomes. This study used assets as an independent variable to control the scale factors. Hence, net incomes after taxes of subsidiaries were used as a measure of performances.

3.2.2 Level 2 Variable

Technological Diversification of Business Group

The measurement of technological diversification of business groups is based on the entropy measure (Jacquemin & Berry 1979) ◦ According the definition of entropy measure (EM), the higher value of EM of a business group indicates that more technological sectors they involves (Zander 1999), therefore, it brings more technological opportunities (Kortum & Lerner 1999). As a result, the business group can get the opportunities to entry a totally new area of new business, to development difference business model. Therefore, it indicates that higher EM will relate to the growth strategy of higher technological diversification. On the other hand, the lower value of EM of a business group indicates that less technological sectors they involves, therefore, it brings less technological opportunities. As a result, the business group has fewer opportunities to do new business. Therefore, it indicates that lower EM will relate to the growth strategy of lower technological diversification.

Based on the above classification of the technological capabilities, this part measures the degree of technological diversification of business groups. First, the international patent code (IPC) is used to classify the technological capabilities of business groups. Then, the first four IPCs are used to separate different technological sectors of business groups to measure their degrees of diversification.

$$\textbf{Entropy measure (EM)} = \sum_{i=1}^{n} Piln\frac{1}{Pi}$$

Where Pi in the present context represents the share of patents of a business group accounted for by the ith technological sectors. The value of the EM ranges between zero and lnn (Zander 1999; Jacquemin & Berry 1979), where a value of zero represents a technology in which capabilities are concentrated in one technological sector and a value approaching lnn represents a technology for which patenting is distributed evenly across the n technological sectors.

The entropy measure value is EM, diversification tendency, which takes into account that a patenting propensity differs across technological sectors. Hence, for each individual business group, it uses a simple count of the number of unique technologies represented by the various technological sectors. If, for example, six out of ten patents are found in one technological sector and the remaining four in a second technological sector, the value of EM is 0.673. If four out of ten patents are found in one technological sector, a second technological sector accounts for four patents, and a third technological sector accounts for the remaining two technologies, the value of EM is 1.055. To sum up, higher EM value, crosses more technological sectors, as a result, do higher technological diversification, whereas, that lower EM value, crossed fewer technological sectors, do lower technological diversification.

4. Results

Hierarchical linear model (HLM) was used to perform multilevel research and validate hypotheses. Following the approach developed by Bryk & Raudenbush (1992), this study adopted grand mean centering to process the variables of Level 1. Grand mean centering means that each explanatory variable should be deducted with the total mean. Aiken & West (1991) suggested that the deduction of each fraction with the same value does not change the relationship between numbers. The approach of grand mean centering in multilevel analysis can avoid multi-colinearity. Meanwhile, the model and the statistical equivalence model can detect context effects and cross-level interactions (Hofmann & Gavin, 1998; Mathieu & Taylor, 2007). This study adopted the grand mean catering for Level 1 to observe the slopes and intercepts of Level variables, and validated the cross-level interactions (Chen, Kirkman, Kanfer, Allen, & Rosen 2007; Gavin & Hofmann 2002; Joshi, Liao, & Jackson 2006).

This study used performances as the outcome variable, and hence, a null model was required to calculate intraclass correlation coefficient (ICC (1)) to confirm the necessity for multilevel analysis (Bryk and Raudenbush 1992). Performance ICC (1) is 0.358. According to Cohen (1988), an ICC (1) smaller than 0.059 suggests a low intra-group coefficient; an ICC (1) between 0.059 and 0.138 indicates medium correlation; an ICC (1) of higher than 0.138 represents a high degree of intra-group correlation. He argued that a medium level means the intra-group correlation cannot ignore the existence of similarities. Therefore, when ICC (1) is greater than 0.059, it is necessary to consider a multilevel statistical analysis. In other words, HLM should be used to analyze the numbers, rather than using generalized linear model (GLM). The intra-class correlation coefficient (ICC (1)) reaches the statistical significance, and hence, this study conducted HLM to validate the follow-up hypotheses.

4.1 Sample Characteristics

This study sampled 3C industrial group and non-3C industrial group. The two industries are rather different in terms of characteristics and patent numbers. The average number of 3C business groups is 13 times of that of non-3C business groups.

Therefore, the samples are divided into two groups to calculate the EM value of individual companies, in order to reduce inter-industry variations. The EM values are aggregated for respective business groups to derive EM value indicative of the technological diversification of business groups. Level 1 variable are aggregates of Level 2, and summarizes the measurement statistics (Table 1).

Table 1: Correlations

	Mean	S.D	1	2	3	4
1. TC	138.36	221.98	1			
2. TD-BD	2.83	4.07	-0.058	1		
3. Firms Size (NTD million)	8.46	1.09	0.348**	0.219	1	
4. Performance (NTD million)	1567.09	5411.92	0.391**	-0.070	0.215	1

Level 1 variable are aggregate to Level 2
***p<0.01 (2-tailed)
Notes: TC = technological capabilities; TD-BD = technological diversification of business group

Table 2: HLM Result

	M1-1	M1-2	M1-3	M1-4	M2-1	M2-2
Intercept	1650.09**	1200.46**	1826.84**	1152.95**	-2791.58	900.03**
Level 1						
TC	8.87*		8.85*		-25.097	
Firms size		787.82**		785.08**		1133.18**
Level 2						
TD-BD			-64.58***	17.44	1760.33	121.77
Level 1* Level 2						
TC * TD-BD					13.40*	
Firms Size * TD-BD						-130.58*
Deviance	6180.05	6346.28	6166.86	6331.98	6159.19	6321.25
Pesudo R^2	0.82	0.68	0.00	-0.019	0.071	0.00

***P＜0.01；** P＜0.05；*P＜0.1
Notes: TC = technological capabilities; TD-BD = technological diversification of business group

Figure 2: The hierarchical moderating effects of technological diversification of business groups on technological capabilities and performances of subsidiaries

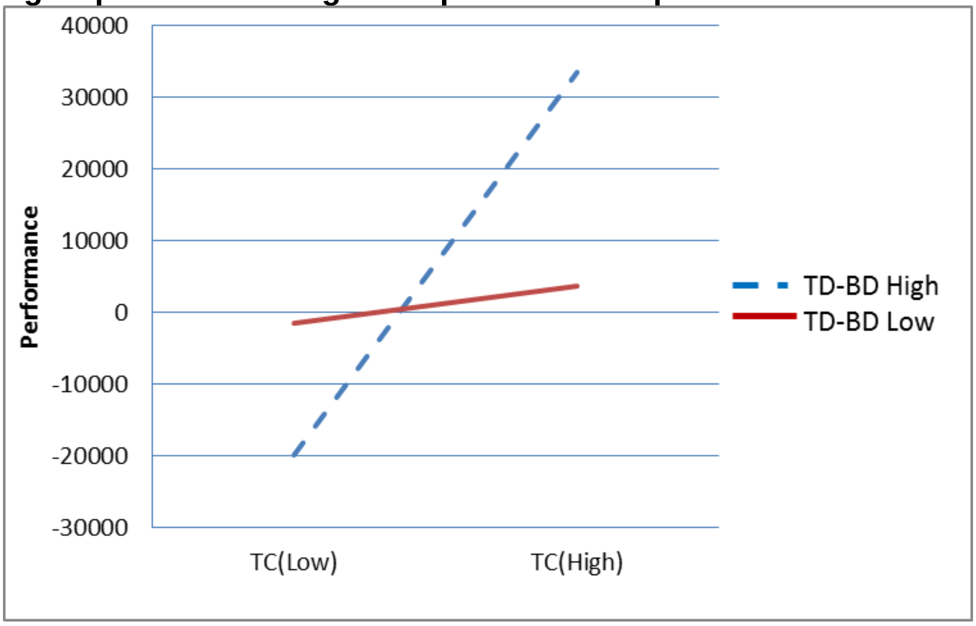


Figure 3: The hierarchical moderating effects of technological diversification of business groups on firm size and performances of subsidiaries

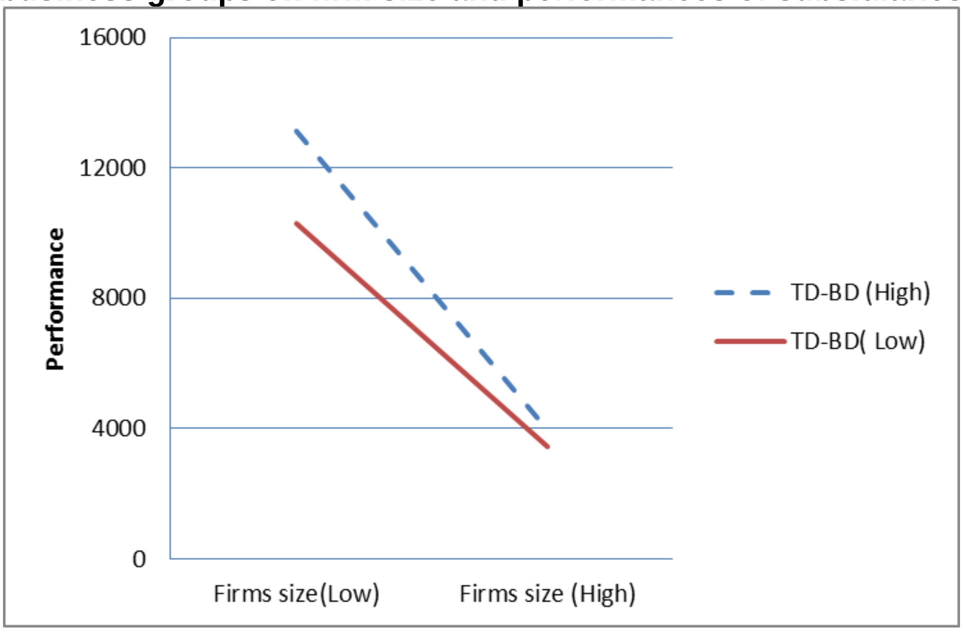


Table 2 is the result of HLM analyses. Model 1-2 and Model 1-3 confirm the relationships in Level 1. Technological capabilities (TC) of subsidiaries have significant and positive influence on performances (β=8.87, P<.1, Model 1-1). Hence, H1 is supported. It is proven that firm sizes of subsidiaries have significant and positive influence on performances (β=787.82, P<.05, Model 1-2).

Hypotheses 2 and 3 illustrate the hierarchical moderating effects of technological diversification of business group (TD-BD) on subsidiaries. This study adopted the method to test moderating effects developed by Baron and Kenny (1986). The first step is to explain the main effects between TD-BD and performances (β=-64.58, P<.01, Model 1-3), before the exploration of and the moderating effects of TD-BD on the technical/scale characteristics and performances of subsidiaries. The results suggested that TD-BD has significant and positive moderating effects on technological capabilities (TC) and performances of subsidiaries (β=13.40, P<.1, Model 2-1). Hence, H2 is supported. The adoption of high-tech diversification strategies of a business group helps the subsidiaries of strong technological capabilities to achieve better performances (Figure 2). TD-BD has significant and negative moderating effects on the firm sizes and performances of subsidiaries (β=-130.58, P<.1, Model 2-2). This explains the situation where performances are poor for big firms. However, the adoption of low-tech diversification strategies of a business group can mitigate the impact on the performances of large-scale subsidiaries. In other words, the speed with which performances deteriorate slows down (Figure 3). Hence, H3 is supported.

5. Conclusions

Business groups have strong mobilization ability to integrate internal resources. Both technological capabilities and operational capabilities are accumulated over time, to eventually form diversification capabilities. This coupled with group cohesion can minimize transactional costs (Granovetter 1985, 1995; Gulati 1999; Khanna & Rivkin 2001; Khanna & Yafeh 2007), and transform competitive advantages into synergies for subsidiaries through the sharing of tangible and intangible assets. This is why sharing of R&D and manufacturing capabilities and opportunities are at a quick face within business groups (Aaker 1991; Kogut & Zander 1992). As this paper emphasizes, it take the examination into the interactions between the company level and the business-group level to properly explain the operating model of business groups.

This paper highlighted the importance of technological capabilities in performance improvement (Schoenecker & Swanson 2002) and developed the methods for business groups to integrate the operations of subsidiaries to effectively pursue technological diversification. Some studies argue that diversification reduce profits (Lamont & Polk 2002). It examined the importance of scalability and increasing returns of technological capabilities to the value creation of subsidiaries in the context of technological diversification strategies of business groups. This is rarely mentioned in existing literature. This concept explains how technological diversification strategies of business groups can hierarchically moderate the relationship between technical/scale characteristics and performances of subsidiaries. The cross-level analysis in this paper concludes two hierarchically moderating effects: (1) when a subsidiary is accumulating technological capabilities, the adoption of high-tech diversification strategies by the business group can improve the performance of that subsidiary; (2) when a subsidiary grows to a certain size, the adoption of low-tech diversification strategies by the business group can mitigate the impacts on the performance of the subsidiary. In terms of theoretic contributions, this paper emphasizes the important moderating effects of technological diversification strategies of business groups on the operations of their subsidiaries. Meanwhile, it also shares its practical experience in the study of moderating effects of multilevel network embeddeness. In terms of practical contributions, the findings serve as a reference to corporate managers in scenario planning as part of strategic planning in business groups.

Regarding research limitations, this study focused on the cross-sectional data of single years to analyze the influence of diversification strategies of business groups on the performance of group subsidiaries. However, it did not examine the influence of the dynamics of technological capabilities on the diversification strategy of business groups. Moreover, it did not cover the evolution of technological capabilities and subsequent performances. In fact, the evolution in the quality/quantity of technological capabilities has certain effects on the formation of strategies in business groups. Future studies should conduct further analyses. Meanwhile, the industries where affiliated companies operate also have influence on the development of technological capabilities. In general, the technological capabilities of traditional industries are weaker than those of electronics industries. However, this study is restricted by the number of samples. Future studies should incorporate the level of industries to perform a three-level analysis.

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