

CORPORATE PARENT EFFECT ON SUBSIDIARY TECHNOLOGY AND DIVERSIFICATION STRATEGIES

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Abstract

This paper examines the corporate parent effect on the diversification strategies of triad and Asian subsidiaries in the ASEAN region. I find that triad subsidiaries tend to participate in high technology intensive industries, and are more likely to diversify. In addition, I also find that the subsidiary diversification strategy is significantly affected by the number of affiliations under the same corporate parent that perform the same or different activities in the region. These results shed light on the influence of corporate parent on subsidiary-level strategy and the role of the subsidiary within an economically integrated region. Various implications are discussed.

Key Words : corporate parenting, subsidiary, multinational enterprise, diversification

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I . INTRODUCTION

The role of a MNE subsidiary has received increasing attention in the strategic management literature (e.g. Birkinshaw, 1996; Birkinshaw and Hood, 1998). Research in this stream tends to focus on the internal factors within MNEs that determine the role of subsidiaries (e.g. Bartlett and Ghoshal, 1989). Little has been done with respect to the effect of external factors such as location, industry, etc. that shape subsidiary behavior, with Benito *et al.* (2003) as one exception. Subsidiaries vary in their interactions with both the parent company and other subsidiaries under the same parent (Meyer, 2004). Benito *et al.* (2003) propose that strategies adopted by subsidiaries are very much dependent on location characteristics. This is especially so in the case of economically integrated regions, where markets are larger and more diverse.

The contribution of international diversification towards firm growth and performance continues to generate extensive research in international business and strategic management literatures (Gomes and Ramaswamy, 1999; Kotabe *et al.*, 2002), partly as a result of contradicting findings (Annavarjula and Beldona, 2000; Palich *et al.*, 2000). Despite the fact that subsidiary diversification strategy has been found to be beneficial to the business unit even though it may not contribute significantly to the corporate parent (Stern and Henderson, 2004), the fit between the corporate parent and the subsidiaries is still essential for the value-creating role and sustainability of the subsidiaries (Campbell *et al.*, 1995).

Firm-specific advantages, and their role in establishing a strong competitive position in the market, have been examined in the context of FDI and decision-making with regard to the ownership and structure of foreign subsidiaries (Erramilli *et al.*, 1997). However, the relationship between firm-specific advantages and how these can be exploited through subsidiaries' diversification strategies has been left unexplored.

Technology intensity refers to the extent to which a firm or industry utilizes technology to convert its inputs into outputs (George, 1995). Abernathy and Clark (1985) suggest that high levels of technological intensity are linked to firms that are able to engage in multiple technological innovations, and that they combine technological skills to develop new technologies (Tushman and Anderson, 1986; Anderson and Tushman, 1990; Tang and Zannetos, 1992). Such firms are characterized by combining complementary technologies and by exploiting technological opportunities (Pavitt *et al.*, 1989; Tyre and Orlikowski, 1993). Although international business research has recognized the importance of technology and technological intensity in foreign market participation, and that technology is important in determining firm structure and strategic choices, these are not the only ownership factors driving the internationalization process. If, however, technology ownership advantages exist, and these advantages are only made possible because of the firm's specific location, then we should expect to see differences in the technological behaviour of

subsidiaries of different origins, i.e. subsidiaries from different origins may choose to participate in industries with different technology intensities. Subsidiaries of firms from industrialized nations, mainly US, Europe and Japan, collectively termed triad nations, generally possess greater technological knowledge and skills, and thus are more able to transfer advanced technological knowledge from their parent firms to their FDI locations.

Given that firms need to keep innovating in order to survive in their industries, it is likely that firms in technologically more intensive industries have to devote more efforts and resources to stay competitive. This leaves them with lesser resources to diversify into other businesses, and thus I further propose that they ought to be less diversified than firms that are in technologically less intensive industries.

The above arguments lead to the key research issue to be addressed in this study. Corporate parents need to manage the fit between themselves and their subsidiaries. In the context of a free trade region, it is also imperative that subsidiary strategies are well coordinated to create value for the corporate parent. This study seeks to investigate the corporate parent effect on the diversification strategies of foreign subsidiaries in the manufacturing sectors of five key economies of the ASEAN region (Malaysia, Indonesia, Thailand, Singapore and Philippines). I argue that as a result of the need to create value from subsidiaries, corporate parent characteristics such as country of origin and the number of subsidiaries conducting businesses in the region will have an impact on the diversification strategies of the subsidiaries. These results shed light on the importance of the corporate parent on subsidiary-level strategy and the role of the subsidiary within an economically integrated region. Various implications are discussed.

II. BACKGROUND AND THEORY DEVELOPMENT

1. Foreign Subsidiaries Participation and Diversification

International diversification, as a growth strategy, offers firms a range of potential advantages in the pursuit of competitiveness, such as the exploitation of potential market opportunities (Peng and Wang, 2000), the lower transaction costs from the internalization process (Hymer, 1976; Rugman, 1981; Caves, 1996), economies of scale and scope (Kim *et al.*, 1989, 1993), and the ongoing development and international utilization of competitive competencies (Hamel, 1991). The establishment of overseas operations, however, presents a number of concerns, especially if the subsidiaries are established in countries that are geographically and culturally distant (Erramilli, 1991). This can come in the form of increasing transaction costs related to managing across borders and cultures (Buckley and Casson, 1976; Capar and Kotabe, 2003).

Several conceptual frameworks have been used in the international business literature to explain why firms locate production abroad and the changes in operational patterns of firms as they internationalize. These include the industrial organization theory (Hymer, 1976), the internalization theory (Buckley and Casson, 1976) and the ownership-location-internalization (OLI) paradigm (Dunning, 1980). The industrial organization theory suggests that the most critical advantage of multinational firms is their privileged access to proprietary technology (Hymer, 1976). This advantage enables a firm to engage in direct investment overseas by transferring these intangible and technological assets to new markets; these assets reflect the ownership advantages of a firm (Dunning, 1980). Research has shown the importance of such assets in creating firm competitive advantage over rivals in foreign markets.

The technological intensity of a firm is likely to have an effect on the way in which it enters new markets in that there is likely to be more concern about the potential loss of proprietary knowledge. The internalization theory would suggest that high levels of control over information dissemination would be appropriate (Buckley and Casson, 1976; Caves, 1996). Although there has been increasing evidence of cooperative relationships centered on the creation of capabilities in cooperating firms (Cantwell and Barrera, 1998), the protection of proprietary knowledge in technologically intensive firms, along with the transaction costs involved in managing complex inter-firm relationships, are key concerns for decision-makers in the internationalization process.

In addition, the internalization theory posits that firms seek to maximize profit in a world of imperfect markets (Buckley and Casson, 1976). According to this theory, FDI will lead to a higher market value for the firm relative to its accounting value only if the firm possesses firm-specific intangible assets such as superior R&D capability, production skills, managerial skills, etc. When the external market is imperfect, largely due to transaction costs, firms are more likely to bypass the external market for its intermediate products by creating an internal market. This involves bringing market-related activities under common ownership and control. The internalization theory was later incorporated into Dunning's OLI eclectic paradigm.

Dunning's (1980) eclectic paradigm integrates elements from the market power, macroeconomic development and internalization models and synthesizes ownership, location and internalization (OLI) advantages that organize a range of variables likely to influence the "who," "where" and "why" of FDI activity. He asserts that firms in certain industries of a particular country possess specific advantages that accrue to them because of the way their industries are developed in their home country. These firms may then utilize these advantages to exploit foreign markets. Firms can engage in effective competition from foreign locations if ownership, internalization, and locational advantages exist.

In an extension to his OLI framework, Dunning (1995) further urges researchers to acknowledge more

explicitly firms engage in FDI to acquire or learn about complementary technologies, on top of exploiting existing competitive advantages. This view of FDI emphasizes that FDI is not only “pushed” by the firm-specific advantages of the investing firm, but may also be “pulled” towards centers of innovations located in recipient countries as a means for the investor to acquire and develop new resources and capabilities.

Although international firms can potentially benefit from the exploitation of firm and location-specific advantages, there is increasing evidence that companies are no longer viewing their subsidiaries as merely potential recipients of knowledge. Indeed, subsidiaries, have the potential to add to firm-specific advantages (Peng, 2001), particularly when there is a process for knowledge exchange. Taking technological expertise as an example, a firm must be able to access the knowledge accrued wherever it is created within the company, if it is to add value overall. However, the capabilities necessary for competing in high technology industries could still reside outside the firm’s or even the nation’s boundaries.

2. Technology Intensive Industries

High technology intensive industries have been the focus of attention by governments as they account for large shares of investment in industrialized countries. As they are often the source of important technological innovations, the benefits are likely to spillover at intra-industry and inter-industry levels. High technology intensive industries are characterized by multiple technological innovations (Abernathy and Clark, 1985), rapid technological developments (Anderson and Tushman, 1990, 1991), increasing technological opportunities (Tye and Orlikowski, 1993), and are mainly driven by short product life cycles and intense competition. Although these could create potential advantages for firms in these industries, it also means that these firms face many challenges. Owing to the high uncertainties involved, firms in high technology intensive industries usually adopt multiple strategies concurrently in order to hedge the risks, e.g. collaboration, diversification, etc.

The importance of technology intensity is well illustrated by the theory of dynamic firm capabilities, which asserts that firms that simply produce a given set of products with a given set of processes in a competent way will not promote long-term survival. A firm must continuously innovate if it aims to be successful for any length of time (Nelson, 1994). Therefore, firms will have to keep innovating, at least in line with the industry average, in order to survive. This is especially so in the case of high technology intensive industries.

Research has suggested that ownership advantages are related to geography (Cantwell, 1989). Nations differ, obviously, in their advantages. Not only is there a variation in factor prices, there is also a difference in the kind of organizational and technological capabilities among countries. These differences are drawn from the effects of the institutional environments and the accumulation of capabilities by the firm.

In diversifying overseas, the firm may be seeking some locational advantages, or seeking to exploit some extant firm-specific advantages, but the subsidiary activities are frequently determined, or shaped by the current nature of firm (Medcof, 2000). A number of studies have noted that one of the key drivers of strategic decision-making for firms involved in high technology intensity industries is the extant capabilities of the firm (Chiesa, 1996; Penner-Hahn, 1998). High technology intensity firms that have accumulated a stock of competitive technological resources are potentially in a strong position in that they frequently involve high levels of tacit knowledge, and are, thus, difficult to imitate. The high requirement for resources in high technology intensity firms, however, and the 'uniqueness' created are the very qualities that may lead to path dependency. In terms of strategies for setting up subsidiaries in the ASEAN region then, the importance of existing firm specific advantages is not only centred on the capabilities themselves, but also on the way in which these capabilities have created a path dependency in the company, and potentially restrict the activities of the new business units.

3. Technology Intensive Industries and Foreign Firm Participation

The need for technology-seeking FDI into countries of technological leadership is bolstered by the persistence of country-specific technological advantages (Kogut, 1991), and path dependency in the process of technological development at the country level (Cantwell, 1989, Teece *et al.*, 1997). Why do technological advantages tend to be country bound and persistent over time? Some recent research attributes country-specific advantages to national organizing principles (Kogut, 1991) and national innovation systems (Nelson, 1993). Gaining access to technologies that reside in a foreign country often requires the presence of multinational firms in the country, due mainly to the localized nature of knowledge spillovers (Jaffe *et al.*, 1993). Ownership advantages, on the other hand, arise from economies of scale with respect to intangible assets such as skilled management capacity or organizational know-how which may be exploited to even greater advantage by investing abroad (Hymer, 1976).

Country-specific advantages do exist, and affect the investment or diversification behavior of foreign firms. Singapore, for example, with limited resources in some areas, provides a sound environment for FDI due to its open markets and government efforts to promote inward investment. Given this, foreign firms might be expected to exhibit different behaviors in choosing the technological activities to be undertaken in Singapore compared with locations not offering the same advantages.

Technologically more intensive industries generally demand more organizational flexibility (Hagedoorn and Narula, 1996), and they rely more on proprietary technology and initial technological advantage which is usually achieved at an early stage. Profits are less subject to market competition initially, though in the long

run, technological imitations and advances will also drive them down. US, European and Japanese subsidiaries, as firms from the industrialized nations, are technologically more advanced than subsidiaries of Asian origin, and are, thus, better positioned in technologically more intensive industries. If an Asian destination country provides additional advantages, such as cost advantages, it is likely that triad nation subsidiaries will choose to participate in technologically more intensive industries than Asian subsidiaries in that same country.

Although firms might enter a new country with the intention of exploiting some comparative advantage or market imperfection in the host country, there is increasing evidence that firms are entering new markets to access innovative capabilities (Peng, 1995; Peng and Wang, 2000). In that companies from the triad nations are bringing more advanced technological advantages, they are likely to be seeking innovative input that strengthens their innovative capabilities, and they ultimately benefit from the accumulated learning and knowledge spillovers from operating in multiple countries. Further, in high technology intensity firms, there is an increasing tendency to seek local sources of new technologies that can be used in other parts of the MNC (Cantwell and Barrera, 1998). In order for firms to capitalize on this for competitive advantage, they must access and utilize their knowledge (Grant, 1996).

Firms that show some level of path dependency may narrow the scope of the subsidiaries to build particular expertise (Chiesa, 1995). Such firms, in highly competitive industries such as high technology are likely to maintain focus on that industry, yet continue to seek additional advantages offered in the host country. As a result, we might expect triad nation firms to focus more closely on technologically intensive industries than their Asian counterparts.

H1: Triad subsidiaries are more likely to participate in technologically more intensive industries than Asian subsidiaries.

4. Subsidiaries Diversification Strategy

The extent of a firm's diversification is determined by structural variables in the industries in which the firm operates, and the economics of organizing activities within the firm as opposed to market arrangements (Williamson, 1975; Lecraw, 1984). Economic research has posited a positive association between technology development and diversification (Link and Long, 1982), and strategic management research has predicted that R&D intensity will follow as a consequence of diversification owing to the economies of scope and enhanced R&D efficiency (e.g., Hambrick and MacMillan, 1985). Others, however, have maintained that diversification strategies may actually discourage risk taking and lead managers to subordinate long-term

investment in R&D to more immediate performance objectives (Burgelman, 1983), as well as encourage managers to engage in diversification solely in their own self-interest to reduce their employment risk, resulting in an agency problem (Amihud and Lev, 1981).

Generally, there is a limited set of competencies that a firm can manage at any point in time, and most firms lack the broad range of competencies that will enable them to deal effectively with diverse technologies and rapidly changing environments. This is especially true in technologically more intensive industries, characterized by multiple technological innovations, rapid technological developments, and increasing technological opportunities. A firm's current strategy and organization is path dependent as a result of the irreversibility of core competencies. This helps to direct the firm's future capabilities and strategic opportunities (Leonard-Barton, 1992), thus confining it to a certain trajectory and narrowing its potential technological alternatives (Nelson and Winter, 1982; Cohen and Levinthal, 1990; Harianto and Pennings, 1994). Thus, as firms accumulate technologies and skills, their experiences will result in each firm's evolutionary path of differentiated technological skills and learning capabilities (Teece *et al.*, 1994). Additionally, a firm's absorptive capacity, which is cumulative in nature and influences the firm's expectations about, and search for technological opportunities, may also hinder development of new technological abilities (Cohen and Levinthal, 1990). Consequently, most firms concentrate their activities on a limited range of operations that allow them to focus on and specialize in a few technologies, which actually leads to better performance (Harianto and Pennings, 1994).

The costs of investment, coupled with the need for continuous technological development, means that firms in technologically more intensive industries will incur a higher level of organization costs than firms in technologically less intensive industries. Facing the increasing costs of technological innovations and developments, and the uncertainties about the returns of such investments, firms in technologically more intensive industries face greater demands in their existing business. Hence, they will have to constantly expend extensive resources in the existing business to keep it competitive. As such, they are less likely to diversify into other businesses. As subsidiaries from the triad nations tend to enter technologically more intensive industries, and that firms in such industries are generally less diversified, we can thus infer that these triad nation subsidiaries are generally less diversified.

H2: *Triad subsidiaries are less likely to diversify than Asian subsidiaries, the extent of which is moderated by the technology intensity of the industry.*

III. DATA AND RESEARCH METHODOLOGY

1. Data

The sample firms comprise foreign subsidiaries in the manufacturing sectors in the key members of the ASEAN (Association of Southeast Asia Nations) – namely Singapore, Thailand, Malaysia, Indonesia and Philippines. There are a total of 1106 foreign firms residing in these countries in the sample year 1996. All background data are taken from the Key Business Directory of Foreign Firms in ASEAN (KBD) compiled by Dun and Bradstreet. Background information collected includes industry classification, year of incorporation in the country resided, firm origin, and number of business lines (including the SIC codes of these business lines). Thirty-eight of these subsidiaries were deleted as a result of missing data, resulting in the final sample of 1068 subsidiaries.

2. Operationalization of Variables

Diversification Strategy. In this study, foreign subsidiaries are classified as either focused or diversified (dichotomous). Specifically, focused subsidiaries are those that concentrate on a single business line. Diversified subsidiaries are those that perform unrelated activities simultaneously. Foreign subsidiaries that perform just related activities are discarded as there are only 16 such cases and thus are under-represented for analysis.

Technology Intensity of Industry. The concept of technology intensity has been defined in a number of ways (Osborn and Baughn, 1990; Hagedoorn, 1993; George, 1995) but mainly measured the degree to which a firm utilizes technology, such as R&D processes and other techniques, methods, designs, machines and tools employed in the commercialization process. I adopt the Organization of Economic Cooperation and Development's (1997) classification of technology intensity of industries, which is based on the ratio of R&D expenditure and embodied technology to output deriving from 22 manufacturing industries in 10 OECD countries. I classify the industries into 3 categories, namely high, medium and low. These are listed in Table 1.

〈Table 1〉. Industry Technology Intensity Classification

Technology intensity	Industry
High	Electronic products
	Paints, pharmaceuticals and other chemical products
	Petroleum products
Medium	Industrial chemicals and gases
	Machinery except electrical and electronic
	Electrical machinery, apparatus and appliances
Low	Plastic products
	Fabricated metal products
	Transport equipment
	Food
	Printing and publishing

Firm Origin. The nationality of firm is recorded and coded into 4 categories, i.e. whether the firm is a subsidiary of a US firm, a European firm, a Japanese firm or other Asian country firm (excluding Japan). These are represented by three 0-1 dichotomous variables, with the Asian subsidiaries used as the reference category.

Control Variables. I control for the number of affiliations that a subsidiary has that perform (a) the same activity and (b) different activity as the subsidiary. This is to adjust for the fact that subsidiaries with more affiliations performing the same activity may be restricted in terms of territory, and thus, may actually become more diversified. Conversely, subsidiaries with more affiliations performing different activity may suggest a more focused strategy for each subsidiary. I also control for whether the subsidiary actually engages in importing and exporting activities. It is likely that subsidiaries that engage in importing and exporting are less committed to single activity, and thus can be more diversified. The opposite is true for subsidiaries that do not engage in importing and exporting – they are more likely to be more intensive in their core activity and thus less diversified. Finally, I control for the country in which the subsidiary resides. This will filter out potential country effects – nation-specific conditions that may affect the behavior of foreign subsidiaries. Table 2 lists the operationalization of the variables while Table 3 shows the descriptive statistics and correlation matrix of all the variables used in this study.

(8)	Asian origin	0.22	0.42	0.11	0.07	0.06	0.13	0.27	0.27	0.41									
(9)	Affiliations with same activity	0.39	0.86	0.13	0.19	0.09	0.12	0.00	0.06	0.01	0.08								
(10)	Affiliations with different activities	0.48	1.81	0.05	0.01	0.10	0.10	0.11	0.06	0.20	0.07	0.24							
(11)	Importing	0.75	0.43	0.04	0.04	0.03	0.07	0.02	0.03	0.06	0.07	0.01	0.04						
(12)	Exporting	0.79	0.41	0.01	0.01	0.04	0.03	0.02	0.00	0.10	0.08	0.02	0.08	0.63					
(13)	Residing in Thailand	0.10	0.30	0.02	0.02	0.03	0.01	0.05	0.03	0.05	0.04	0.03	0.07	0.02	0.04				
(14)	Residing in Malaysia	0.40	0.49	0.14	0.07	0.12	0.04	0.15	0.10	0.01	0.25	0.06	0.07	0.06	0.02	0.28			
(15)	Residing in Indonesia	0.06	0.23	0.02	0.03	0.01	0.03	0.04	0.06	0.06	0.05	0.00	0.05	0.08	0.12	0.08	0.20		
(16)	Residing in Philippines	0.04	0.19	0.08	0.06	0.04	0.02	0.10	0.05	0.11	0.03	0.09	0.03	0.04	0.05	0.07	0.17	0.05	
(17)	Residing in Singapore	0.40	0.49	0.09	0.12	0.15	0.02	0.16	0.04	0.04	0.24	0.12	0.01	0.10	0.12	0.27	0.67	0.20	0.17

| r | > 0.079 – significant at 1%
 | r | > 0.060 – significant at 5%

IV. RESULTS AND DISCUSSION

Table 4 shows the result of the multinomial logistic regression of foreign firm origin on technology intensity of industry choice. Both the baseline and the multinomial logistic regression models are significant in explaining the choice of industry. The $\Delta\chi^2$ value suggests that the improvement of the multinomial logistic model over the baseline model is significant. Thus, foreign firm origin variables significantly improve the explanatory power of the model.

<Table 4> Multinomial Logistic Regression of Origin of Firms on Technology Intensity of Industry Choice

Variable	Baseline Model		Multinomial Logistic Model	
	High	Medium	High	Medium
Intercept	-0.222 (0.204)	-0.064 (0.217)	-0.764** (0.257)	-0.521+ (0.277)
Affiliations with same activity	0.466*** (0.105)	-0.031 (0.133)	0.442*** (0.106)	-0.063 (0.134)
Affiliations with different activities	0.078 (0.066)	0.211** (0.065)	0.066 (0.067)	0.220** (0.066)

Importing	0.475* (0.220)	0.323 (0.245)	0.473* (0.222)	0.330 (0.246)
Exporting	-0.214 (0.234)	-0.085 (0.263)	-0.253 (0.236)	-0.084 (0.265)
Residing in Thailand	0.109 (0.261)	-0.408 (0.289)	0.143 (0.264)	-0.301 (0.293)
Residing in Malaysia	0.129 (0.168)	-0.626** (0.182)	0.296+ (0.177)	-0.451* (0.192)
Residing in Indonesia	0.506 (0.350)	-0.029 (0.383)	0.636+ (0.356)	0.146 (0.389)
Residing in Philippines	0.447 (0.399)	-0.430 (0.484)	0.523 (0.406)	-0.433 (0.488)
US origin			0.587* (0.243)	0.840** (0.254)
Europe origin			0.683** (0.231)	0.333 (0.261)
Japan origin			0.686** (0.203)	0.353 (0.227)
-2 Log Likelihood (df)	517.260 (16)		854.805 (22)	
X2	88.200***		112.093***	
$\Delta\chi^2$			23.893 (6)***	
Number of subsidiaries	1068	1068	1068	1068

+ p < 0.10; * p < 0.05; ** p < 0.01; *** p < 0.001

US subsidiaries are more likely to engage in both high and medium technology intensive industries than Asian subsidiaries relative to low technology intensive industries. European and Japanese subsidiaries, on the other hand, are only more likely to engage in high technology intensive industries than Asian subsidiaries relative to low technology intensive industries. This is not true for engagement in medium technology intensive industries relative to low technology intensive industries. Hypothesis 1 is thus generally supported – as Asian subsidiaries are less likely to enter into technologically more intensive industries than subsidiaries from the triad nations. This result clearly suggests that firm origin is significant in the choice of participation in the industries. That is, technologically more intensive industries are more popular with firms that originate from the triad nations.

Triad subsidiaries' greater likelihood to engage in high technology intensive industries than Asian subsidiaries can be attributed mainly to their ownership advantages, in particular, their greater endowments in technologies. Investments in the region can be for both exploitation and exploration purposes. Exploitation pertains to the subsidiaries that utilize existing, more advanced technologies to cater to the regional markets in ASEAN. Exploration involves the subsidiaries' venture into new areas effectively supported by the ASEAN infrastructure.

Asian subsidiaries' participation in technologically less intensive industries also suggests their potential use of some of the countries' infrastructures and other factor conditions for reaching out to regional markets. For example, they may be leveraging on Singapore using the country as a base for networking as Singapore tends to draw a large number of more advanced multinational corporations, while other companies may be there just to acquire technological skills and thus capitalizing on the benefits of spillovers. Furthermore, Singapore offers a safe and stable environment for businesses in the region, especially for those that need to diversify economic risks from other operating bases. These firms are also concerned with seeking greater exposure and access to new technologies obtainable in, or through, Singapore; though they are less likely to place emphasis on exploiting the labor-cost factor, as Singapore's labor cost is substantially higher than most other Asian countries.

Asian subsidiaries generally do not possess the necessary technological skills to compete in technologically more intensive industries. This is especially so as such industries entail constant technological advances and changes, and thus require a wide range of technological skills. Such requirements may prove to be too demanding for Asian subsidiaries. In contrast, Triad subsidiaries bring with them advanced technological skills, largely from their home location, as well as the resources necessary for further R&D, which allow them to continue to advance their technologies in Singapore. As technologically more intensive industries command more incentives in terms of technological leadership, the US, European and Japanese subsidiaries are more willing to have a presence in Singapore, presumably a technologically less advanced nation.

These patterns reflect the combination of ownership advantages of foreign subsidiaries from the industrialized countries (consisting of sophisticated technologies, marketing channels and expertise) and Singapore's strategic logistical base. In contrast, Asian firms lack such ownership advantages, and at the same time, Singapore offers no locational advantage to investors seeking lower labor costs than those available in their home base. This pattern, however, slowly blurs when the industries have less differences, i.e. smaller differences when we compare medium to low technology intensive industries.

The results also show that subsidiaries with more affiliations performing the same activity in the region tend to participate in high technology intensive industries as compared to low technology intensive industries. There is no effect on the difference between medium and low technology intensive industries. Subsidiaries that have more affiliations performing the same activity in the region tend to be more focused in their approach – they tend to work within a smaller territory. Such focus is highly necessary in the context of high technology intensive industries. On the other hand, subsidiaries with more affiliations performing different activities in the region are more likely to enter into medium technology intensive industries than low technology intensive industries. There is no effect on the difference between high and low technology intensive industries. Furthermore, the likelihood of importing tends to be higher in high technology intensive

industries as compared to low technology intensive industries. This also suggests that there are certain levels of technology transfer to the region as a result of increased investments, while low technology intensive industries tend to focus on local production.

Table 5 shows the effect of the origin of subsidiaries on diversification strategy of the subsidiaries. Model 1 is the baseline model and Model 2 is the logistic regression model of the effect of firm origin on diversification strategy, controlling for the technology intensity of residing industries. The results partially support Hypothesis 2. The US and European subsidiaries are more likely to diversify than Asian subsidiaries, in contrast to Japanese subsidiaries which are not more likely to do so.

<Table 5> Logistic Regression of Origin of Firms and Technology Intensity of Industry Choice on Diversification Strategy

Variable	Model 1	Model 2	Model 3
Intercept	-0.758*** (0.208)	-1.078*** (0.255)	-1.498*** (0.329)
Affiliations with same activity	0.399*** (0.082)	0.370*** (0.082)	0.386*** (0.083)
Affiliations with different activities	-0.111* (0.045)	-0.093* (0.046)	-0.096* (0.045)
Importing	0.212 (0.203)	0.197 (0.204)	0.193 (0.206)
Exporting	-0.072 (0.214)	-0.060 (0.216)	-0.030 (0.217)
Residing in Thailand	-0.204 (0.231)	-0.150 (0.235)	-0.183 (0.237)
Residing in Malaysia	-0.659*** (0.155)	-0.543** (0.162)	-0.529** (0.165)
Residing in Indonesia	-0.080 (0.296)	-0.057 (0.302)	-0.045 (0.305)
Residing in Philippines	0.436 (0.337)	0.378 (0.342)	0.259 (0.346)
High technology intensity	0.013 (0.165)	-0.036 (0.167)	0.691+ (0.367)
Medium technology intensity	0.261 (0.176)	0.227 (0.178)	0.713+ (0.410)
US origin		0.431+ (0.220)	0.850* (0.395)
Europe origin		0.777*** (0.215)	1.279** (0.378)
Japan origin		0.120 (0.200)	0.716* (0.347)
High technology intensity x US origin			-0.524 (0.519)
Medium technology intensity x US origin			-0.729 (0.554)

High technology intensity x Europe origin			-0.857+ (0.498)
Medium technology intensity x Europe origin			-0.656 (0.562)
High technology intensity x Japan origin			-1.215** (0.467)
Medium technology intensity x Japan origin			-0.509 (0.505)
-2 Log Likelihood (df)	1297.731 (10)	1279.995 (13)	1269.900 (19)
χ^2	56.250***	73.987***	84.081***
$\Delta\chi^2$		17.737(3)***	10.095(6)
Number of subsidiaries	1068	1068	1068

+ p < 0.10; * p < 0.05; ** p < 0.01; *** p < 0.001

Table 5 also shows the results of the moderating effect of technology intensity on the firm origin-diversification relationship, which are depicted in Model 3. Although the overall effect of the interaction terms is insignificant, there are some clear indications that the degree of technology intensity of the industry moderates the effect of firm origin on diversification in the case of European and Japanese subsidiaries in high technology intensive industries. The effect of firm origin on diversification strategy remains strong after the introduction of the moderating terms. Overall, US subsidiaries are more likely to diversify than Asian subsidiaries regardless of the technology intensity of the industry in which they reside. European and Japanese firms are also, in general, more likely to diversify than Asian subsidiaries. However, this is moderated in the context of high technology intensive industries, as seen from the negative significant coefficients of the respective interaction terms.

Technologically more intensive industries are characterized by rising costs of development, rapid technological diffusion, compression of product life cycles, product and market uncertainties, and globalization. These demand a large set of technologies, which in turn requires a wide range of competencies. Firms in such industries must constantly innovate in order to stay competitive. Technologies are path dependent, i.e. they follow a certain trajectory. Hence, when firms diversify, they will have to acquire technological skills that they do not possess, which they may not have resources for or competencies to assimilate. Significant risks are also involved in the act of diversifying. On the other hand, competitive advantages in technologically less intensive industries are generally more difficult to protect, as there are less technological competition and product and market uncertainties. Hence, firms in technologically less intensive industries may not have the incentive to engage in diversification in order to concentrate their resources on their main activities.

European MNEs have the disadvantage of geographical distance from ASEAN countries and the substantial costs involved in establishing a number of subsidiaries. In addition, it is likely that most European MNEs are not familiar with Asian markets. Thus, having a diversified portfolio will lower the associated risks. However, in the context of high technology intensive industries, despite even more need to lower risks, the requirements to compete deem concentration more important. In other words, European subsidiaries are strategically better off focusing on their core activity. Likewise, Japanese subsidiaries exhibit the same behavior as European subsidiaries. US subsidiaries, on the other hand, have the consistent strategy of being more likely to diversify than Asian subsidiaries.

It is also important to note the results of two control variables. The number of affiliates performing the same activity as the subsidiary has a positive significant effect on the focal subsidiary's likelihood to diversify. It is likely that as the number of such affiliates increases, the regional market size covered by each of these subsidiaries is reduced. As such, there may be a tendency to diversify in order to enhance firm growth. From the corporate perspective, it is essential for subsidiaries to cover substantial market grounds without impinging on each other. Conversely, the number of affiliates performing different activities from the subsidiary has a negative significant effect on the focal subsidiary's likelihood to diversify. With many subsidiaries performing different activities, each focal subsidiary will attempt to focus on its main activity to avoid competition, as well as to reap the benefits from economies of scale. From the corporate perspective, the economies of scale generated from specialized business units may reap more substantive profits than less specialized business units.

These findings, together with the results from the hypotheses, suggest that the corporate parent has a significant effect on subsidiaries' diversification strategy. Specifically, this is not just in terms of the ownership advantages derived from the corporate parent, but also from coordinating the strategic fit between the focal subsidiary with both the parent and the affiliates under the same corporate umbrella.

V. CONCLUSION AND IMPLICATIONS

Though the role of a MNE subsidiary has received increasing attention in the strategic management literature, little has been done with respect to the effect of external factors such as location, industry, etc. that shape subsidiary behavior. For the survival of a subsidiary, it is important that it is not just profitable within itself, but that it also creates value for the corporate parent. Thus, the coordination and fit of strategies of a focal subsidiary to both the parent company and other subsidiaries under the same parent is

essential.

This paper examines the corporate parent effect on the diversification strategies of triad and Asian subsidiaries in the ASEAN region. I find that triad subsidiaries tend to participate in high technology intensive industries, and are more likely to diversify. In addition, I also find that the subsidiary diversification strategy is very much affected by the number of affiliations in the region under the same corporate parent that perform the same or different activities. These results shed light on the importance of corporate parent on subsidiary-level strategy and the role of subsidiary within an economically integrated region. That is, the role of subsidiaries as ongoing concerns and value creators for corporate parents is in itself confined to the fit within the corporate umbrella. The implications for strategy research, which tend to focus on strategies at the business or corporate levels, are the increasing need to integrate the analysis of both the corporate and business levels. Observation of sub-optimal strategies at the business level could be a partial compromise of the greater value generated by all business units for the corporate parent.

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