



Corporate Diversification and Firm Performance: The Moderating Role of Contractual Manufacturing Model

Chia-Wen Hsu^{a,b*}, Heng-Yih Liu^b

^a Department of International Business, National Taiwan University, Taiwan

^b Department of International Business, Yuan Ze University, Taiwan

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Abstract

Corporate diversification has been a central issue of research concern in strategic management. Previous research basically suggests that a managed diversification may enhance corporate performance. However, few studies illuminate how a firm's operating context affects the relationships between corporate diversification strategies and firm performance. By taking this weakness into research consideration, this paper examines the features of diversification, a firm's operating context and its impacts on economic performance in detail. Using a longitudinal data containing firm-level operation information during 1997-2002, the empirical investigation finds that product diversity and customer diversity are positively associated with firm performance, whereas geographic diversity is negatively associated with firm performance. However, contractual manufacturing model is not only positively associated with firm performance, but also acts as a moderator between product diversity and firm performance. Implications of this result and suggestions for future research are discussed.

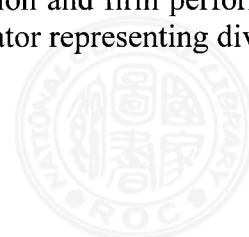
Keywords: Corporate diversification, contractual manufacturing model, firm performance

1. Introduction

Corporate diversification and firm performance has been widely studied in the management literature over the past decades (e.g. Rumelt, 1974, 1982; Hoskisson and Hitt, 1990; Wan and Hoskisson, 2003). Previous research basically suggests that a managed diversification may enhance corporate performance. For example, Hitt et al. (1997) indicated that firms can achieve synergies by an integration of product and international diversification. Kim et al. (1989) also found that a combination of related-product as well as international diversification strategy helps the firm to achieve profit stability. Thus, critical to the attainment of synergy between product and international diversification lies in the firm's knowledge of how to best manage corporate diversification in a synergistic manner.

Despite the importance of this research topic, few studies consider the question of what is a relevant moderator that has significant influence on the relationship between corporate diversification and firm performance. For instance, contextual difference recently becomes more relevant when one attempts to extend current theoretical development. Although Wan and Hoskisson (2003) found that home country environment is an important component moderating the relationship between corporate diversification and firm performance. Home country environment can be regarded as an external moderator representing diverse sets of

*Corresponding author. Email: cwhsu@saturn.yzu.edu.tw



opportunities and constraints for firm. More studies are required to reveal if any internal moderator within the firm can also moderate the relationship between corporate diversification and firm performance.

The purpose of this study is to demonstrate how a firm's contractual manufacturing model affects the relationship between corporate diversification and firm performance. This investigation evaluates performance consequences of both product and international diversifications with particular emphasis on the relationship among product diversity, customer diversity, and geographic diversity with firm performance. In particular, we examine the moderating role of a firm's contractual manufacturing model on the corporate diversification – performance relationship. The key argument put forth in this study is that fully leveraging existing capabilities without upgrading new capabilities will offset benefits from corporate diversification. In the following sections, the literature and theoretical developments are discussed, and several hypotheses are formulated. This is followed by the description of the methodology and of data used in the empirical study, and the discussion of the results. Finally, conclusions drawn from this study are presented.

2. Theoretical development and hypotheses

In light of heavy attention on the topic of the effect of corporate diversification on a firm's performance, we reviewed key articles on the subject published in the leading management journals. Our review resulted in the summary of a table that included corporate diversification strategy, the authors, diversification – performance relationship, and explanatory variables. For comprehensive reviews of theoretical development, please refer to we recommend the studies by Palich et al. (2000) and Hitt et al. (2006) which provide an excellent survey of the corporate diversification literature.

As the conceptual framework in Figure 1 suggests, we propose a positive relationship between product diversification and firm performance. Furthermore, we separately propose a positive relationship between customer diversity and firm performance, and a negative relationship between geographic diversity and firm performance. More importantly, we expect the firm's contractual manufacturing model to moderate the relationship between corporate diversification and firm performance.

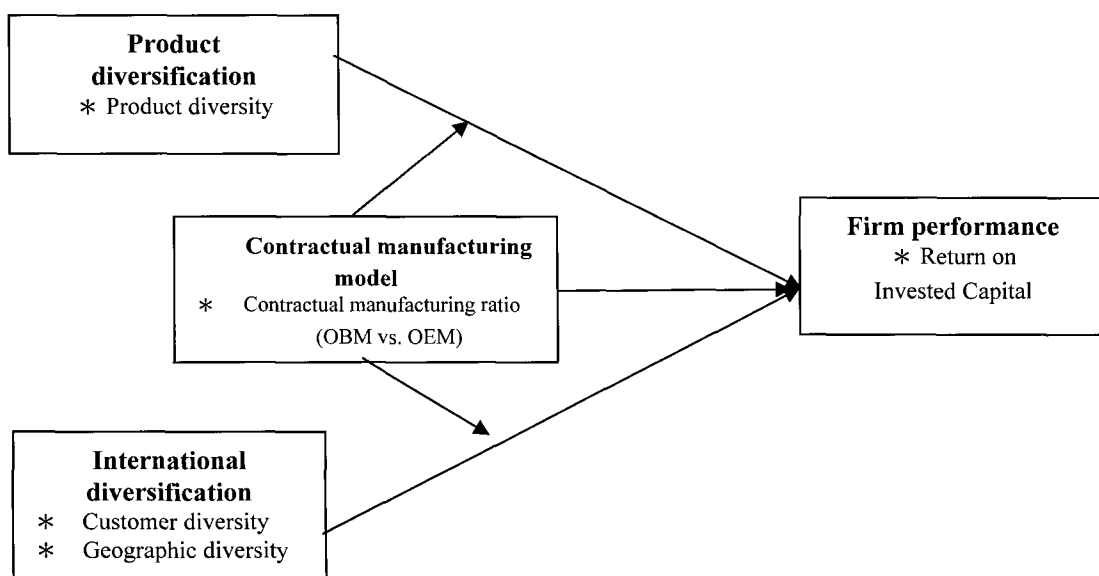


Figure 1. Conceptual framework

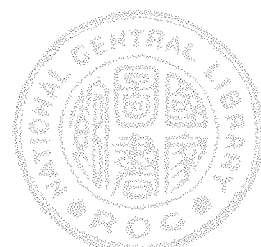
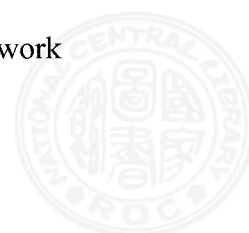


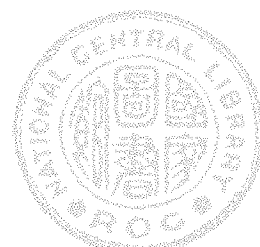
Table 1. Corporate diversification and firm performance research

Corporate Diversification strategy	Authors	Diversification – performance relationship	Explanatory variables
Product diversification	Cave, 1981; Rumelt, 1982; Markides, 1992; Lang & Sstulz, 1994.	Linear relationship (Positively related)	Market power Internal market efficiencies Firm-specific assets
	Grant, Jammie & Thomas, 1988; Lubatkin & Chatterjee, 1994	Inverted-U relationship	Limited diversification
	Wernerfelt & Montgomery, 1988; Markides & Williamson, 1994	Intermediate relationship	Marginal decline of diversification benefit.
International diversification	Rugman, 1979; Delios & Beantish, 1999; Geringer, Tallman, & Olsen, 2000	Linear relationship (Positively or negatively related)	Exploitation of market imperfections Coordination inefficiencies
	Hitt, Hoskisson, & Kim, 1997; Lu & Beamish, 2001	Curvilinear relationship (Inverted-U or U-shaped curve)	Increasing transaction cost and managerial information processing
	Contractor, Kundu, & Hsu, 2003; Lu & Beamish, 2004; Thomas & Eden, 2004	Sigmoid relationship (S-curve)	Liability of foreignness Liability of newness Coordination cost

2.1 The background of contractual manufacturing in Taiwan

In the context of increasing competitive pressure in the early 1980s, Western firms, for the purpose of cost reduction, came to consider Asian firms as their dominant outsourcing partners. Through such cooperative partnerships based on inter-firm specialization, Asian suppliers were indeed able to enhance their competitive cost position (Bettis et al. 1992). Because of rapid technological progress and increasing scale economies, adopting industrial outsourcing initiatives has become more critical to a firm's competitiveness in the so-called horizontally configured industries (Yoffie, 1997). The simplest form of cooperative arrangement is original equipment manufacture (hereafter, OEM). In the OEM supply relationship, Asian firms provide manufacturing services based on product designs and standards furnished by Western vendors. With the growing manufacturing competence of Asian firms, the OEM system enables firms to export large volumes of products using international brands and distribution channels.

In the contractual manufacturing context, a supplier is able to leverage its existing competence by conducting multiple business activities using a competence-based system of growth management. One applicable option is to strategically engage in multiple buyer-seller relationships. A contractual manufacturer can realize such an operation by directing its products toward a variety of different buyers, which may be located in different geographic areas or market segments. This kind of business operation, based on providing contractual manufacturing services for multiple buyers, is, in fact, quite usual in global markets (Bartlett and Ghoshal, 1995).



2.2 Product diversification and firm performance

The resource-based view (RBV) provides a foundation for understanding why and how firms diversify, thus helping us to clarify the types of resources and capabilities that have value and lead to strategic advantage for diversified firms (Barney, 1991; Chatterjee and Wernerfelt, 1991; Mahoney and Pandian, 1992). Firms tend to diversify over time to make use of underutilized resources, including excess capacity, idle workers, under-challenged engineers, and excess capital, systems and infrastructure (Penrose, 1959; Mahoney and Pandian, 1992). Slack resources that otherwise might not be used may be put to good use (Penrose, 1959), and scarce resources may be bargained over by a larger and more powerful organization (Porter, 1985). Firm performance may be superior to that of its competitors in situations where combining separate businesses permits preferential access to the types of strategic assets underpinning the firm's cost or differentiation advantage (Markides and Williamson, 1996). The more specialized the resources, the more diversification may be required to sustain growth over time and fully utilize capabilities (Penrose, 1959). These resources and knowledge are frequently worth more within the firm than if sold on the open market, and must be maintained if the firm is to sustain its competitiveness.

Correspondingly, the competence-based view also proposes that exploring new resources and capabilities in line with exploiting existing ones is conducive to sustainable competitive advantage (e.g. Sanchez et al. 1996). The exploitative nature of firm operation is a process of competence leveraging that occurs when a firm applies its existing competence to current or new markets, and the explorative nature of firm behavior involves a process of competence building that involves qualitative change to existing resources or capabilities (Sanchez and Heene, 1997). Therefore, a firm may leverage its existing competence to exploit the value of current competence and achieve economies of scope (Sanchez and Heene, 1997). From this theoretical standpoint, we have to examine the output relatedness for each product diversification strategy. In so doing, product diversity is reaching a new product area that has similar competence as the existing one, which resembles competence leveraging, and can reduce uncertainty or develop new business opportunities.

To summarize, based on both the resource-based view and the competence-based perspective, leveraging strategic resources and capabilities across product lines should provide economy of scope to business-related competences in addition to appropriating rents from more customers. We expect that firms could enhance performance, while leveraging existing competences via product diversification into new business stays within the scope of the firm's strategic resources and capabilities. Thus, the following hypothesis can be reasonably established:

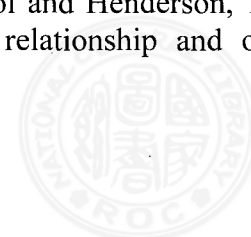
Hypothesis 1: Product diversity is positively associated with firm performance.

2.3 International diversification and firm performance

In this paper, we postulate that customer diversity and geographic diversity are important explanatory variables with regard to firm performance. As for international diversification management, we propose these two dimensions as a framework for the evaluation of the realized diversity scope, based on international operation by Taiwanese hardware manufacturing firms.

2.3.1 Customer diversity and firm performance

Previous research has suggested that the buyer-seller relationship exerts a significant effect on a supplier's performance (e.g. Porter, 1980; Cool and Henderson, 1998). In this sense, the analysis of dynamics of interorganizational relationship and organizational



development becomes more vital for management scholars and practitioners (e.g. Levinthal and Fichman, 1988; Fichman and Levinthal, 1991). This dynamic process suggests that adaptation over time may have important implications for interorganizational relationship development. More clearly, the result of the buyer structure for a contract manufacturer centers on the level of a buyer's diversity. Within the context of contract manufacturing activities, relying on a limited number of large buyers or on many smaller buyers will reflect different degrees of resource dependence (Pfeffer and Salancik, 1978). The former weakens the supplier's bargaining power and results in slimmer profits. To elaborate, if a supplier relies on a very limited number of large buyers, profitability may be squeezed due to a weaker bargaining power. Large buyers take advantage of their size and may not leave too much room of profitability for the supplying firm. For example, in their survey of the disk drive industry, Christensen and Bower (1996) show that the reason why leading firms may fail when faced with technological change is they listen too carefully to their customers and requisite impetus does not develop. However, the good thing is that the supplier's sales volume may be more readily ensured due to the quasi-captive nature of the contractual supply. Hence, a flexible customer strategy might be useful for firms to maintain their competitive edge.

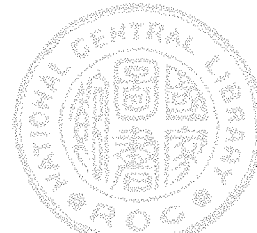
Specifically, the synergistic effects derived from leveraging current competence to serve multiple customers can be realized with various benefits. First, maximizing the utilization of production capacity can further improve the manufacturer's cost position in the highly competitive contractual supply business. Second, a contractual manufacturer may be able to feedback the product information from buyers, and this, in turn, may strengthen the firm's manufacturing competence. For instance, George Morrow, executive vice president of global commercial operations in Amgen Biotechnology, agrees on the importance of focusing on customers. They visit 10-20 customers in one week to find out what's working and what's not. They pay attention to their customers' feedback and want to deliver higher quality product to their customers (Xavier, 2005). Both could result in higher performance directly relevant to future collaboration with new customers. Third, engaging in multiple buyer relationships allows the manufacturer to be more flexible in adjusting its excess capacity to respond to the temporary fluctuations of market demand.

In other words, whether a supplier is engaged with a few buyers or with many buyers is a factor which might have influence on the firm performance. Leveraging existing competence in order to serve multiple buyers will likely generate significant synergies in capacity utilization and performance enhancement. Therefore, we can establish the following hypothesis:

Hypothesis 2: Customer diversity is positively associated with firm performance.

2.3.2 Geographic diversity and firm performance

In the international diversification literature, the consensus view that the main reason for geographic expansion is exploitation of market imperfections (Rugman, 1979) has led to extensive empirical testing of the linear and positive relationship between multinationality and performance often with mixed and even conflicting results. Thus, while some studies confirmed the positive relationship (Delios and Beamish, 1999), some others showed negative relationship (Geringer et al. 2000). More recently, taking into account the transaction and coordination costs involved in internationalization, some scholars advanced the possibility of a curvilinear relationship between the two. While Hitt et al. (1997) and Qian (2002) proposed an inverted U-shaped relationship; Lu and Beamish (2001) suggested a U-shaped curve. There is even an S-curve hypothesis advanced to reconcile the alternative explanations (Lu and Beamish, 2004).



These studies that probed the relationship between geographic scope and performance have achieved more mixed and even conflicting results than investigations dealing with product diversification and performance. Mostly, existing literature examining the link between geographic scope and firm performance argues that the superior performance of MNEs is derived from their ability to achieve higher returns from exploiting proprietary assets, such as brand equity, patents, or unique processes, across a greater number of markets. Advantages also arise from increased market power, the ability to source lower cost inputs, and the spread of risk across various host country settings (Kim et al., 1993). However, several significant costs are associated with geographic dispersion while the firm tries international diversification. For example, it creates a huge demand for coordinating costs in terms of managerial efforts in handling products as well as geographic dispersion. Increasing geographic dispersion can greatly increase transaction costs and the demand for managerial information-processing ability (Hitt et al. 1994). In order to obtain the benefits of economies of scale and scope, firms inevitably incur a high level of coordination efforts across business units in multiple geographic areas. Thus, the costs of coordination, distribution, and management among different product categories rise with geographic dispersion. That is, if the geographic scope extends beyond a certain level, the costs associated with greater amount of coordination complexity caused by a larger scope of product diversification then start to outweigh the benefits (Palich et al. 2000). Thus, we can construct the following hypothesis:

Hypothesis 3: Geographic diversity is negatively associated with firm performance.

2.4 Contractual manufacturing model and firm performance

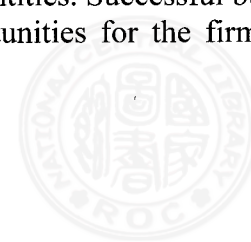
2.4.1 The effect of contractual manufacturing model on firm performance

According to Penrose's (1959) resource-based approach, competence leveraging is attributable to the recognition of the indivisibility of existing resources, realization of economies of scope, or simply static synergy (Teece, 1982). In the context of the contractual manufacturing relationship, a manufacturer could, for example, leverage its competence by extending its coverage to multiple customers and geographic areas based on a manufacturing-based relatedness operation (John and Harrison, 1999). Such relatedness takes firms into new but similar settings where they have unique resources or capabilities, encouraging and yielding economies of scale and scope (Hill et al. 1992; Markides and Williamson, 1996; Stern and Henderson, 2004). Economies of scope arise not just from common in-market or distribution channels but also from productive resources and competences (Qian, 2002). A series of product expansions could, for example, be derived from the already existing inherent competence of the firm (Prahalad and Hamel, 1990). The more use is made of such already-existent competence in the production of a firm, the greater is the potential for organizational synergy. In sum, we can establish the following hypothesis:

Hypothesis 4: A high level of contractual manufacturing model achieved by a contractual manufacturer is positively associated with firm performance.

2.4.2 Interaction effects of contractual manufacturing model and corporate diversification

The building of new competences and the leveraging of existing ones create a variety of different challenges to organizations. Competence building refers to the qualitative changes in a firm's resource configurations, and is thereby explorative in nature (March, 1991). The effectiveness of such qualitative changes is dependent upon a firm's entrepreneurial efforts and the mutual learning capabilities of its organizational entities. Successful building of new competence should generate novel value-creating opportunities for the firm. However, a



kind of learning myopia, often encountered in firms, results in a tendency to neglect the long term, omit the big picture, and overlook the causes of failure (Levinthal and March, 1993). Competence leveraging, on the other hand, refers to quantitative changes in the firm's assets or capabilities with a low degree of explorative learning and a high degree of exploitative learning (March, 1991; Sanchez et al. 1996). Formally put, competence leveraging refers to a firm's efforts in applying its existing competence to current or new market opportunities. For instance, a series of product expansions might be derived from the same core competence of the firm (Prahalad and Hamel, 1990). Firms thus exploit the potential value of their current competencies in order to enjoy economics of scope (Sanchez and Heene, 1997). Opportunities for leveraging the existing stock of competence are attributable to the existence of resource indivisibility and replicability, so that economies of scope (Teece, 1982) or static synergy (Christensen and Foss, 1997) can be realized.

In the context of contractual manufacturing, a manufacturer may leverage its manufacturing competence, in synergetic manner, by targeting multiple customers. The leveraging of current distinctive competencies is based on the renewed deployment of important organizational capabilities, and its success depends on the effectiveness of the current resources within the organization, and their ability to offer unique, often renewed, plus-only product-attributes, and thus to fulfill new customer needs. As a result, embedded risk level is moderately low and the firm may enjoy moderate short run benefits.

The leveraging of existing competences involves a relatively lower level of risk. Nevertheless, the potential benefit of such methods, which simply replicate existing competences, is usually marginal, and hence yields a diminished economic return. Further, competence leveraging may also invite the potential hazard of imitation (Kogut and Zander, 1992), which may dilute a contractual manufacturer's competitive advantage in the long run. Indeed, such leveraging activity is a contributor to the kind of uncertain environment that may cause a diminishing return on a firm's current competence and put its long run survival in danger (Chesbrough, 2002). It is reasonable to reckon that this type of leveraging logic may possibly reach a saturated point where process technology is mature and price competition is fierce. This easily leads to thin profit just like what we have observed for most of Taiwan's contractual manufacturers. Thus, a firm needs to free itself from the kind of learning myopia that may limit the firm's capacity to sustain competitive advantage in the long run (Levinthal and March, 1993). In contrast, competence building is a forward looking for new competence by which a firm elaborately regards as a growth engine that sets the ground for future prosperity. This focus is rather a long term consideration. To maintain the optimal balance between economic return and business risk, a firm is best advised to undertake both competence building and competence leveraging initiatives in the course of competence-based growth (Penrose, 1959; Wernerfelt, 1984).

In sum, leveraging existing competence for the purpose of providing contractual manufacturing services implies a full utilization of current competences in order to realize certain short run benefits while undertaking this type of exploiting activity may incur lower embedded risk. However, if a firm fails to upgrade or renew competence, its competitive advantage may not be sustained in the long run. This leads us to our next hypotheses:

Hypothesis 5a: A high level of contractual manufacturing model achieved by a contractual manufacturer negatively moderates the relationship between product diversity and firm performance.

Hypothesis 5b: A high level of contractual manufacturing model achieved by a contractual manufacturer negatively moderates the relationship between customer diversity and firm performance.



Hypothesis 5c: A high level of contractual manufacturing model achieved by a contractual manufacturer positively moderates the relationship between geographic diversity and firm performance.

3. Methodology

3.1 Data sources and sample

The sample was derived from the companies listed in the information and electronics technologies category on the Taiwan Stock Exchange (TSE). After excluding software, information service, and distribution-based companies, our final sample contained 124 hardware manufacturing companies in Taiwan, including electronic components (69 companies), consumer electronics (20 companies), computer peripherals (24 companies), and computer system (11 companies). We then collected the operating and financial information released by the sample companies under the Taiwan Economic Journal (TEJ) database, a reputable data bank in Taiwan, and sample companies' annual report. To include the information of all 124 companies, our time frame starts from 1997 to 2002 as the investigative time period for the information from these 124 companies.

3.2 Regression model specification

We specified an empirical model to incorporate the hypothesized determinants of a firm's performance for empirical testing, as shown in the following equation :

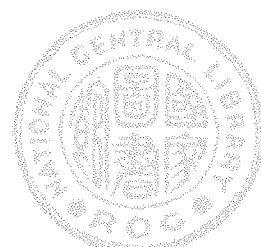
Return on Invested Capital $_{i,t} = \beta_0 + \beta_1 \text{product diversity}_{t-1} + \beta_2 \text{customer diversity}_{t-1} + \beta_3 \text{geographic diversity}_{t-1} + \beta_4 \text{contractual manufacturing model}_{t-1} + \text{interaction} + \text{controls} + \varepsilon_{i,t}$, where i indicates the number of the firm taken from our sample and t represents the year investigated, *Return on Invested Capital* $_{i,t}$ represents the firm-level performance for company i in year t ; and ε_{it} is the disturbance term. The subscripts indicated the time lags we used for the theoretical variables to point out concerns regarding potential reverse causality in cross-sectional risk models (Bromiley, 1991).

Because the data structure contains both cross-sectional and time-series observations, we employed the panel data techniques to test our hypotheses. For hypotheses testing, we used random-effects pooled cross-sectional time-series regression model to investigate the relationship between corporate diversification and firm performance for two reasons. First, random-effects model is the appropriated specification over the fixed-effects model for panels over short periods (Hsiao, 1986; Yin and Zajac, 2004). The time frame for this study is 6 years from 1997 to 2002, which makes random-effects model an appropriate method. Second, fixed-effects estimators cannot be computed if there are regressors that do not vary within the groups (Yin and Zajac, 2004). In the following paragraphs, we shall briefly explain the dependent, independent, and control variables in this study.

3.3 Variables and measurements

3.3.1 Dependent variable

Performance. We employed the *Return on Invested Capital* (ROIC) in this study to measure profitability, calculated as operating returns divided by the amount of capital invested for firm i in year t . In this investigation, operating returns are the company's earnings before interest, taxes, and depreciation minus the net gain from non-operating investment. The denominator also excludes capital from non-operating investments.



3.3.2 Independent variables

Product diversity. We measured the contractual manufacturer's product portfolio and calculated the level of product diversity. This measure was constructed by taking 1 minus the sum of square sales percentage of each product category of the firm i in year t . A high level of product diversity therefore reflects a manufacturer's high degree of diversity on product structure, hence a high degree of competence leveraging.

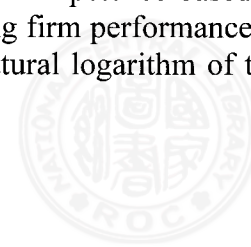
Customer diversity. This study evaluated the manufacturer's buyer structure and calculated the level of customer diversity. This measure was constructed by taking 1 minus the sum of the square sales percentage for each principal external buyer that accounted for 10 percent or more of the consolidated company revenue. This was fed into the estimation equation to calculate the firm's customer diversity. A high level of customer diversity therefore reflects a manufacturer's high degree of diversity on buyer structure, hence a high degree of competence leveraging.

Geographic diversity. This study used a geographic diversity measure, calculated by taking 1 minus the sum of square sales percentage of each external sale region or country, and feeding it into the estimation equation, in order to evaluate the manufacturer's geographic diversity. The concept is similar to the Hirschman-Herfindahl index used for measuring market concentration. A high level of geographic diversity therefore reflects a manufacturer's high degree of diversity on market structure, hence a high degree of competence leveraging.

Contractual manufacturing model. To identify the degree that a contractual manufacturer leverages its current competence of providing subcontracting services to own-brand business, one has to evaluate the manufacturer's sales structure. By simply dividing a manufacturer's sales revenue into those generating from providing subcontracting services, this study used contractual manufacturing ratio as the proxy for contractual manufacturing model, calculated by the subcontracting revenue divided by total revenue. This refers to the degree of manufacturing competence leveraging mainly at the output stage. A high contractual manufacturing ratio therefore reflects a manufacturer's high degree of reliance on contract manufacturing business (i.e. OEM business model).

3.3.3 Control variables

Because the current empirical context focuses on a broadly defined industry, it was unnecessary to control for inter-industry heterogeneity. Nevertheless, four firm-level control variable sources were specified because of their potential impact on hardware manufacturer's performance. The *R & D intensity*, calculated by the amount of research and development expenditures as a percentage of a firm's total sales revenue, indicates the level of a manufacturer's efforts in competence building or upgrading. The *Degree of Value-Added*, calculated by the amount of direct labor and overhead divided by total costs of goods sold, refers to a manufacturer's efficiency in internal production activities. As the global computer industry becomes more disaggregated along the value chain, the picture of division of labor is changing. This may affect the degree of value creation of a firm in particular segment, which in turn may influence competence management methods and hence eventual performance. Thus, we used the firm's degree of value-added as the potential source of firm heterogeneity within the current empirical context that needs to be controlled. The *Firm Leverage*, calculated as total debt divided by total equity, acted as a good proxy for the firm's financial structure. Effects derived from financial leveraging should be removed in order to capture a true picture of the effects of competence-based management on performance. As suggested by many studies investigating firm performance (Ravenscraft, 1983), we added a *Firm Size* variable, measured as the natural logarithm of the total sales



revenue of the sample firm, in the equation to control for the economy of scale factor.

4. Analysis and results

4.1 Descriptive statistics

Table 2 provides descriptive statistics for all variables. Note that these statistics are based on the annual data for six years (1997-2002), and thus the size of the pooled sample set becomes 744 (=124x6). As evidenced by these statistics, the sample firms enjoyed an average 12% annual return on invested capital. Further, these firms reflected a high degree of dependence on contractual manufacturing services in these industries, and characterized by servicing multiple customers with diverse geographic areas.

Table 2. Descriptive statistics and correlations^a

Variables	Mean	S. D.	1	2	3	4	5	6	7	8
1 Return on invested capital (ROIC _t)	0.12	0.11								
2 Firm size (SIZE _t)	14.89	1.38	0.17 *							
3 Leverage (LEVERAGE _t)	0.39	0.14	-0.29 *	0.15 *						
4 R&D intensity (RDI _t)	0.03	0.04	-0.03	-0.20 *	-0.21 *					
5 Degree of value-added (VAD _t)	0.42	0.22	0.16 *	-0.30 *	-0.17 *	-0.25 *				
6 Product diversity (PD _t)	0.39	0.23	0.04	0.00	-0.11 *	0.07 *	-0.01			
7 Contractual manufacturing model (CMM _t)	0.81	0.20	0.13 *	-0.12 *	0.03	-0.10 *	0.21 *	-0.21 *		
8 Customer diversity (CD _t)	0.90	0.11	-0.01	-0.15 *	-0.03	-0.20 *	0.26 *	0.20 *	0.01	
9 Geographic diversity (GD _t)	0.57	0.17	0.08 *	0.30 *	-0.08 *	0.23 *	-0.08 *	0.22 *	-0.22 *	0.16 *

^a N = 744

* p < 0.05

4.2 Regression results

The pooled regression results using the firm performance measured as the dependent variable is given in Table 3. To test proposed hypotheses, we specified the explanatory variable for proxy product diversification (i.e. Product diversity) and for measuring international diversification (i.e. customer diversity and geographic diversity). All equations were well specified with significant Wald chi-square values. (all at p < 0.01). The details on empirical results are discussed in order.

With regard to the estimation results from Table 3, we found that product diversity exerts a significant positive impact on firm performance. This result suggests that the product diversity of the firm is a critical determinant of the firm performance. Several

product diversification literatures have argued that the product diversity have significant impact on firm performance and the results in this paper are in line with prior observations that product diversity is positively associated with firm performance. This result indicates Hypothesis 1 is supported.

Table 3. Random effects GLS regression analysis of effects of corporate

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	-0.15 *** (0.05)	-0.29 *** (0.07)	-0.35 *** (0.08)	-0.30 *** (0.07)	-0.38 *** (0.10)	-0.40 *** (0.11)
SIZE _{<i>i</i>}	0.02 *** (0.003)	0.02 *** (0.00)	0.02 *** (0.00)	0.02 *** (0.00)	0.02 *** (0.00)	0.02 *** (0.00)
LEVERAGE _{<i>i</i>}	-0.16 *** (0.03)	-0.17 *** (0.03)	-0.17 *** (0.03)	-0.17 *** (0.03)	-0.17 *** (0.03)	-0.17 *** (0.03)
ROIC _{<i>i-1</i>}	0.48 *** (0.04)	0.46 *** (0.04)	0.46 *** (0.04)	0.46 *** (0.04)	0.46 *** (0.04)	0.46 *** (0.04)
RDR _{<i>i</i>}	-0.39 ** (0.20)	-0.34* (0.21)	-0.28 (0.21)	-0.33 (0.21)	-0.34* (0.21)	-0.28 (0.21)
RDR _{<i>i-1</i>}	0.11 (0.10)	0.20* (0.10)	0.19* (0.10)	0.21** (0.11)	0.21** (0.10)	0.20* (0.11)
VAD _{<i>i</i>}	0.08 *** (0.02)	0.08 *** (0.02)	0.07 *** (0.02)	0.07 *** (0.02)	0.07 *** (0.02)	0.07 *** (0.02)
PD _{<i>i-1</i>}		0.03* (0.02)	0.19 *** (0.07)	0.03* (0.02)	0.03 (0.02)	0.18 *** (0.08)
CD _{<i>i-1</i>}		0.06* (0.04)	0.07* (0.04)	0.07* (0.04)	0.07* (0.04)	0.07* (0.04)
GD _{<i>i-1</i>}		-0.06** (0.03)	-0.06** (0.03)	-0.06** (0.03)	0.09 (0.12)	0.01 (0.13)
CMM _{<i>i-1</i>}		0.05** (0.02)	0.13 *** (0.04)	0.03 (0.03)	0.15* (0.09)	0.16* (0.09)
PD _{<i>i-1</i>} *CMM _{<i>i-1</i>}			-0.20** (0.09)			-0.18** (0.09)
CD _{<i>i-1</i>} *CMM _{<i>i-1</i>}				0.00 (0.00)		0.00 (0.00)
GD _{<i>i-1</i>} *CMM _{<i>i-1</i>}					-0.17 (0.14)	-0.08 (0.14)
R ²	0.36	0.38	0.38	0.38	0.38	0.38
Wald chi-square	344.36***	363.89***	371.91***	363.99***	365.62***	371.67***

1. *** P<0.01, ** P<0.05, * P<0.1

2. Standard deviation in parenthesis

For the international diversification impact, the firm's customer diversity has a significant positive impact on the return on invested capital. This result shows that a manufacturer characterized by leveraging activity through multiple customers will have higher performance. This result also supports Hypothesis 2. On the other hand, the result from model 2 shows that firms with high geographic diversity will have lower return on invested capital. This result provides the same evidence as the prior argument that increasing geographic dispersion can greatly increase transaction costs and the demand for managerial information-processing ability (Hitt et al., 1994). Therefore, Hypothesis 3 is supported.

Regarding the impact of contractual manufacturing model on firm performance, results show that a contractual manufacturer characterized by higher contractual manufacturing ratio will have a higher level of return on invested capital. Thus, Hypothesis 4 receives support, indicating that the performance of contractual manufacturers is significantly influenced by contractual manufacturing model. Models 3-6 present the analysis of moderating effects, where contractual manufacturing model is used as a moderator to examine the relationship between corporate diversification and firm performance. From the results in model 3 and model 6, contractual manufacturing model negatively moderates the relationship between product diversity and firm performance. These results indicate a full support for Hypothesis 5a. Further, our hypothesis 5b and 5c suggest that the performance impact of customer diversity and geographic diversity are moderated upon by the levels of contractual manufacturing model. Models 4-6 show that the degree of contractual manufacturing model has no effect on the relationship between international diversification and firm performance. Therefore, our empirical results did not support Hypothesis 5b and

Hypothesis 5c.

5. Discussion

Conventional strategic management theory suggests that corporate diversification is critical to the growth of a firm. This paper has examined how a firm's contractual manufacturing model affects the relationship between corporate diversification and firm performance. This investigation evaluates performance consequences of both product and international diversifications with particular emphasis on the relationship among product diversity, customer diversity, and geographic diversity with firm performance. In particular, we examined the moderating role of firm's contractual manufacturing model on the corporate diversification – performance relationship. The key argument put forth in this study is that fully leveraging existing capabilities and without upgrading new capabilities will offset benefits from corporate diversification.

Using the Taiwan's hardware manufacturing companies as our empirical context, we find that a firm's product diversity, customer diversity and contractual manufacturing model will lead to better ex-post economic result. As discussed before, a firm may leverage its existing competence to exploit the value of current competence and achieve economies of scope (Sanchez and Heene, 1997). Firms with strong competences at home can exploit these in international markets (Bartlett and Ghoshal, 1989). In other words, the higher the exploitation of firm's existing competences, the higher the firm's performance.

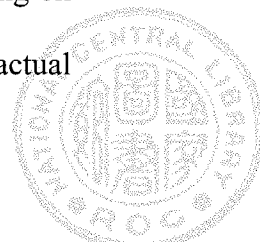
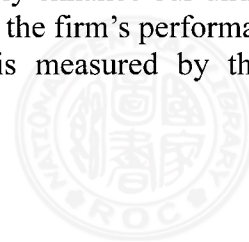
In addition, the level of contractual manufacturing model significantly moderates the relationship between product diversification and firm performance. That is to say, focusing too much on leveraging existing competence for contractual manufacturing business without building or upgrading competence does not guarantee a firm's success. The key lesson that these empirical results deliver for Taiwanese contractual manufacturers is to expand the scope of value creation through best managed corporate diversification in a synergistic manner by continuous upgrading or building competence from contractual manufacturing business to own-brand business.

As what we mentioned in prior discussion, empirical testing of the relationship between corporate diversification and firm performance often with mixed and even conflicting results. In order to check the robustness of present results, we ran two additional tests. First, we checked the curve-linear relationship between corporate diversification and firm performance. Second, we also tested the business group effect separately. Both tests indicated that they did not affect the present results. In sum, our efforts not only validate but also contribute to a productive conversation and comprehensive understanding of corporate diversification research.

5.1 Limitations and future research directions

The present research contains several deficiencies due to the exploratory nature of the research design and limitations of some measurements. First of all, we used geographic diversity as the measurement for a firm's efforts in international diversification. The firms in Taiwan's information technology industry are characterized by high major buyer concentration together with high geographic expansion, especially for the firms with high contractual supply ratio. In other words, the effect of geographic diversity could be affected by firm's major buyer configuration. Creating relevant measures that are able to reflect a rich content of the buyer-supplier relationship will definitely enhance our understanding on the relationship between the geographic diversification and the firm's performance.

Second, our assessment of product diversification is measured by the contractual



manufacturer's product portfolio. As what we have delineated in methodology section, the TEJ database provides the firm's product portfolio annually. Nevertheless, firms classified product category differently—some used broad classification and some used minor ones. This will affect the calculation of product diversity. In the future, relevant measures of product diversification within the buyer-supplier context will be in need of exploring causal relationships between the product diversification and the firm's performance.

Finally, the current research may also suffer all limitations associated with single country and single industry category analysis. As diversification is a dominant strategy of operation in many industries, such as textile, chemical, and shoemaking, future research can extend our conceptualization to other industries. Looking closely at industry heterogeneity may provide more insights regarding different configurations of competence-based management within the context of product and international diversification. In other words, future research that applies the current logic to other industries may prove to be fruitful in identifying both opportunities and constraints for forms of diversification and performance relationship, which will provide a significant implication for a firm's strategy formulation.

6. Conclusion

Providing cost-competitive contractual manufacturing services for their western buyers has been a major source of business growth for firms in many emerging economies. A major concern for firms in these economies is how to sustain competitive advantage in such buyer-supplier relationship. This study based on Taiwanese contractual manufacturers shows that a successful profit formula may be based on competence leveraging through corporate diversification and competence building or upgrading from contractual manufacturing business to own-brand business.

For a contractual manufacturer to provide subcontracting services, a high level of product diversity in the product portfolio produces high economic returns. Similarly, a high degree of customer diversity will simultaneously produce high returns. Alternatively speaking, focusing on competence leveraging in product diversification together with high level of customer diversity in international diversification does guarantee that contract electronics manufacturers can achieve high returns. In this regard, providing contract manufacturing services and extending these services to several major buyers may offer contractual manufacturers an opportunity to learn more advance products or process competence and increased economic returns.

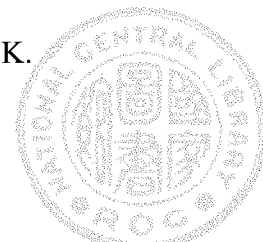
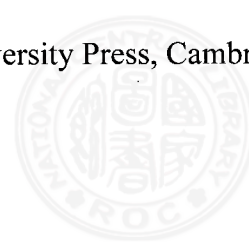
Meanwhile, while preliminary at best, using a competence-based perspective in exploring the logic of corporate diversification has proved to be fruitful together with cross-border management in explaining contractual manufacturing model in buyer-supplier linkage. Despite the room for further improvement, we hope this investigation provides a helpful theoretical framework to explain how a firm manages its corporate diversification and maintains a balance growth path based on the interplay between competence leveraging and building.

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